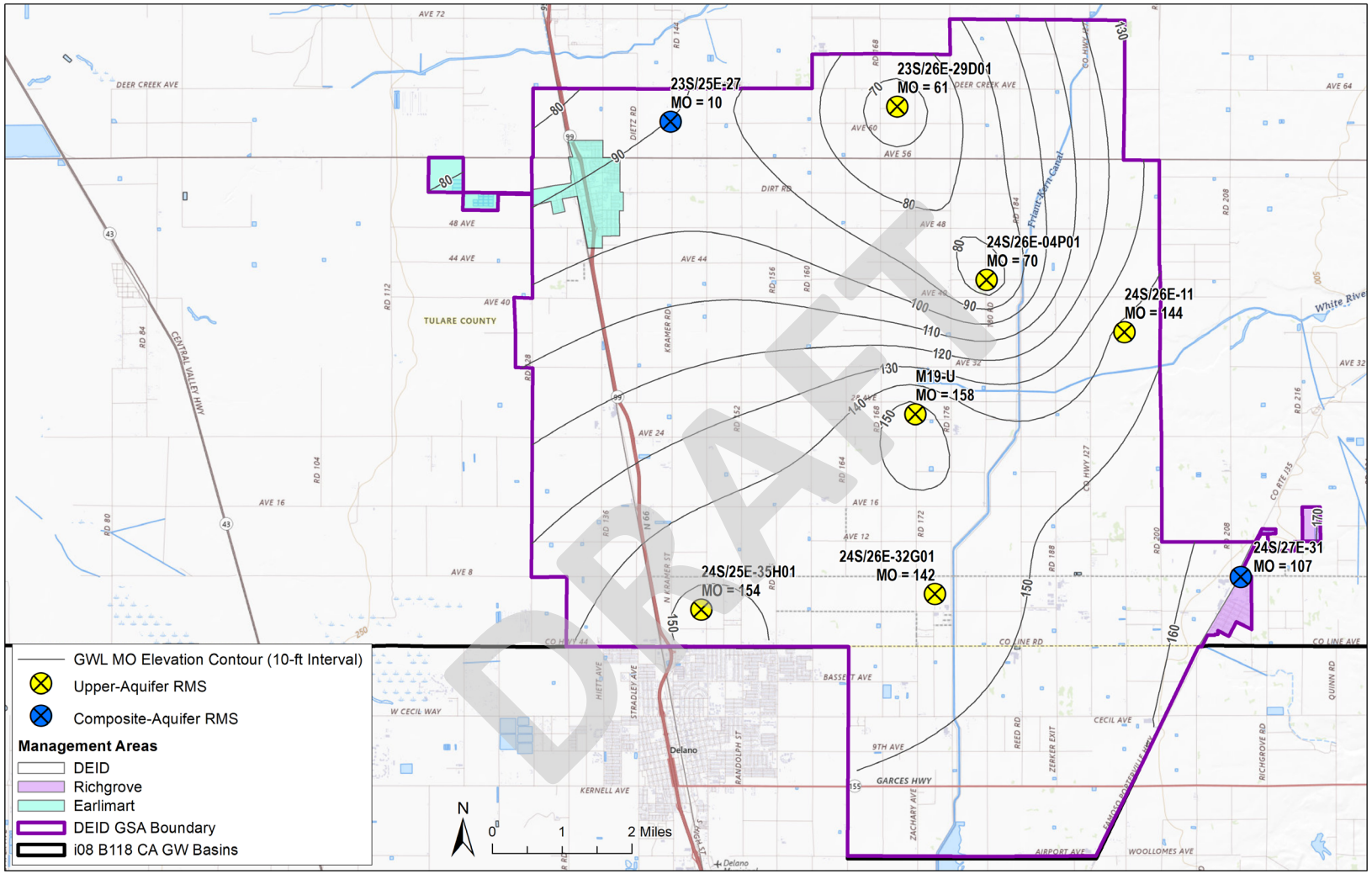


Figure 3-9: Map of Upper Aquifer Groundwater Level MOs

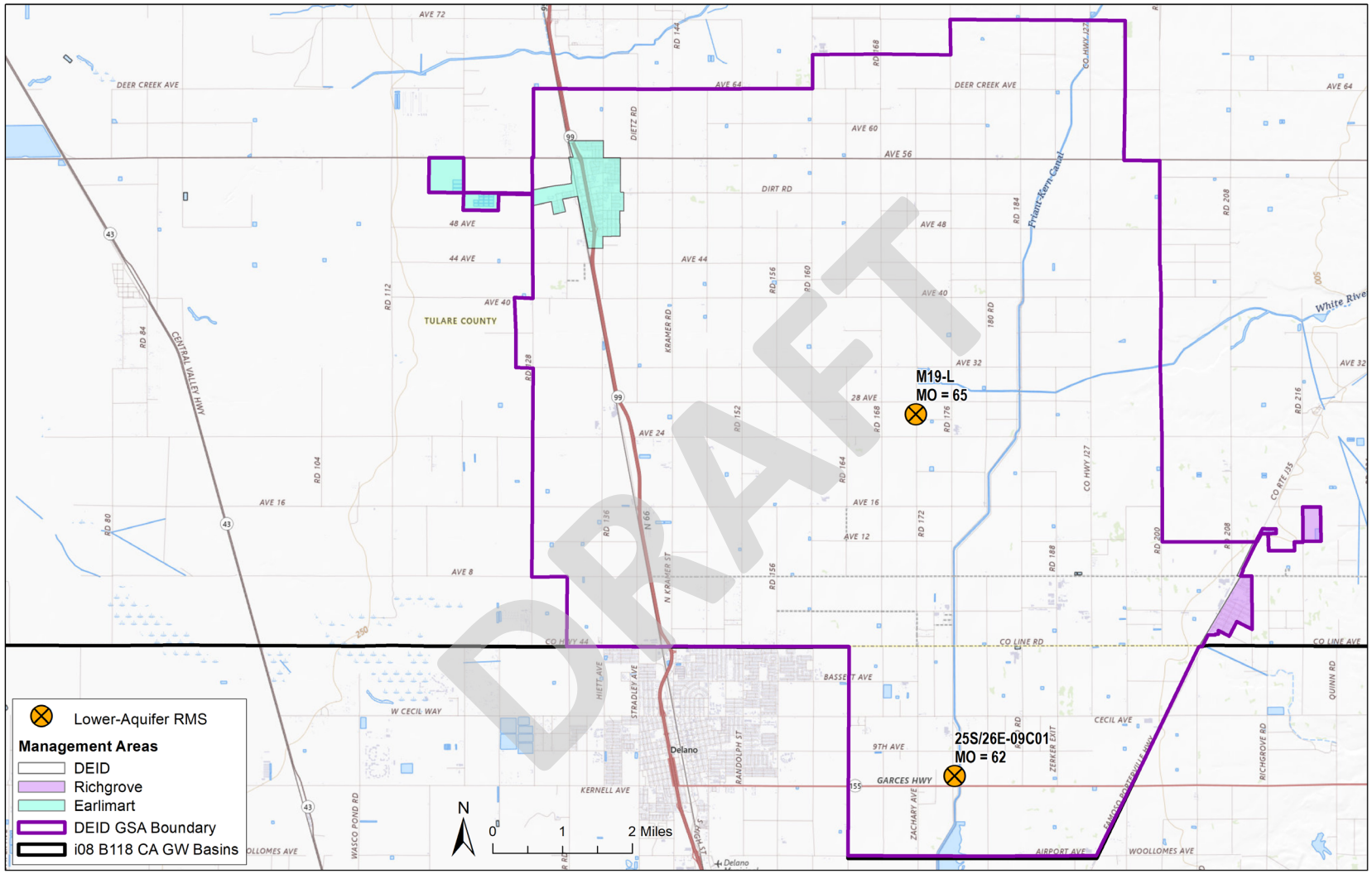


Figure 3-10: Map of Lower Aquifer Groundwater Level MOs

The interim milestones (IMs) for the upper aquifer represent target groundwater levels at the RMS to demonstrate progress towards the MOs and are based on incrementally (net) increasing groundwater level changes over time based on the following:

- 2025 IM– for the upper aquifer, the 2025 IM is set to be equal to the MT.
- 2030 IM – elevation at two-thirds of the elevation difference between the 2025 interim milestone and the MO
- 2035 IM – elevation at two-thirds of the elevation difference between the 2030 interim milestone and the MO

For the lower aquifer, the MOs and IMs were set to be equal to the minimum thresholds since the process for establishing the SMC was dependent on the minimum thresholds established for the land subsidence sustainability indicator (see **SECTION 3.6.3** Minimum Thresholds).

Subsection 3.5.4.2 Operational Flexibility *[§354.30(c)]*

Operational flexibility can be deduced from the difference between the minimum threshold and the measurable objective. In the case of lower aquifer wells, there is no operational flexibility as a result of the no-tolerance policy for additional subsidence. Upper aquifer groundwater level SMC offer reasonable operational flexibility to account for naturally occurring seasonal and climactic changes in the water system.

Subsection 3.6 Land Subsidence SMC *[§354.28(c)(5)(A),(c)(5)(B)]*

§ 354.26. Undesirable Results

(a) Each Agency shall describe in its Plan the processes and criteria relied upon to define undesirable results applicable to the basin. Undesirable results occur when significant and unreasonable effects for any of the sustainability indicators are caused by groundwater conditions occurring throughout the basin.

(b) The description of undesirable results shall include the following:

(1) The cause of groundwater conditions occurring throughout the basin that would lead to or has led to undesirable results based on information described in the basin setting, and other data or models as appropriate.

(2) The criteria used to define when and where the effects of the groundwater conditions cause undesirable results for each applicable sustainability indicator. The criteria shall be based on a quantitative description of the combination of minimum threshold exceedances that cause significant and unreasonable effects in the basin.

(3) Potential effects on the beneficial uses and users of groundwater, on land uses and property interests, and other potential effects that may occur or are occurring from undesirable results.

(c) The Agency may need to evaluate multiple minimum thresholds to determine whether an undesirable result is occurring in the basin. The determination that undesirable results are occurring may depend upon measurements from multiple monitoring sites, rather than a single monitoring site.

(d) An Agency that is able to demonstrate that undesirable results related to one or more sustainability indicators are not present and are not likely to occur in a basin shall not be required to establish criteria for undesirable results related to those sustainability indicators.

As stated throughout this Plan, land subsidence occurring in the Tule Subbasin has impacted and elevates the risk of near-future impacts on critical infrastructure within DEID GSA. Therefore, DEID GSA has established a zero-tolerance policy for additional subsidence.

DEID GSA is a net recharger, has not overdrafted since the 1950s, and avoids inducing land subsidence through use of DEID's class 1 and class 2 CVP surface water supplies. However, as described in Section 2, the groundwater overdraft of neighboring GSAs has induced subsidence within DEID GSA and along the FKC, the main artery of DEID GSA's sustainability

Subsection 3.6.1 Land Surface Beneficial Uses and Users *[§354.26(b)(3)]*

The beneficial users, uses, and property interests that are susceptible to land subsidence impacts due to lower aquifer overdraft are listed in **Table 3-3** below.

Table 3-3: Summary of Beneficial Uses and Users (Critical Infrastructure) Potentially Impacted by Land Subsidence

Infrastructure / Beneficial Use	Significant & Unreasonable Impact
Flood Control	Capacity loss from reduced land slope leading to increased risk of flooding
Friant-Kern Canal	Capacity loss from reduced canal slope and cracks
Local Canals	Capacity loss from reduced canal slope and cracks
Gravity Pipelines (Including DEID's extensive pipeline network)	Capacity loss from reduced pipeline slope or failure from overpressure
Supply Wells	Collapse of deep wells that prevents use and requires repair or replacement
Roads and Bridges	Uneven settlement that requires repairs or replacement
Electrical Power Lines	Stretch or harm
Sanitary Sewers	Cracks or loss of capacity
Gas and Water Pipelines	Cracks or loss of capacity
Railroad Tracks	Uneven settlement that requires repairs or replacement

Subsection 3.6.2 Land Subsidence Undesirable Results

As depicted in **Figure 3-1**, defining beneficial users, significant and unreasonable effects, and URs are critical first steps to establishing effective SMC.

Subsection 3.6.2.1 Significant and Unreasonable Land Subsidence

The definition of significant and unreasonable impacts in the Tule Subbasin is defined as the tipping point at which groundwater conditions across the Tule Subbasin cause impacts to beneficial users, uses, and property interests that cannot be sustained or mitigated.

In the case of subsidence in the Tule Subbasin, the mitigation costs for any impact on the most vulnerable infrastructure (FKC and DEID GSA's pipeline distribution system) exceeds the responsible parties' existing mitigation budgets. Therefore, groundwater levels cannot be sustained or mitigated by the responsible parties, indicating that any additional subsidence would induce significant and unreasonable effects.

It is important to restate that DEID GSA does not contribute to land subsidence. The ability to achieve the SMC herein, and the mitigation responsibilities fall within the overdrafting parties surrounding DEID GSA. DEID GSA will continue to share data, analyses, and findings with these parties to support a sustainable future for the Tule Subbasin and inform necessary changes in demand management policies, protective SMC, and sufficient mitigation program design and implementation.

Subsection 3.6.2.1.1 Most Vulnerable Beneficial Uses and Users

The most vulnerable user to land subsidence-related impacts within DEID GSA is DEID itself, as the pipeline distribution system can tolerate zero additional subsidence. This pipeline distribution system is vital for DEID GSA's ability to maintain sustainability for agriculture, communities, domestic households, and other beneficial users who rely on DEID's surface water supplies and/or use in lieu of groundwater to secure sustainability.

In addition to the pipeline distribution system, the FKC has lost significant capacity since the start of the Middle Reach Capacity Correction Project. Land subsidence has contributed to reduced conveyance below the design capacity for several portions of the canal. DEID GSA relies on the FKC as the surface water conveyance source for continued sustainability. Any drop in capacity directly impacts DEID's surface water users and indirectly impacts the groundwater-dependent communities in and around DEID GSA that rely on DEID's use of this surface water in lieu of groundwater and recharge at the Turnipseed Water Banking Facilities.

Subsection 3.6.2.2 Criteria for Defining Land Subsidence Undesirable Results

Because the critical infrastructure of the FKC and the DEID pipeline distribution system are at immediate risk of significant and unreasonable impacts, an UR is defined as **a single exceedance of an MT subsidence rate and cumulative subsidence (since 2020) at any RMS site (Table 3-1).**

Subsection 3.6.2.3 Potential Causes of Undesirable Results

Undesirable results associated with subsidence are caused by overpumping or reduced groundwater recharge during drought periods that lead to groundwater levels in the aquifer declining and remaining below previous water-level minimums in the clay units of the confined aquifers, whereby the effective stress exceeds the new maximum effective stress.

Subsidence impacts may occur in the Subbasin even if groundwater levels stabilize, as residual subsidence from past overdrafts can continue for many years after groundwater level decline slows or stops (Lees *et al*., 2022). Subsidence impacts may also occur due to continued pumping in neighboring subbasins, outside the jurisdiction of the Tule Subbasin.

In the case of DEID GSA, land subsidence is induced by groundwater overdraft of neighboring GSAs. See **Appendix A6** which details an attribution analysis. The results of this analysis concluded that DEID GSA's groundwater management is indeed sustainable and not contributing to overdraft. However, neighboring GSAs' overdraft is resulting in land subsidence within DEID GSA's boundary and impacting critical infrastructure (i.e., FKC) upstream of DEID GSA that beneficial users within the DEID GSA heavily depend on for sustainability.

Subsection 3.6.2.4 Effects on Beneficial Users and Land Uses

Potential effects on beneficial users include but are not limited to:

1. Reduction in surface water supply to meet demand and consequential increased use of groundwater supply
2. Increased critical infrastructure operational costs
3. Increased critical infrastructure maintenance costs
4. New repair costs for critical infrastructure
5. Loss of individual groundwater supply due to well damage
6. Reduction in recharge volume due to conveyance capacity impediments

Subsection 3.6.3 Land Subsidence Minimum Thresholds

§354.28 Minimum Thresholds.

(c) *Minimum thresholds for each sustainability indicator shall be defined as follows:*

(5) *Land Subsidence. The minimum threshold for land subsidence shall be the rate and extent of subsidence that substantially interferes with the surface land uses and may lead to undesirable results. Minimum thresholds for land subsidence shall be supported by the following:*

- *Identification of land uses and property interests that have been affected or are likely to be affected by land subsidence in the basin, including an explanation of how the Agency has determined and considered those uses and interests, and the Agency's rationale for establishing minimum thresholds in light of those effects.*
- *Maps and graphs showing the extent and rate of land subsidence in the basin that defines the minimum threshold and measurable objectives.*

Subsidence minimum thesholds (and the corresponding minimum threshold rate) are reflective of DEID GSA's no-tolerance policy for additional land subsidence. The quantifiable minimum thresholds are summarized in **Table 3-4** and shown on **Figure 3-11.**

Table 3-4: Land Subsidence Minimum Thresholds by RMS Location

RMS ID	Management Area	GPS Coordinates		2020 Baseline Elevation	Minimum Threshold Elevation (2023)	Cumulative Subsidence MT (2020-2040)	Subsidence MT Rate (post-2024)
		Latitude	Longitude	(ft amsl)	(ft amsl)	(ft)	(ft per year)
D0012_B_RMS	DEID	35.862818	-119.285763	267.1	266.06	1.1	0
D0030_B_RMS	Earlimart	35.891982	-119.268016	272.8	271.89	0.9	0
D0031_B_RMS	DEID	35.833956	-119.255191	296.7	295.86	0.8	0
D0032_B_RMS	DEID	35.79103	-119.24428	316.7	316.44	0.3	0
D0033_B_RMS	DEID	35.849263	-119.196881	366.1	365.66	0.5	0
D0034_B_RMS	DEID	35.891666	-119.196996	340.8	339.61	1.2	0
D0073_G_FKC	DEID	35.892022	-119.151852	406.2	405.55	0.7	0
D0074_B_FKC	DEID	35.877256	-119.143982	415.5	415.06	0.5	0
D0075_B_FKC	DEID	35.86335	-119.162	403.2	402.72	0.5	0
D0076_B_FKC	DEID	35.84863	-119.150061	408.9	408.2	0.7	0
D0077_B_FKC	DEID	35.834073	-119.161183	401.9	401.51	0.4	0
D0078_B_FKC	DEID	35.819486	-119.168215	406.1	405.87	0.2	0
D0079_G_FKC	DEID	35.805073	-119.178585	407.1	406.99	0.1	0
D0080_B_FKC	DEID	35.80553	-119.157965	433.1	432.94	0.1	0
D0081_B_FKC	DEID	35.805089	-119.180813	399.5	399.42	0.1	0
D0082_B_FKC	DEID	35.790221	-119.169645	423.4	423.43	0.0	0
D0083_B_FKC	DEID	35.769064	-119.165418	419.5	419.53	0.0	0
D0084_B_FKC	DEID	35.747001	-119.182358	407.3	406.94	0.4	0
D0089_B_RMS	Richgrove	35.805288	-119.105225	498.2	498.19	0.0	0

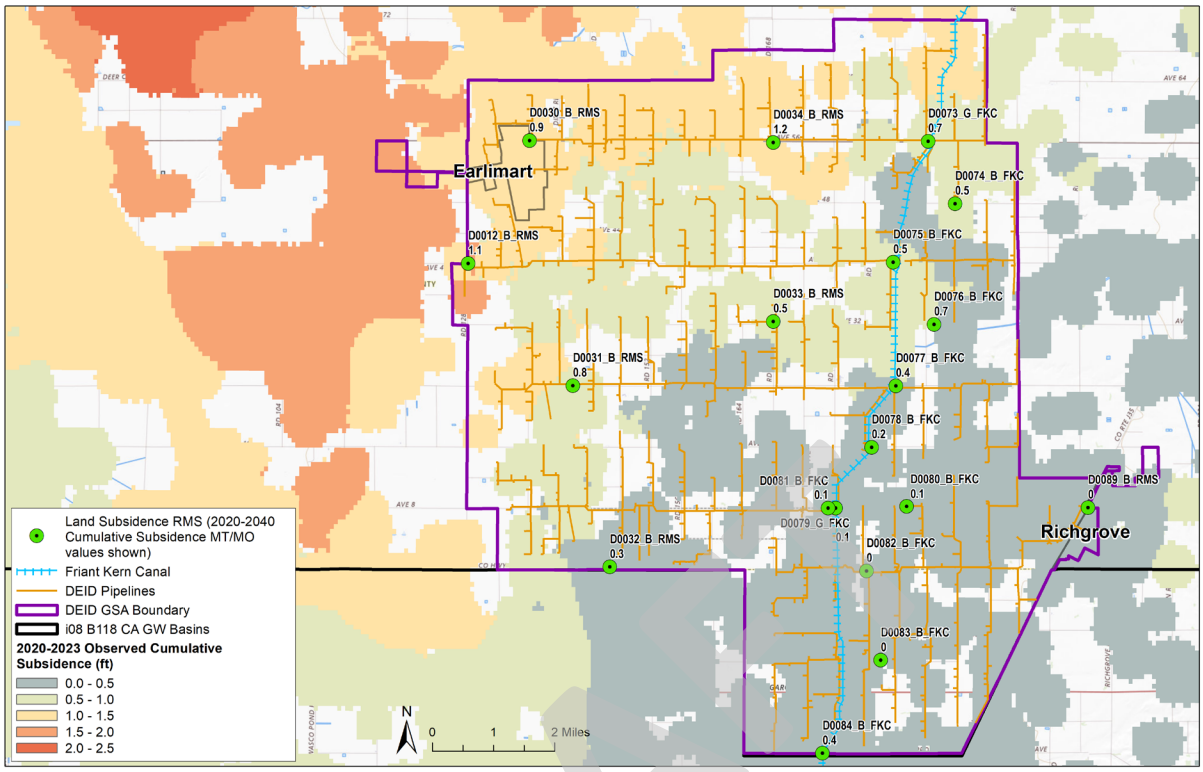


Figure 3-11: Map of Land Subsidence RMS with MTs and MOs

The minimum thresholds of zero subsidence at these RMSs represent conditions that, if experienced, could generate significant and unreasonable conditions that could lead to undesirable results.

Subsection 3.6.3.1 Information and Methodology Used to Establish Minimum Thresholds

The minimum thresholds for each RMS associated with the Land Subsidence sustainability indicator have been quantified using the same data set described in **Section 3.5.1.4** of this Plan.

Process for Determining Minimum Threshold

The following four steps detail the process for setting the minimum threshold at each RMS.

Step 1: Utilize each RMS well location based on the process for establishing the interim milestones and measurable objective.

Step 2*: Extract the projected land subsidence (from 2020-2040) from the GFM "transitional pumping" scenario.

Step 3: Subtract the maximum forecasted land subsidence from the baseline 2020 ground surface elevation (see **Appendix A-6**) at each RMS location to quantify the minimum threshold.

Establish the minimum threshold for land subsidence for the entire plan implementation period as a single value below the interim milestones and measurable objective. The

difference between the interim milestones and measurable objective is the operational flexibility established at each RMS.

Step 4:** Compare the minimum threshold value to estimates of tolerable subsidence for surface land uses and critical infrastructure such as the FKC and DEID pipelines (see **Appendix A-6** in this GSP). If necessary, adjust interim milestones and measurable objective values to avoid undesirable results or provide appropriate mitigation.

*Step 2 describes the process for establishing land subsidence minimum thresholds at RMS locations that DEID GSA will utilize to quantify this GSP's effectiveness for reaching its sustainability goal and incorporates projects and management actions proposed by all GSAs in the Tule Subbasin. This includes the neighboring GSAs' use of the Transitional Pumping Penalty Program, which applies fees, increased monitoring, and other actions to landowners who pump in excess of their pro-rata share of the sustainable yield. This policy allows overdraft pumping at a fee that is intended to fund mitigation of the Friant-Kern Canal induced by overpumping in these participating GSAs.

Step 4 describes the process for evaluating potential adverse conditions from land subsidence on beneficial uses and users for high-priority land uses and low-priority land uses as described in the Tule Subbasin Coordination Agreement (Appendix A)**. High-priority land uses are those that are potentially impacted by regional land subsidence regardless of if there is differential land subsidence. Low-priority land uses are not typically impacted by regional land subsidence but are susceptible to differential land subsidence if it occurs.

The potential for adverse conditions from land subsidence on the high-priority land use of the DEID distribution pipelines was also evaluated by DEID independently of the Coordination Agreement technical analysis (**Appendix A-6**). DEID's evaluation included a 2020 land survey of the pipeline elevation to calculate the hydraulic head within the pipe based on the hydraulic grade line (HGL) along the gravity-fed pipeline laterals starting at the FKC (**Appendix O)**. The as-built pressure class (based on pipe size and material) along each pipeline lateral varies with distance from the canal. The hydraulic head at each pipe segment was compared to the respective pressure class under static (zero flow) conditions to evaluate the pipeline's susceptibility to damage. If the hydraulic head (pressure) at any location along the pipeline meets or exceeds the respective pressure class for the pipe, the pipe design may fail.

The independent pipeline subsidence evaluation indicates that subsidence since 2015 has increased the amount of pipelines to have their pressure rating exceeded. The risk due to pipe pressures exceeding the pipe pressure classification is pipeline failure, which will not only impact DEID and its customers but may create regional public health and safety problems.

For the FKC, the land subsidence minimum thresholds were compared to the tolerable subsidence provided for the parallel canal design, which varies along its length to accommodate the varying levels of subsidence as provided in **Table 3-5.** The parallel canal will be built to convey full design capacity, and enough freeboard will be added to maintain the design capacity through 2070 provided the future subsidence is less than the design criteria. The highlighted rows are located within the DEID GSA and indicate that 1 to 4 ft of future subsidence is designed into the parallel canal design (Stantec Pers. Comm. Matt Carpenter, June 9, 2022).

Table 3-5: Future Subsidence Design Tolerance for Middle Reach of New Parallel Canal and Existing Canal Raise

Middle Reach Segment	Action	Sta	Sta	Future Subsidence Designed Into Bank and Lining Heights (feet)
Future Phase – 5th Ave Check to Tule River Check	Raise Existing Canal Lining	4774+20	5166+36	Raise Existing Canal Lining by 15" to 24"
Future Phase - Tule River Check to Ave 136	New Parallel Canal	5171+35	5294+00	1
Phase 1 – Ave 136 to Ave 108	New Parallel Canal	5294+00	5502+00	2
Phase 1 – Ave 108 to upstream of Rd 208	New Parallel Canal	5502+00	5621+00	5
Phase 1 –upstream Rd 208 to upstream Ave 56	New Parallel Canal	5621+00	5885+00	4
Future Phase – upstream of Ave 56 to upstream of Ave 32	New Parallel Canal	5885+00	6034+00	3
Future Phase – upstream of Ave 32 to upstream of Ave 24	New Parallel Canal	6034+00	6100+00	2
Future Phase – upstream of Ave 24 to Ave 16	New Parallel Canal	6100+00	6180+46	1
Future Phase – Ave 16 to Lake Woollomes	Raise Existing Canal Lining	6181+82	6430+00	Raise Existing Canal Lining by 25" to 44"

Subsection 3.6.3.2 Relationship between Individual Minimum Thresholds and Relationship to Other Sustainability Indicators

Land subsidence is correlated with the chronic lowering of aquifer groundwater levels. Lower aquifer groundwater level SMCs are coupled with land subsidence SMC—both of which reflect DEID GSA's no-tolerance policy for additional land subsidence.

A relationship between the land subsidence MTs and water quality MTs has not been established. It is not anticipated that land subsidence will result in significant and unreasonable degradation of water quality. However, DEID GSA are coordinating with other local agencies, non-profit organizations, and landowners to monitor for any potential degradation of water quality due to subsidence. The no-tolerance of additional land subsidence policy should be protective of any groundwater quality degradation induced by compression of the aquitard.

Subsection 3.6.3.3 Effect of Minimum Thresholds on Neighboring Basins and Subbasins

DEID GSA's no-tolerance policy for land subsidence, reflected in the SMC, is more protective than neighboring GSAs and subbasins' policies.

Subsection 3.6.3.4 Effects on Beneficial Users and Land Uses

By establishing SMC protective of zero additional subsidence, all beneficial users, uses, and property interests are protected.

Subsection 3.6.3.5 Relevant Federal, State, or Local Standards

There are no federal, state, or local regulations related to subsidence.

Subsection 3.6.3.6 Method for Quantitative Measurement of Minimum Thresholds

DEID GSA will continue monitoring and reporting consistent with the land subsidence representative monitoring network described in Section 4. The results of these monitoring activities will be compared against SMC established for land subsidence and reported in the Annual Report, consistent with past years' reporting.

Subsection 3.6.4 Land Subsidence Measurable Objectives and Interim Milestones

The MO and IMs for land subsidence in DEID GSA are consistent with the MT—zero additional land subsidence. It is important to clarify that even if all groundwater extractions were halted in and surrounding the Tule Subbasin, additional (residual) subsidence would still occur.

DEID GSA has established stringent criteria even if it may not be feasible, as SGMA requires SMC to be based on the protection of beneficial users, uses, and property interests. The most vulnerable beneficial user susceptible to land subsidence impacts in DEID GSA are DEID landowners who rely on DEID's pipeline distribution system and Friant-Kern Canal's function to continue sustainable groundwater management.

The following four steps detail the process for setting interim milestones and the measurable objective at individual RMS locations.

Step 1: Locate the RMS defined in the Tule Subbasin Monitoring Plan (**Appendix A-1**).

Step 2*: Extract the projected (from 2020-2040) land subsidence from the GFM "safe yield" scenario at each RMS location.

Step 3: Subtract the projected land subsidence from the baseline 2020 ground surface elevation at each RMS location for the period 2020-2040 to quantify numerically the interim milestones (2025, 2030, and 2035) and the measurable objective value in 2040.

Step 4:** Compare the interim milestones and measurable objective value to estimates of tolerable subsidence for surface land uses and critical infrastructure such as the FKC and DEID pipelines. If necessary, adjust interim milestones and measurable objective values to avoid URs or provide appropriate mitigation.

*Step 2 describes the process for establishing land subsidence interim milestones and measurable objectives at RMS locations that DEID GSA will utilize to quantify this GSP's effectiveness for reaching its sustainability goal and incorporates projects and management actions starting in 2020 proposed by all GSAs in the Tule Subbasin, specifically under the scenario all GSAs in the Subbasin operate sustainably (i.e., "safe yield" conditions—absence of transitional pumping) in addition to including Management Action #4 (Increase In-District Recharge/Banking Operations; see **Subsection 5.2.1.4**).

Step 4 describes the process for evaluating potential adverse conditions from land subsidence on beneficial uses and users for high-priority land uses and low-priority land uses as described in the Tule Subbasin Coordination Agreement (see **Appendix A). High-priority land uses are those that are potentially impacted by regional land subsidence regardless of whether there is differential land subsidence. Low-priority land uses are not typically impacted by regional land subsidence but are susceptible to differential land subsidence.

Table 3-6: Subsidence Measurable Objective and Interim Milestones

RMS ID	Baseline *GSE (ft amsl)* 2020	Interim Milestone *Ground Surface Elevation (ft amsl))* 2025 Safe Yield	2030 Safe Yield	2035 Safe Yield	Meas. Obj. *GSE (ft amsl)* 2040 Safe Yield
D0012_B_RMS	267.11	266.06	266.06	266.06	266.06
D0030_B_RMS	272.80	271.89	271.89	271.89	271.89
D0031_B_RMS	296.69	295.86	295.86	295.86	295.86
D0032_B_RMS	316.74	316.44	316.44	316.44	316.44
D0033_B_RMS	366.12	365.66	365.66	365.66	365.66
D0034_B_RMS	340.83	339.61	339.61	339.61	339.61
D0073_G_FKC	406.23	405.55	405.55	405.55	405.55
D0074_B_FKC	415.51	415.06	415.06	415.06	415.06
D0075_B_FKC	403.21	402.72	402.72	402.72	402.72
D0076_B_FKC	408.89	408.20	408.2	408.2	408.2
D0077_B_FKC	401.91	401.51	401.51	401.51	401.51
D0078_B_FKC	406.07	405.87	405.87	405.87	405.87
D0079_G_FKC	407.12	406.99	406.99	406.99	406.99
D0080_B_FKC	433.09	432.94	432.94	432.94	432.94
D0081_B_FKC	399.50	399.42	399.42	399.42	399.42
D0082_B_FKC	423.44	423.43	423.43	423.43	423.43
D0083_B_FKC	419.51	419.53	419.53	419.53	419.53
D0084_B_FKC	407.29	406.94	406.94	406.94	406.94
D0089_B_RMS	498.22	498.19	498.19	498.19	498.19

Notes: A rate of subsidence is not calculated for the interim milestones and the measurable objective as the GFM land subsidence results indicate that subsidence is abated under this scenario; however, additional work is required to determine the potential for residual subsidence in the Tule Subbasin. The values above for the Safe Yield are assuming zero additional subsidence for the DEID GSA and are the fall 2023 elevations at each RMS site, which are the most current available elevations.

The "safe yield" GFM land subsidence results indicate no subsidence at the RMS locations due to the substantial increase in groundwater levels within the DEID GSA boundary under the "safe yield" conditions—absence of transitional pumping. This provides conservative interim milestones and measurable objectives for the GSP and is reasonable due to the planned increased recharge at the Turnipseed water banking facilities and decreased pumping within portions of the DEID GSA and throughout the Tule Subbasin over the GSP implementation period. An uncertainty identified with the GFM is the exclusion of residual subsidence, which is a phenomenon known to occur in areas that have experienced long term subsidence while groundwater levels have ceased declining (Lees et al., 2022). The GFM simulates no subsidence under the safe yield scenario, when it is likely that residual subsidence may occur for multiple years after water levels recover. The interim milestones and

measurable objectives will be reevaluated following each monitoring event and addressed in subsequent GSP updates.

Subsection 3.7 Reduction in Groundwater Storage SMC

Pursuant to GSP Emergency Regulations §354.28(d), groundwater levels may be used as a proxy for other sustainability indicators if a significant correlation between chronic lowering of groundwater levels and the reduction in groundwater storage SMC [§354.28(c)(4)]

Subsection 3.7.1 Use of Chronic Lowering of Groundwater Levels SMC as a Proxy for Reduction in Groundwater Storage SMC *[§354.28(c)(4)]*

> **§ 354.28. Minimum Thresholds**.
>
> **(d)** *An Agency may establish a representative minimum threshold for groundwater elevation to serve as the value for multiple sustainability indicators, where the Agency can demonstrate that the representative value is a reasonable proxy for multiple individual minimum thresholds as supported* by

The SMC, including UR, MT, MO, and IM for the reduction of groundwater storage is established as the same values and with the same protection of beneficial users, uses, and property interests as groundwater levels. See **Subsection 3.5** for rationale, methodology, and SMC definitions that apply to both the chronic lowering of groundwater levels and reduction in groundwater storage.

Appendix A-4 validates the use of groundwater level SMC for groundwater storage.

Subsection 3.8 Degraded Groundwater Quality SMC

> ***§ 354.26. Undesirable Results***
>
> *(a) Each Agency shall describe in its Plan the processes and criteria relied upon to define undesirable results applicable to the basin. Undesirable results occur when significant and unreasonable effects for any of the sustainability indicators are caused by groundwater conditions occurring throughout the basin.*
>
> *(b) The description of undesirable results shall include the following:*
>
> *(1) The cause of groundwater conditions occurring throughout the basin that would lead to or has led to undesirable results based on information described in the basin setting, and other data or models as appropriate.*
>
> *(2) The criteria used to define when and where the effects of the groundwater conditions cause undesirable results for each applicable sustainability indicator. The criteria shall be based on a quantitative description of the combination of minimum threshold exceedances that cause significant and unreasonable effects in the basin.*
>
> *(3) Potential effects on the beneficial uses and users of groundwater, on land uses and property interests, and other potential effects that may occur or are occurring from undesirable results.*
>
> *(c) The Agency may need to evaluate multiple minimum thresholds to determine whether an undesirable result is occurring in the basin. The determination that undesirable results are occurring may depend upon measurements from multiple monitoring sites, rather than a single monitoring site.*
>
> *(d) An Agency that is able to demonstrate that undesirable results related to one or more sustainability indicators are not present and are not likely to occur in a basin shall not be required to establish criteria for undesirable results related to those sustainability indicators.*

In the case of DEID GSA, the constituents of concern present within the GSA are either legacy issues and/or have no evidence of groundwater management causing further degradation. However, more data and information is necessary to assess the relationship between groundwater management and quality. See **Section 4** for the groundwater quality data gaps and efforts being made to fill these gaps.

DEID GSA's existing representative monitoring network currently includes monitoring two community wells in Earlimart and Richgrove, which provide drinking water supplies for 85-90% of the residents in DEID GSA. To assess drinking water quality of the remaining 10-15%, a domestic drinking water well is included in the groundwater quality representative monitoring network and supplemental ILRP, CV-SALTS, and GAMA data are evaluated on an annual basis. DEID GSA currently monitors on an annual basis; however, may consider seasonal monitoring in the event groundwater quality degradation trends are identified during the annual evaluation.

To improve the understanding of the 10-15% of households that are sourced by domestic wells in DEID GSA, DEID GSA has added a new management action, "Well Registration Program," which is intended to gather existing data and information on well construction, groundwater levels, and groundwater quality from domestic wells in the GSA. This information will be used to fill this data gap and provide the necessary information to proactively manage water quality and notify households if their well is at risk of impacts. Any domestic well that experiences an impact induced by groundwater management if the impact occurred after January 1, 2015, can qualify for emergency drinking water (within 24-hours), interim supplies (tank and enrollment in a hauled water program within 72-hours), and long-term solutions, such as a contaminant treatment system, connection to a community well, deepening the well or pump, etc. More information on the DEID GSA Mitigation Program and the partnership with Self-Help Enterprises to administer the drinking water mitigation, translation, education, and outreach services will be available in the Mitigation Plan appendix of the revised GSP.

The interim milestones and measurable objective for the Groundwater Quality sustainability indicator have been quantified using groundwater quality data from the existing RMS wells which are monitored under separate groundwater quality regulatory programs, such as those wells monitored under the ILRP, CV-Salts Nitrate Control Program, GAMA, Geotracker, Envirostor, and those associated with Public Water Systems.

For more information on historic and current groundwater quality within DEID GSA, visit SUBSECTION 2.3.4**.** SGMA requires GSAs to monitor and manage groundwater quality impacts induced by groundwater management that occurred after SGMA was enacted on January 1, 2015. In the case of DEID GSA, the groundwater management activities that may influence concentration or migration changes for COCs are summarized tabularly and in description in Section 2.3.4.

Of the management activities that DEID GSA engages in, the activity that may influence groundwater quality is the significant recharge activities at the Turnipseed Water Bank Facilities (see **Figure 1-8** for a location of these facilities). It is assumed that the good quality surface water would be a positive influence on the underlying groundwater quality; however, more monitoring and data is needed to demonstrate this is the case. Currently, the relationship between surface water recharge and groundwater quality is limited in data and research and considered a data gap in DEID GSA. Therefore, the following new management actions are developed for multiple purposes, and one being to fill this data gap. Details of these management actions are available in **Section 6.**

1. DEID GSA Mitigation Plan
2. Well Registration Program
3. Groundwater Quality Data Gap Action Plan

Subsection 3.8.1 Degraded Groundwater Quality Beneficial Uses and Users

[§354.26(b)(3)]

The beneficial users, uses, and property interests that are susceptible to groundwater quality impacts are listed in **FIGURE 4-4**. The most vulnerable beneficial user includes domestic drinking water wells, because of the lack of resources and planning often available to domestic well users versus community and agricultural well users. In addition, the upper aquifer is more susceptible to anthropogenic contamination, such as from agricultural, industrial, commercial, and other activities. Domestic wells are often drilled in the upper aquifer, adding to their susceptibility.

The DEID GSA mitigation program awards emergency through long-term solutions for domestic well owners who have been impacted by groundwater management-induced groundwater quality degredation. More information on this is available in the Mitigation Plan, **Appendix A-7**.

Subsection 3.8.2 Degraded Groundwater Quality Undesirable Results

[§354.26(a),(b)(1),(b)(2),(b)(3)]

In the case of DEID GSA, the constituents of concern present within the GSA are either legacy issues and/or have no evidence of groundwater management causing further degradation. However, more data and information is necessary to assess the relationship between groundwater management and quality. See **Section 4** for the groundwater quality data gaps and efforts being made to fill these gaps.

Subsection 3.8.2.1 Significant and Unreasonable Land Subsidence

The definition of significant and unreasonable impacts in the Tule Subbasin is defined as the tipping point at which groundwater conditions across the Tule Subbasin cause impacts to beneficial users, uses, and property interests that cannot be sustained or mitigated.

Impacts may be deemed an undesirable result/significant and unreasonable if groundwater quality is adversely impacted by groundwater pumping and recharge projects and these impacts result in groundwater no longer being generally suitable for agricultural irrigation and/or domestic use and there are not sufficient funds and resources to fulfill mitigation for individual domestic wells affected.

Subsection 3.8.2.1.1 Most Vulnerable Beneficial Uses and Users

As stated in **Subsection 3.8.1**, domestic wells are the most vulnerable beneficial user susceptible to groundwater quality contamination. DEID GSA is in the process of expanding the representative monitoring network to improve the spatial density of groundwater quality and level monitoring at depths consistent with domestic wells within the GSA. See **Section 4** for more information on data gaps and the plan to fill them.

Subsection 3.8.2.2 Criteria for Defining Groundwater Quality Undesirable Results

An undesirable result is defined as **a single exceedance of an MT at any RMS site.**

This is because more data and information are needed to confirm if a minimum threshold exceedance was induced by groundwater management and if beneficial users are being impacted.

A single exceedance does not indicate the certain presence of undesirable results; however, it does initiate an exceedance policy in which the GSA performs additional monitoring, analyses, and land use investigations to evaluate if mitigation services are needed and can be awarded or if significant and unreasonable impacts are present.

Subsection 3.8.2.3 Potential Causes of Undesirable Results

Potential causes of groundwater quality contamination induced by groundwater management are summarized in **Table 3-7** below.

Subsection 3.8.2.4 Effects on Beneficial Users and Land Uses

Potential effects on beneficial users include but are not limited to:

- Loss of reliable drinking water supplies
- Inability to irrigate or support livestock due to impaired water quality
- Reduction in property values
- Increased need and cost for treatment

Table 3-7: Potential Causes of Groundwater Quality Contamination Induced by Groundwater Management Activities

Groundwater Management Activity	Potential Effect	Explanation of Activity in DEID GSA	DEID GSA's Current Strategy	DEID GSA's Next Steps
Upper Aquifer Groundwater Pumping	Migration of COCs via changes in head/slope. This can be induced by excessive localized pumping activities. DEID GSA has not overdrafted since the 1950s and access to surface water for irrigation is accessible across DEID; therefore, this is likely to be induced by neighboring allowable overdraft pumping.	DEID GSA is a net recharger to the Tule Subbasin, and balance upper aquifer groundwater extractions with water banking. Therefore, it is unlikely that DEID GSA's upper aquifer groundwater extractions may cause impacts. DEID GSA's groundwater levels in both aquifers are influenced by unsustainable pumping in neighboring GSAs, and DEID will continue to evaluate options.	There are three groundwater quality representative monitoring sites (RMS) within the DEID GSA. All three are monitored by the Tule Basin Management Zone and results are reviewed by DEID GSA on an annual basis. Two are located in and supply the communities of Earlimart and Richgrove, which represent approximately 80-90% of the population within DEID GSA. The other RMS is a private domestic well. All three of these sites' monitoring protocols and sustainable management criteria are informed by drinking water standards (including MCLs as the minimum thresholds).	DEID GSA is evaluating adding additional upper aquifer RMS that may be representative of domestic drinking water conditions.
Lower Aquifer Groundwater Pumping	Migration of COCs via changes in head/slope and release of COCs previously adsorbed to the Corcoran Clay (released via subsidence). This can be induced by excessive localized pumping activities. DEID GSA has not overdrafted since the 1950s and access to surface water for irrigation is accessible across DEID; therefore, this is likely to be induced by neighboring allowable overdraft pumping.	Much like the upper aquifer, DEID GSA does not extract groundwater in excess of what is replenished on the eastern edge of the Subbasin (edge of the Corcoran Clay). However, neighboring unsustainable groundwater management, especially in the areas east of DEID GSA where the Corcoran Clay's horizontal extent discontinues, have potential to impact the groundwater gradient, flow rates, and induce subsidence in areas west of the extractions.	There is one RMS that monitors the lower aquifer groundwater levels. The monitoring protocols and sustainable management criteria are informed by agricultural standards. Wells generally drilled in the lower aquifer are used for agricultural purposes because the cost of drilling this deep is impractical/unaffordable for domestic uses and the volume of water needed can be met by the upper aquifer for domestic uses.	DEID GSA is evaluating adding additional lower aquifer RMS and studying the different beneficial users that are drilled at different depths in the DEID GSA to expand on the current understanding of well uses by depth. DEID GSA is in the process of developing and implementing a Well Registration Program which is expected to provide the necessary information to pursue the beneficial use study.
Recharge Activities	Migration of groundwater contamination through increases in groundwater level head/slope.[1] This can be induced by recharged waters mobilizing and migrating legacy contamination embedded in the underlying vadose soils and groundwater.	DEID GSA recharges in the 944-acre Turnipseed Recharge Facility via reliable Class 1 and when available Class 2 Friant-Kern Canal water via DEID's CVP Contract. Groundwater recharge and storage is a significant element of DEID GSA's sustainability and resiliency strategy.	DEID GSA evaluates all available groundwater quality data near and within the flow path of DEID's recharge activities. However, no dedicated monitoring wells are installed to study this relationship. DEID GSA is prioritizing the efforts communicated under "next steps."	DEID GSA is nearing completion on Phase VI of the Turnipseed Recharge Facilities (Sep. 2024). DEID GSA is evaluating locations to install monitoring wells with the intent of studying the relationship between recharge activities and the underlying groundwater quality at different depths. This commitment is included as a management action in the 2nd Amended GSP.

[1]The surface water quality recharged is of better quality than the underlying aquifer; therefore, the potential effect of decreased groundwater quality through recharge of poorer quality water is not a potential effect within DEID GSA.
[2]MCL: Maximum Contaminant Level/Limit

Degraded Groundwater Quality Minimum Thresholds *[§354.28(b)(1),(2),(3)]*

§354.28 Minimum Thresholds.

(c) *Minimum thresholds for each sustainability indicator shall be defined as follows:*

(4) *Degraded Water Quality. The minimum threshold for degraded water quality shall be the degradation of water quality, including the migration of contaminant plumes that impair water supplies or other indicator of water quality as determined by the Agency that may lead to undesirable results. The minimum threshold shall be based on the number of supply wells, a volume of water, or a location of an isocontour that exceeds concentrations of constituents determined by the Agency to be of concern for the basin. In setting minimum thresholds for degraded water quality, the Agency shall consider local, state, and federal water quality standards applicable to the basin.*

Subsection 3.8.2.5 Information and Methodology Used to Establish Minimum Thresholds

The following three steps detail the process for setting minimum threshold values at individual RMS wells related to Groundwater Quality:

Step 1:

Locate the RMS defined in the Tule Subbasin Monitoring Plan (**Appendix A-1**), identify which portion of the aquifer it represents, and the associated COC to be monitored at the RMS based on beneficial uses and users of groundwater represented by the RMS (Agricultural or Drinking Water) as described below:

Drinking Water: The RMS well is within an urban management area or 1 mile of a public water system.

Agricultural: Greater than 50% of the pumping within the representative area is determined to be agricultural and there are no public water systems within a 1-mile radius.

Agricultural or drinking water COCs will be evaluated based on the established MCL or WQO by the DEID GSA. In the case of drinking water, the following Title 22 constituents will be monitored and for agricultural the following Basin Plan WQO and COCs as previously identified in.

Step 2:

Establish minimum thresholds at each Groundwater Quality RMS based on the regulatory limits set as part of the responsible regulatory programs that are applicable to the identified beneficial uses and users of groundwater represented by the RMS as shown in **Table 3-8**.

Table 3-8: Groundwater Quality Minimum Thresholds based on Existing Regulatory Standards

Constituent	Units	Minimum Threshold	
		Drinking Water Limits (MCL/SMCL)	Agricultural Water Quality Objective (WQOs)
Arsenic	ppb	10	N/A
Nitrate as N	ppm	10	N/A
Hexavalent Chromium	ppb	10	N/A
Dibromochloropropane (DBCP)	ppb	0.20	N/A
1,2,3-Trichloropropane (TCP)	ppt	5	N/A
Tetrachloroethene (PCE)	ppb	5	N/A
Chloride	ppm	500	106
Sodium	ppm	N/A	69
Total Dissolved Solids	ppm	1,000	450
Perchlorate	ppb	6	N/A

Overall Note: An exceedance of a minimum threshold for groundwater quality does not indicate that the impact is within SGMA or the GSA's authority to address. SGMA requires GSAs to be responsible for groundwater quality degradation induced by groundwater management, such as groundwater pumping and recharge activities. To assess the presence of significant and unreasonable impacts/undesirable result within the GSA's authority, the GSA may perform a causation analysis to determine if the impact had potential to be caused by changing groundwater levels, migration, introduction of new or increased concentrations of COCs or other mechanism induced by groundwater management.

Step 3:

Evaluate historical groundwater quality data for instances where SMC established at RMS wells have been historically exceeded. In those instances, SMC will not be set at the MCLs or WQOs, but rather the pre-SGMA implementation concentration. These RMS (listed below) will continue to be closely monitored to evaluate if further degradation is occurring at the RMS as a result of GSP implementation.

(Note that Point Source/Non-Point Source Discharges unrelated to groundwater recharge are not monitored under this Plan or regulated by the GSA and may trigger a minimum threshold).

The minimum thresholds for groundwater quality for each management area are summarized in **Table 3-9**.

Table 3-9: Groundwater Quality Minimum Thresholds for Areas with Repeated SMC Exceedances

RMS ID	Well Use	Management Area	Aquifer	COC Minimum Thresholds[9]				
				Conductivity	pH	Nitrate as N	Arsenic	Hexavalent Chromium
				(µm/cm)	*-*	*(mg/L)*	*(ppb)*	*(ppb)*
E0083349	Domestic Drinking Water	DEID	Upper	<708	>6.5, <8.3	<14	N/A	N/A
E0070434	Agricultural Irrigation	DEID	Upper	<700	>6.5, <8.3	<15	N/A	N/A
TCSD CCR	Community Drinking Water	Richgrove CSD	Lower	<900	>6.5, <8.5	<10	<10.5	<10
EPUD CCR	Community Drinking Water	Earlimart PUD	Lower	<900	>6.5, <8.5	<10	<10	<10

Overall Note: An exceedance of a minimum threshold for groundwater quality does not indicate that the impact is within SGMA or the GSA's authority to address. SGMA requires GSAs to be responsible for groundwater quality degradation induced by groundwater management, such as groundwater pumping and recharge activities. To assess the presence of significant and

unreasonable impacts/undesirable result within the GSA's authority, the GSA may perform a causation analysis to determine if the impact had potential to be caused by changing groundwater levels, migration, introduction of new or increased concentrations of COCs or other mechanism induced by groundwater management.

Subsection 3.8.2.5.1 Relationship for each Sustainability Indicator

At this point, there is no evidence of groundwater quality degradation induced by groundwater management within DEID GSA. However, groundwater quality is a data gap, particularly near recharge facilities and at domestic wells. DEID GSA is in the process of filling this data gap. More information is available in **Section 4**.

Further, it can be deduced that the protective SMC for groundwater levels and land subsidence would be protective of groundwater quality that may be related to those sustainability indicators.

Subsection 3.8.2.5.2 Selection of Minimum Thresholds to Avoid Undesirable Results

The MT is set at levels deemed protective by state and federal programs that specialize in water quality in the context of human health. MTs for groundwater quality serve as an action limit—in instances in which an exceedance is recorded, DEID GSA will investigate land use nearby, groundwater extractions, and other groundwater-management related activities within the vicinity of the exceeded well since 2015. In addition, the GSA will remind households of the Mitigation Program and resources available within to monitor and mitigate for groundwater quality.

Subsection 3.8.2.5.3 Impact of Minimum Thresholds on Water Uses and Users *[§354.28(b)(5)]*

MTs are established at drinking water standards. Drinking water standards are more stringent than agricultural or industrial standards. Therefore, the MTs are protective of all beneficial users, uses and property interests.

Subsection 3.8.2.5.4 Measurement of Minimum Thresholds *[§354.28(b)(6)]*

DEID GSA will continue to monitor groundwater quality consistent with the representative groundwater quality monitoring network, described in **Section 4**. Additional monitoring is being added to fill the domestic well and recharge influence data gap related to groundwater quality. As stated, see **Section 4** for more information on the plan to fill this data gap and **Section 6** for a description of these management actions.

Subsection 3.8.3 Measurable Objectives and Interim Milestones

[§354.30(a)(b)(c)(d)(e)(f)(g)]

§354.30 Measurable Objectives.

(h) *Each Agency shall establish measurable objectives, including interim milestones in increments of five years, to achieve the sustainability goal for the basin within 20 years of Plan implementation and to continue to sustainably manage the groundwater basin over the planning and implementation horizon.*

(i) *Measurable objectives shall be established for each sustainability indicator, based on quantitative values using the same metrics and monitoring sites as are used to define the minimum thresholds.*

(j) *Measurable objectives shall provide a reasonable margin of operational flexibility under adverse conditions which shall take into consideration components such as historical water budgets, seasonal and long-term trends, and periods of drought, and be commensurate with levels of uncertainty.*

(k) *An Agency may establish a representative measurable objective for groundwater elevation to serve as the value for multiple sustainability indicators where the Agency can demonstrate that the representative value is a reasonable proxy for multiple individual measurable objectives as supported by adequate evidence.*

(l) *Each Plan shall describe a reasonable path to achieve the sustainability goal for the basin within 20 years of Plan implementation, including a description of interim milestones for each relevant sustainability indicator, using the same metric as the measurable objective, in increments of five years. The description shall explain how the Plan is likely to maintain sustainable groundwater management over the planning and implementation horizon.*

(m) *Each Plan may include measurable objectives and interim milestones for additional Plan elements described in Water Code Section 10727.4 where the Agency determines such measures are appropriate for sustainable groundwater management in the basin.*

(n) *An Agency may establish measurable objectives that exceed the reasonable margin of operational flexibility for the purpose of improving overall conditions in the basin, but failure to achieve those objectives shall not be grounds for a finding of inadequacy of the Plan.*

Subsection 3.8.3.1 Methodology for Setting Measurable Objectives

The following four steps detail the process for setting interim milestones and the measurable objective at individual RMS related to Groundwater Quality:

Step 1:

Locate the RMS defined in the Tule Subbasin Monitoring Plan (see **Appendix A-1**), identify which portion of the aquifer it represents, and the associated constituents of concern (COCs) to be monitored based on beneficial uses and users of groundwater represented by the RMS (Agricultural or Drinking Water) as described below:

Drinking Water: The RMS well is within an urban management area or within 1 mile of a public water system.

Agricultural: Greater than 50% of the pumping within the representative area is determined to be agricultural and there are no public water systems within a 1-mile radius.

Agricultural or drinking water COCs will be evaluated based on the established maximum contaminant level (MCL) or water quality objectives (WQO) by the responsible regulatory agency. In the case of drinking water, Title 22 constituents will be monitored, and for agricultural water, Basin Plan WQOs and COCs will be monitored, as identified in **Table 3-10.**

Table 3-10: Constituents of Concern by Beneficial Uses and Users

Drinking Water	Agricultural
Arsenic	Nitrogen as N
Nitrate as N	Chloride
Hexavalent Chromium	Sodium
Dibromochloropropane (DBCP)	Total Dissolved Solids
1,2,3-Trichloropropane (TCP)	Perchlorate
Tetrachloroethene (PCE)	
Chloride	
Total Dissolved Solids	
Perchlorate	

Step 2:

Establish measurable objectives and interim milestones at each Groundwater Quality RMS based on 75% of the regulatory limits set as part of the responsible regulatory programs that are applicable to the identified beneficial uses and users of groundwater represented by the RMS as shown in **Table 3-11.**

Table 3-11: Interim Milestones & Measurable Objectives for Groundwater Quality

Constituent	Units	Interim Milestone & Measurable Objective	
		75% Drinking Water Limits (MCL/SMCL)	75% Agricultural Water Quality Objective (WQOs)
Arsenic	ppb	7.5	N/A
Nitrate as N	ppm	7.5	N/A
Hexavalent Chromium	ppb	7.5	N/A
Dibromochloropropane (DBCP)	ppb	0.15	N/A
1,2,3-Trichloropropane (TCP)	ppt	3.75	N/A
Tetrachloroethene (PCE)	ppb	3.75	N/A
Chloride	ppm	375	79.5
Sodium	ppm	N/A	51.75
Total Dissolved Solids	ppm	750	337.5
Perchlorate	ppb	4.5	N/A

Step 3:

Evaluate historical groundwater quality data for instances where SMC established at RMSs have been historically exceeded. In those instances, SMC will not be set at the MCLs or WQOs, but rather the pre-SGMA implementation concentration. These RMSs will be closely monitored to evaluate if further degradation is occurring at the RMS as a result of GSP implementation during the GSP planning and implementation horizon.

Under the terms of the cooperative agreements with the RCSD and EPUD, those agencies have an ongoing opportunity to propose minimum thresholds for additional constituents and determine whether additional changes to the monitoring network should be made to address water quality issues. DEID GSA will consider such proposals when made. In addition, the DEID GSA will collect water quality data from the public water systems as part of its monitoring efforts. The collected data will reflect what the public

water systems report to existing regulatory agencies and will be evaluated to determine if existing regulatory requirements are being met and if specific management actions would be warranted by the DEID GSA under its authority to manage groundwater. The DEID GSA will evaluate the water quality data in coordination with the public water systems to determine if groundwater pumping activities are contributing to significant and unreasonable effects related to degraded water quality.

(Note that Point Source/Non-Point Source Discharges unrelated to groundwater recharge are not monitored under this Plan or regulated by the Agency).

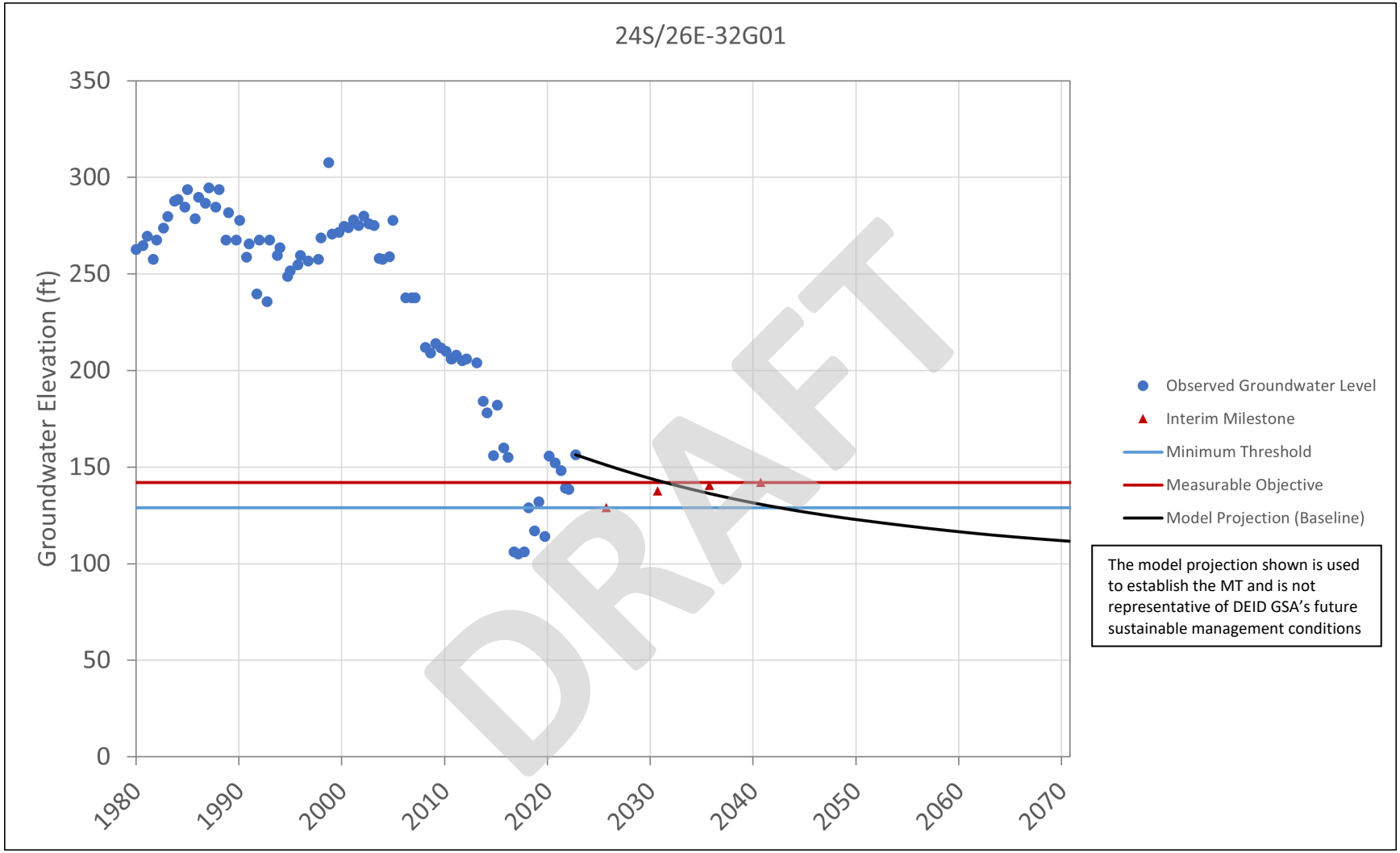
The DEID GSA acknowledges a data gap related to individual domestic well locations, elevations, and water quality. The DEID GSA will address this data gap in coordination with Tulare County, to the extent it is not addressed by any other water quality monitoring regulatory programs and agencies that are being coordinated with this GSP, such as the Tule Basin Management Zone. In addition to the Mitigation Program described in this Updated GSP (**Appendix A-7**), the GSA may consider additional management actions beyond those identified in **Section 5** of this GSP if specific data is developed that identifies water quality impacts during GSP implementation. Any such action should be in coordination with Tulare County, including the potential for the continuation by the County of existing programs for drought mitigation assistance implemented during the last major drought.

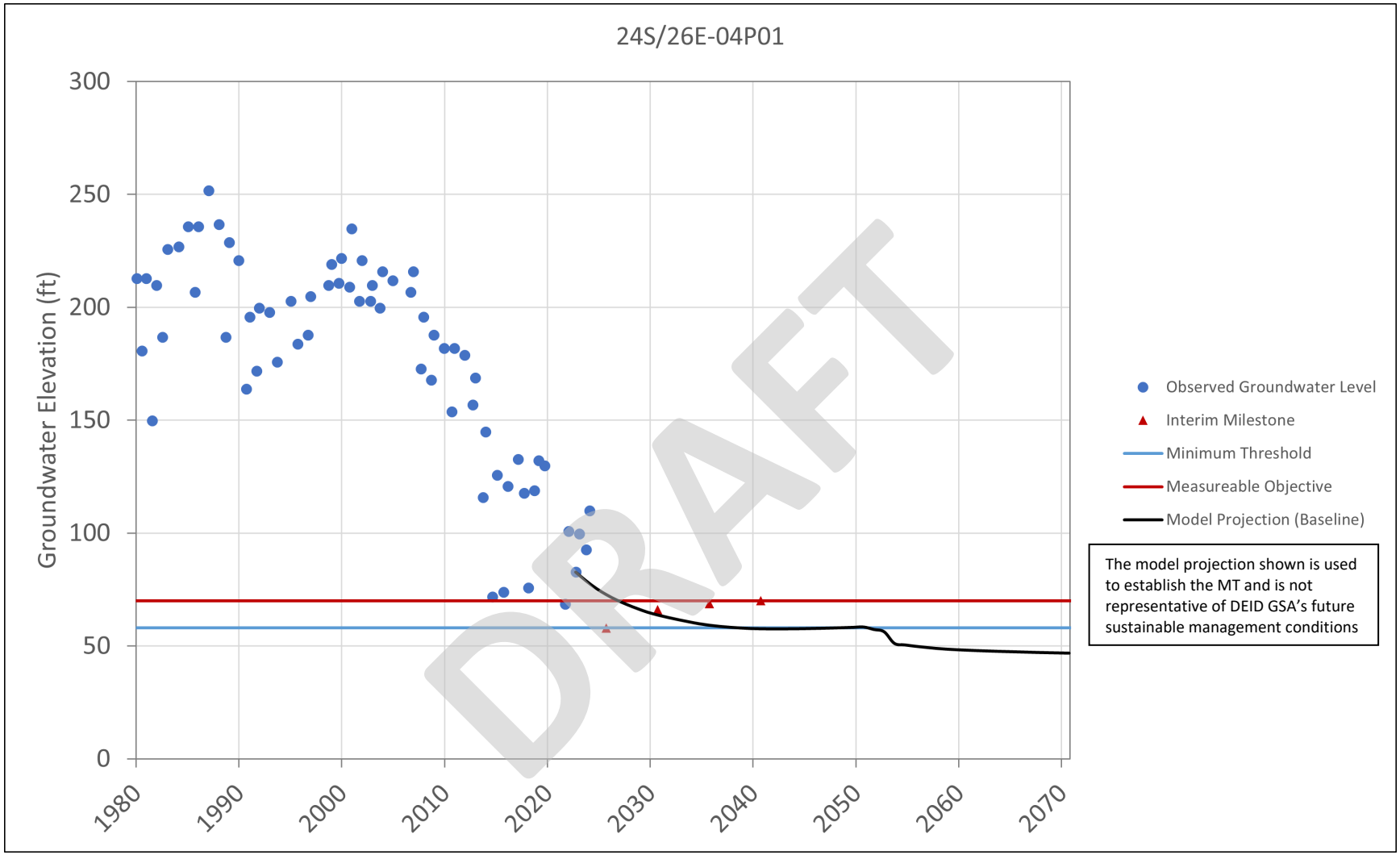
Table 3-12: Quality Interim Milestones and Measurable Objectives

RMS ID	Well Use	Management Area	Aquifer	COC Baseline Measurement 2018				
				Conductivity	pH	Nitrate as N	Arsenic	Hexavalent Chromium
				(µm/cm)	-	*(mg/L)*	*(ppb)*	*(µg/L)*
E0083349	Domestic Drinking Water	DEID	Upper	615	7.89	12	N/A	N/A
1095774	Agricultural Irrigation	DEID	Upper	588	7.93	13	N/A	N/A
Richgrove CSD CCR	Community Drinking Water	Richgrove	Lower	N/A	N/A	3.4	9.1	No Data
Earlimart PUD CCR	Community Drinking Water	Earlimart	N/A	N/A	N/A	3.47	4.0	8.65

RMS ID	COC Interim Milestone and Measurable Objectives																			
	Conductivity				pH				Nitrate as N				Arsenic				Hexavalent Chromium			
	(µm/cm)				-				*(mg/L)*				*(ppb)*				*(ppb)*			
	2025	2030	2035	2040	2025	2030	2035	2040	2025	2030	2035	2040	2025	2030	2035	2040	2025	2030	2035	2040
E0083349	680	680	680	680	>6.5, <8.3	>6.5, <8.3	>6.5, <8.3	>6.5, <8.3	<13.2	<13.2	<13.2	<13.2	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
1095774	<700	<700	<700	<700	>6.5, <8.3	>6.5, <8.3	>6.5, <8.3	>6.5, <8.3	<14.3	<14.3	<14.3	<14.3	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
RCSD CCR	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
EPUD CCR	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10

Exhibit 3-1: RMS Groundwater Level Hydrographs


24S/26E-32G01
Groundwater Elevation (ft)
350
300
250
200
150
100
50
0
1980
1990
2000
2010
2020
2030
2040
2050
2060
2070
Observed Groundwater Level
Interim Milestone
Minimum Threshold
Measurable Objective
Model Projection (Baseline)
The model projection shown is used to establish the MT and is not representative of DEID GSA's future sustainable management conditions
DRAFT


24S/26E-04P01
Groundwater Elevation (ft)
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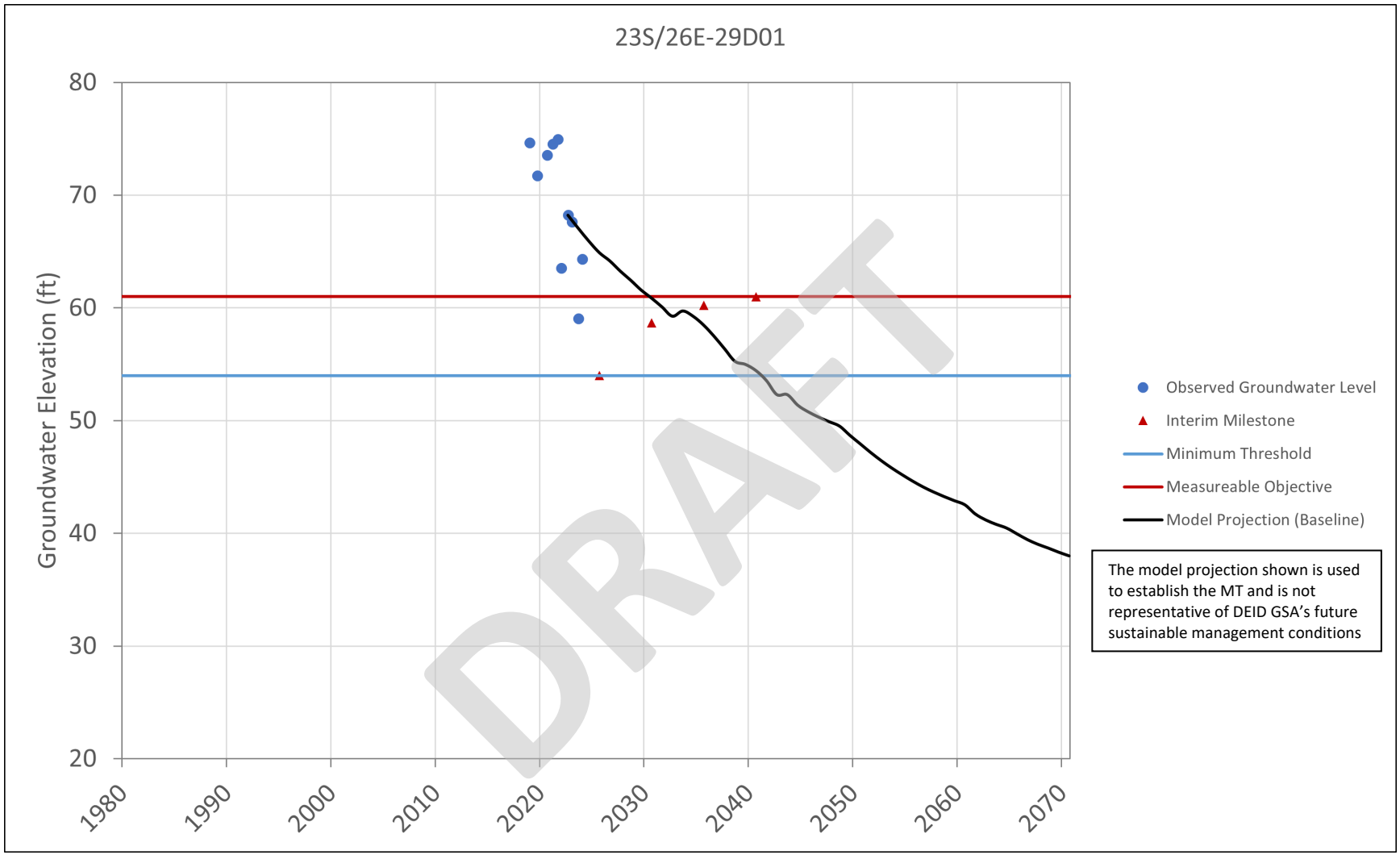
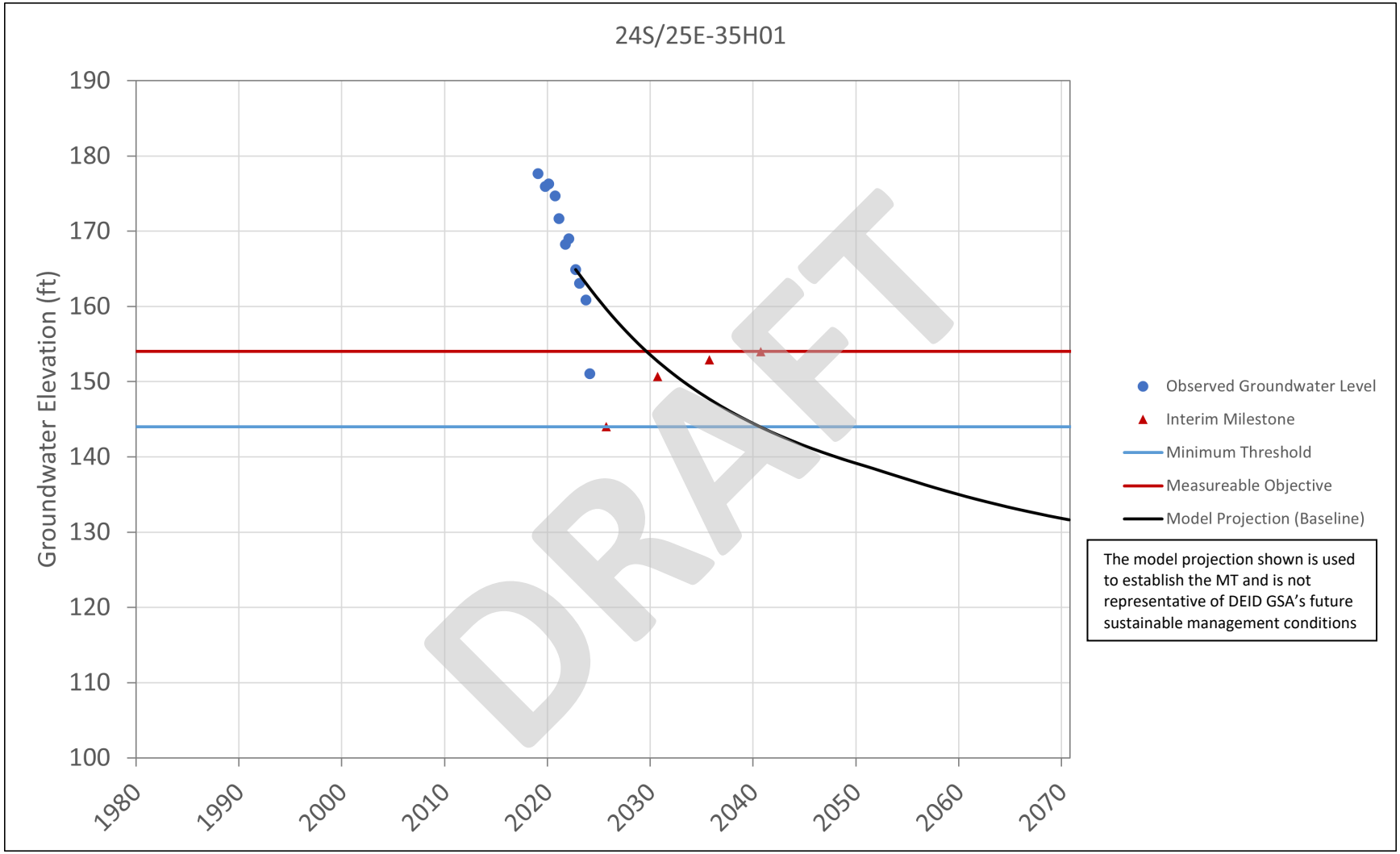
250
200
150
100
50
0
1980
1990
2000
2010
2020
2030
2040
2050
2060
2070
Observed Groundwater Level
Interim Milestone
Minimum Threshold
Measureable Objective
Model Projection (Baseline)
The model projection shown is used to establish the MT and is not representative of DEID GSA's future sustainable management conditions
DRAFT


23S/26E-29D01
Groundwater Elevation (ft)
80
70
60
50
40
30
20
1980
1990
2000
2010
2020
2030
2040
2050
2060
2070
Observed Groundwater Level
Interim Milestone
Minimum Threshold
Measureable Objective
Model Projection (Baseline)
The model projection shown is used to establish the MT and is not representative of DEID GSA's future sustainable management conditions
DRAFT


24S/25E-35H01
Groundwater Elevation (ft)
190
180
170
160
150
140
130
120
110
100
1980
1990
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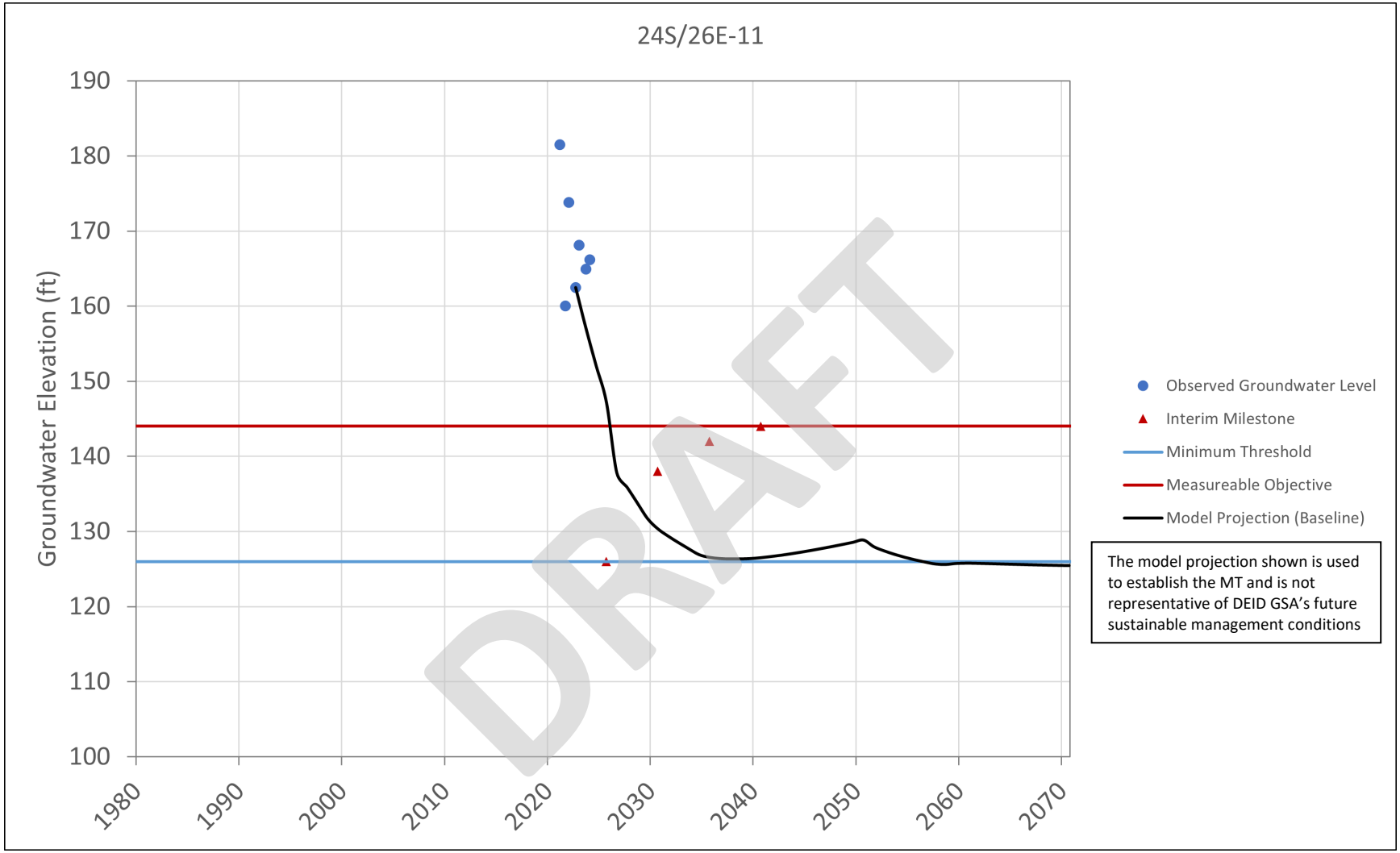
2010
2020
2030
2040
2050
2060
2070
Observed Groundwater Level
Interim Milestone
Minimum Threshold
Measureable Objective
Model Projection (Baseline)
The model projection shown is used to establish the MT and is not representative of DEID GSA's future sustainable management conditions
DRAFT


24S/26E-11
Groundwater Elevation (ft)
190
180
170
160
150
140
130
120
110
100
1980
1990
2000
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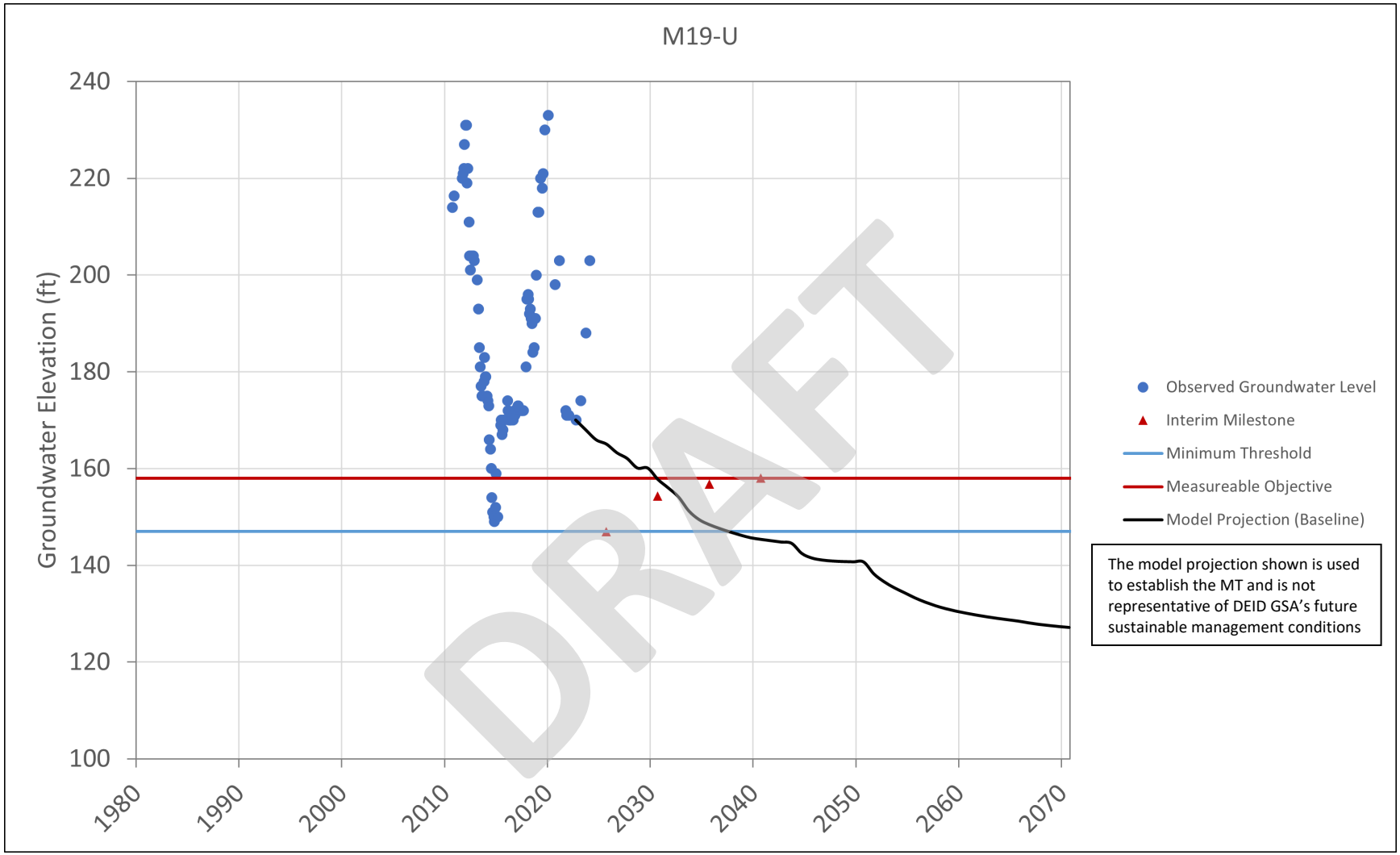
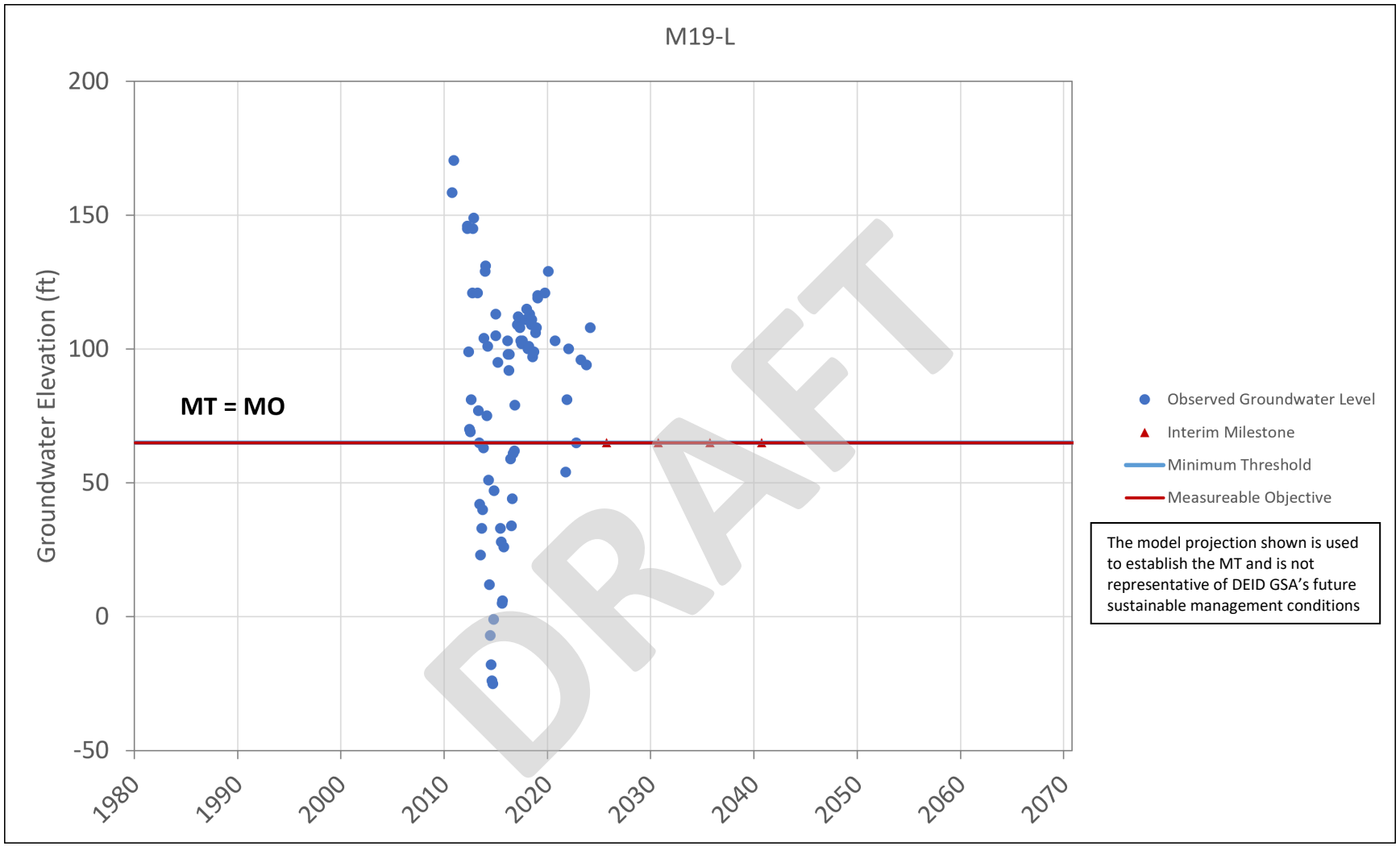
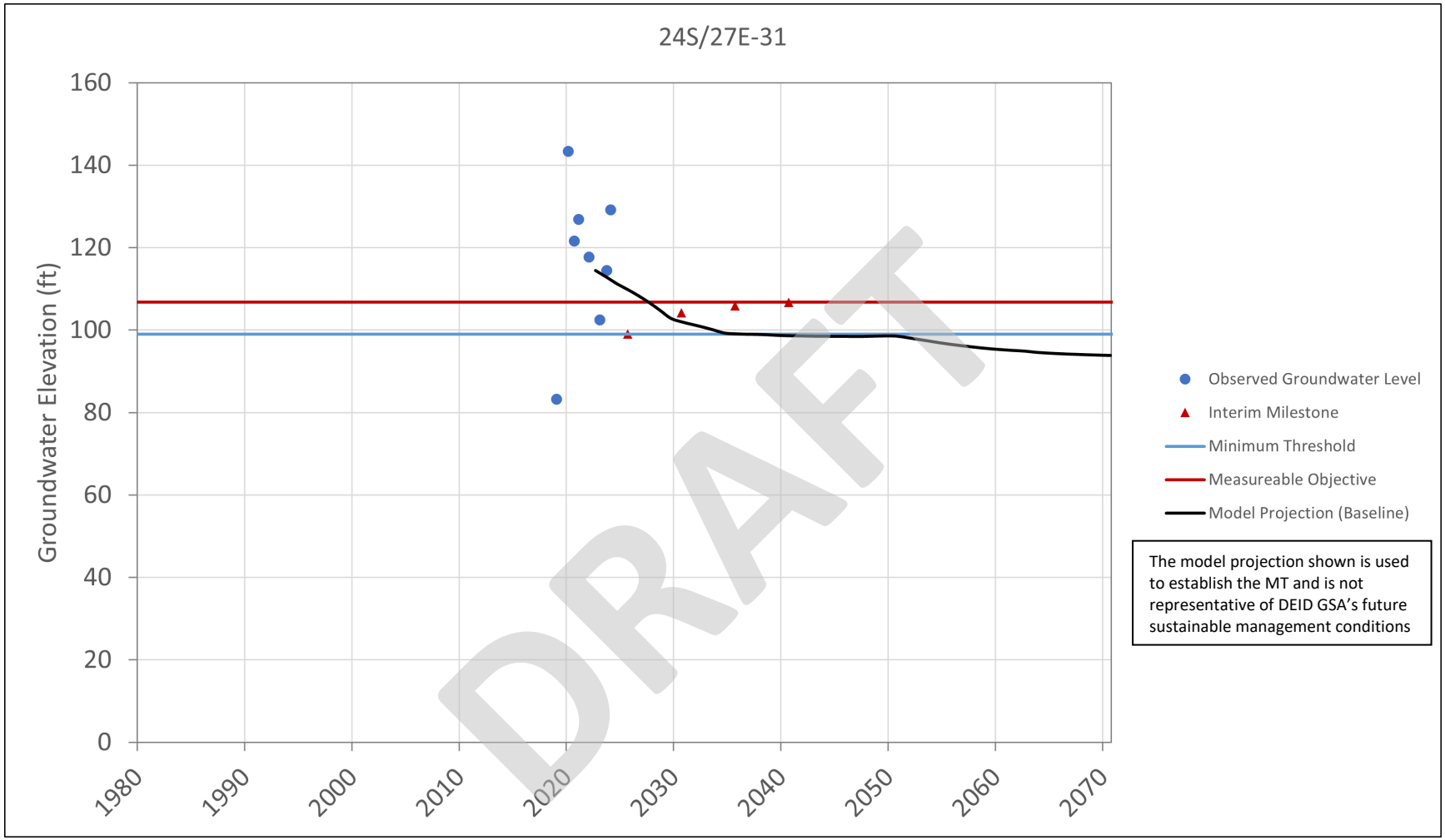
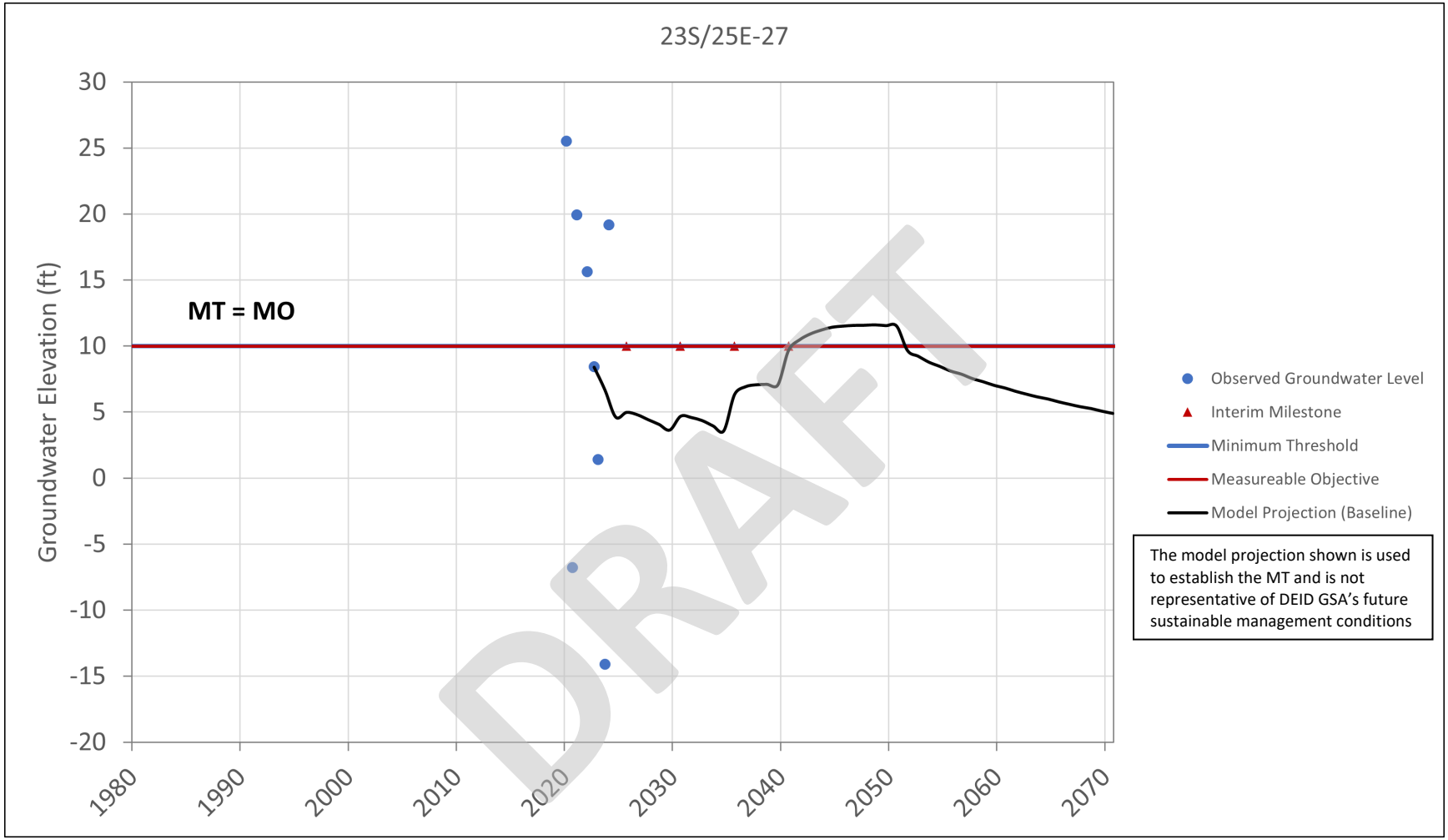
2020
2030
2040
2050
2060
2070
Observed Groundwater Level
Interim Milestone
Minimum Threshold
Measureable Objective
Model Projection (Baseline)
The model projection shown is used to establish the MT and is not representative of DEID GSA's future sustainable management conditions
DRAFT


M19-U
Groundwater Elevation (ft)
240
220
200
180
160
140
120
100
1980
1990
2000
2010
2020
2030
2040
2050
2060
2070
Observed Groundwater Level
Interim Milestone
Minimum Threshold
Measureable Objective
Model Projection (Baseline)
The model projection shown is used to establish the MT and is not representative of DEID GSA's future sustainable management conditions
DRAFT


M19-L
Groundwater Elevation (ft)
200
150
100
50
0
-50
1980
1990
2000
2010
2020
2030
2040
2050
2060
2070
MT = MO
Observed Groundwater Level
Interim Milestone
Minimum Threshold
Measureable Objective
The model projection shown is used to establish the MT and is not representative of DEID GSA's future sustainable management conditions
DRAFT


24S/27E-31
Groundwater Elevation (ft)
160
140
120
100
80
60
40
20
0
1980
1990
2000
2010
2020
2030
2040
2050
2060
2070
Observed Groundwater Level
Interim Milestone
Minimum Threshold
Measureable Objective
Model Projection (Baseline)
The model projection shown is used to establish the MT and is not representative of DEID GSA's future sustainable management conditions
DRAFT


23S/25E-27
Groundwater Elevation (ft)
30
25
20
15
10
5
0
-5
-10
-15
-20
1980
1990
2000
2010
2020
2030
2040
2050
2060
2070
MT = MO
DRAFT
Observed Groundwater Level
Interim Milestone
Minimum Threshold
Measureable Objective
Model Projection (Baseline)
The model projection shown is used to establish the MT and is not representative of DEID GSA's future sustainable management conditions

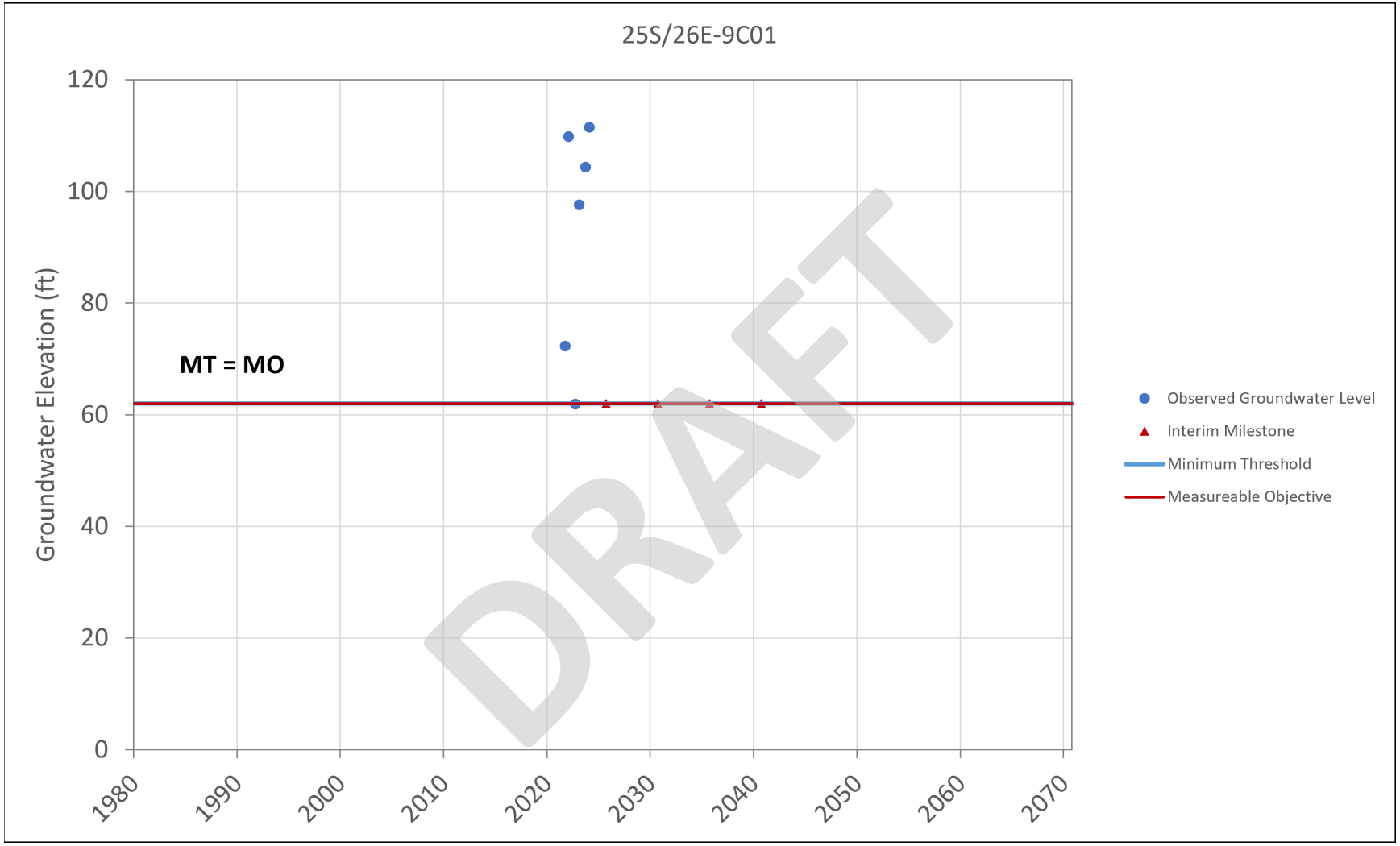

25S/26E-9C01
Groundwater Elevation (ft)
120
100
80
60
40
20
0
1980
1990
2000
2010
2020
2030
2040
2050
2060
2070
MT = MO
Observed Groundwater Level
Interim Milestone
Minimum Threshold
Measureable Objective
DRAFT

Exhibit 3-2: COC Groundwater Quality Isocontour Maps

Tule Subbasin
Sustainable Groundwater Management Act

Tule Subbasin
Groundwater Quality Analysis

Ambient Arsenic 2017-2022

Drinking Water MCL: 10 µg/L

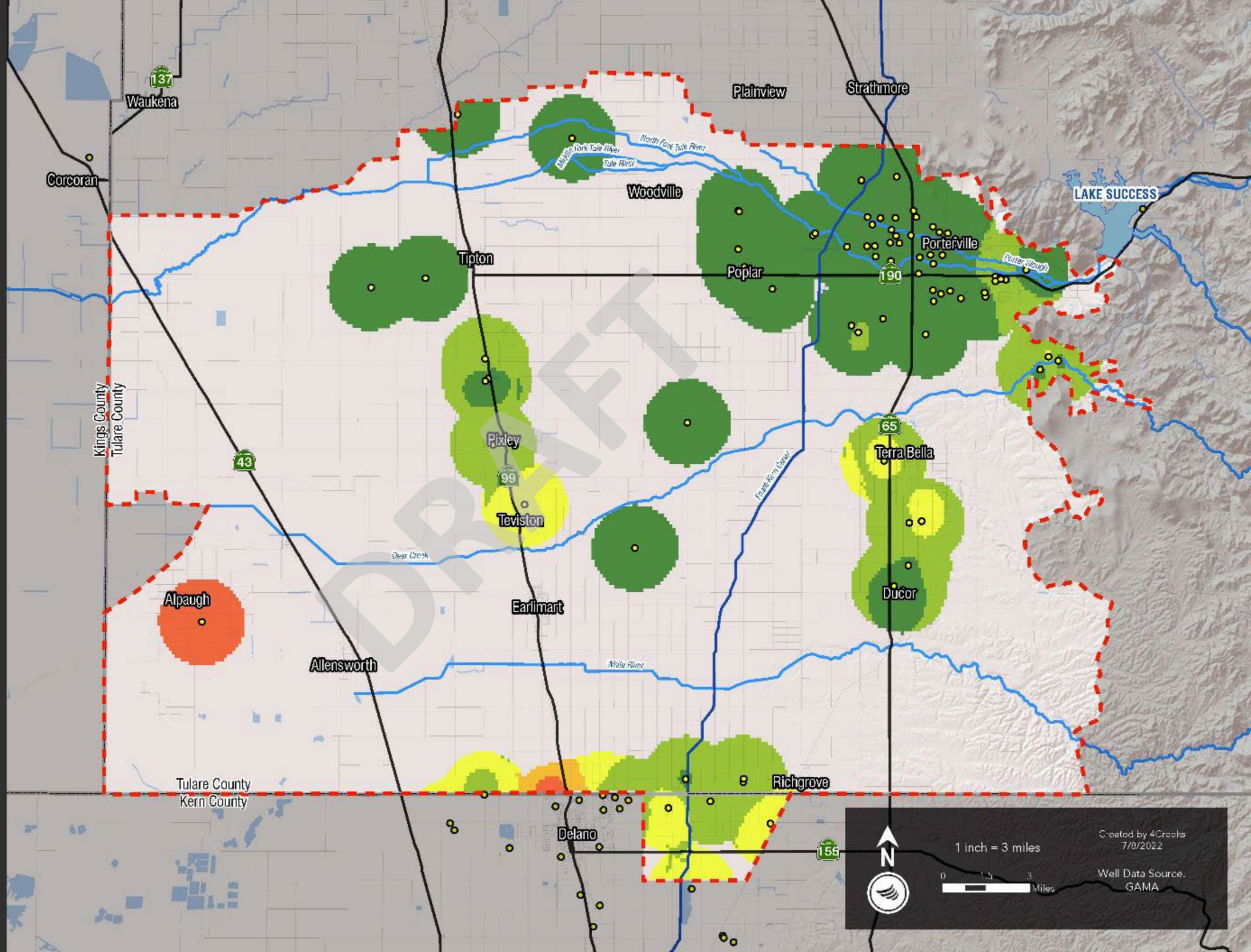
Legend

- Tule Subbasin
- Lake Success
- Major Roads
- Roads
- Friant-Kern Canal
- Waterways
- Constituent Sampling Wells

Arsenic (µg/L)

- 0.0 - 2.5
- 2.5 - 5.0
- 5.0 - 7.5
- 7.5 - 10.0
- 10.0+

4CREEKS



Tule Subbasin
Sustainable Groundwater Management Act

Tule Subbasin
Groundwater Quality Analysis

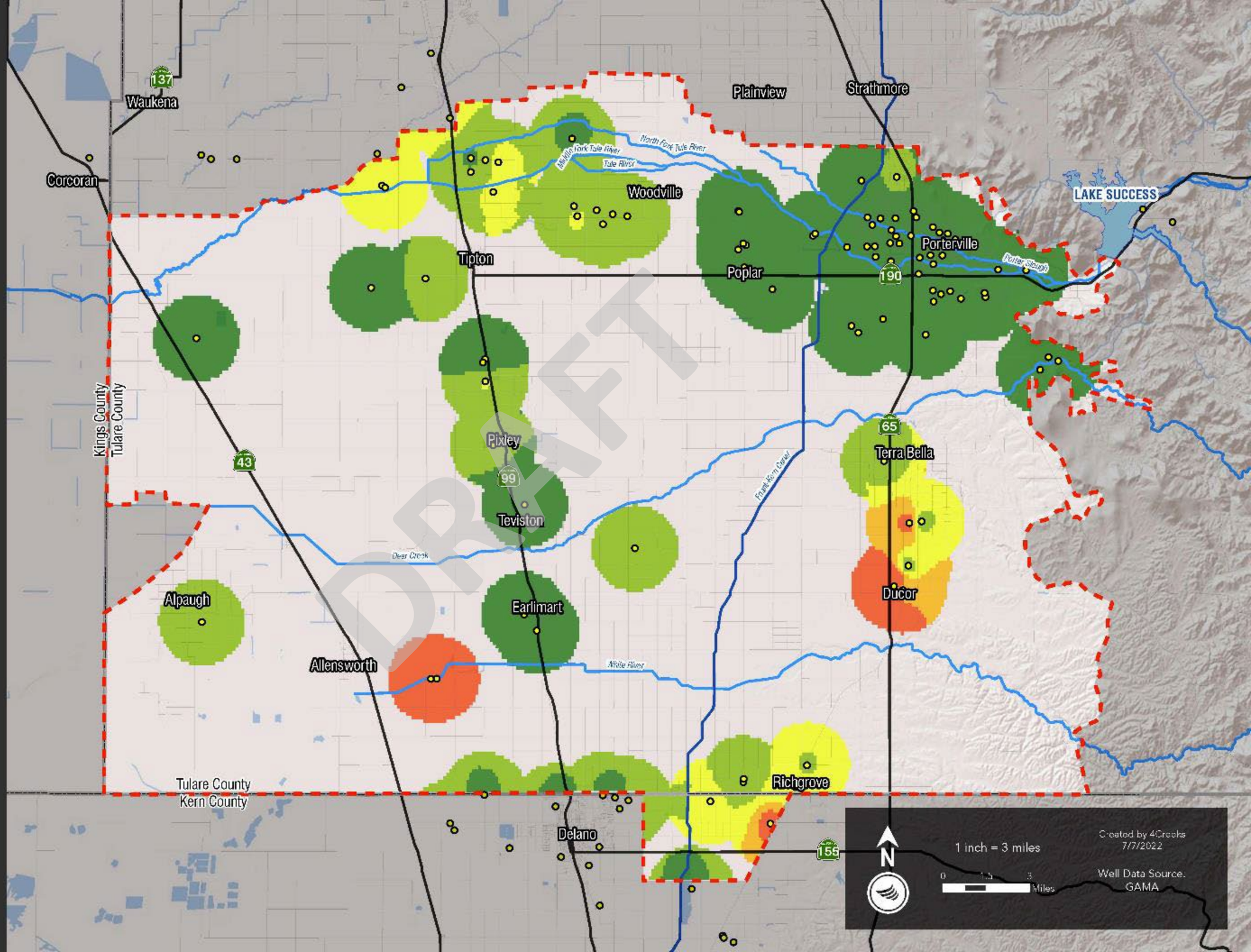
Ambient Chloride 2017-2022

Agricultural Water Quality Goal: 106 mg/L

Legend
- Tule Subbasin
- Lake Success
- Major Roads
- Roads
- Friant-Kern Canal
- Waterways
- Constituent Sampling Wells

Chloride (mg/L)
- 0 - 26.5
- 26.5 - 53.0
- 53.0 - 79.5
- 79.5 - 106
- 106+

4CREEKS



Tule Subbasin
Sustainable Groundwater Management Act

Tule Subbasin
Groundwater Quality Analysis

Ambient Chloride 2017-2022

Drinking Water MCL: 500 mg/L

Legend
- Tule Subbasin
- Lake Success
- Major Roads
- Roads
- Friant-Kern Canal
- Waterways
- Constituent Sampling Wells

Chloride (mg/L)
- 0 - 125
- 125 - 250
- 250 - 375
- 375 - 500
- 500+

4CREEKS

Waukena
Corcoran
Plainview
Strathmore
Woodville
Tipton
Poplar
Porterville
LAKE SUCCESS
Pixley
Teviston
Terra Bella
Ducor
Alpaugh
Earlimart
Allensworth
Richgrove
Delano
Kings County
Tulare County
Tulare County
Kern County
North Fork Tule River
Middle Fork Tule River
Tule River
Porter Slough
Deer Creek
Friant-Kern Canal
Kaweah River
137
43
99
65
190
155

1 inch = 3 miles
0 1.5 3 Miles
N
Created by 4Creeks 7/7/2022
Well Data Source: GAMA

Tule Subbasin
Sustainable Groundwater Management Act

Tule Subbasin
Groundwater Quality Analysis

Ambient Chromium-6
2017-2022

Drinking Water MCL:
10 µg/L

Legend
- Tule Subbasin
- Lake Success
- Major Roads
- Roads
- Friant-Kern Canal
- Waterways
- Constituent Sampling Wells

Chromium-6 (µg/L)
- 0.0 - 2.5
- 2.5 - 5.0
- 5.0 - 7.5
- 7.5 - 10.0

4CREEKS

Waukena
Corcoran
Plainview
Strathmore
Woodville
Tipton
Poplar
Porterville
LAKE SUCCESS
Pixley
Teviston
Terra Bella
Ducor
Alpaugh
Earlimart
Allensworth
Richgrove
Delano
Kings County
Tulare County
Tulare County
Kern County
Middle Fork Tule River
North Fork Tule River
Tule River
Deer Creek
Friant-Kern Canal
Porter Slough
Poso Creek
137
43
99
190
65
155

N
1 inch = 3 miles
0 1.5 3 Miles

Created by 4Creeks
7/8/2022

Well Data Source:
GAMA

Tule Subbasin
Sustainable Groundwater Management Act

Tule Subbasin
Groundwater Quality Analysis

Ambient Dibromochloropropane 2017-2022

Drinking Water MCL: 0.2 µg/L

Legend
- Tule Subbasin
- Lake Success
- Major Roads
- Roads
- Friant-Kern Canal
- Waterways
- Constituent Sampling Wells

Dibromochloropropane (µg/L)
- 0 - 0.05
- 0.05 - 0.1
- 0.10 - 0.15
- 0.15 - 0.20
- 0.20+

4CREEKS

Waukena
Corcoran
Plainview
Strathmore
Woodville
LAKE SUCCESS
Porterville
Tipton
Poplar
Pixley
Terra Bella
Teviston
Ducor
Alpaugh
Earlimart
Allensworth
Richgrove
Delano
Kings County
Tulare County
Tulare County
Kern County
North Fork Tule River
Middle Fork Tule River
Tule River
Porter Slough
Deer Creek
White River
Friant-Kern Canal
137
43
99
190
65
155

1 inch = 3 miles
0 1.5 3 Miles
N
Created by 4Creeks 7/8/2022
Well Data Source: GAMA

Tule Subbasin
Sustainable Groundwater Management Act

Tule Subbasin
Groundwater Quality Analysis

Ambient Nitrate 2017-2022

Drinking Water MCL: 10 mg/L

Legend
- Tule Subbasin
- Lake Success
- Major Roads
- Roads
- Friant-Kern Canal
- Waterways
- Constituent Sampling Wells

Nitrate (mg/L)
- 0.0 - 2.5
- 2.5 - 5.0
- 5.0 - 7.5
- 7.5 - 10.0
- 10.0+

4CREEKS

Waukena
Corcoran
Plainview
Strathmore
Woodville
Tipton
Poplar
Porterville
LAKE SUCCESS
Pixley
Teviston
Terra Bella
Ducor
Alpaugh
Earlimart
Allensworth
Richgrove
Delano
Kings County
Tulare County
Tulare County
Kern County
Middle Fork Tule River
North Fork Tule River
Tule River
Porter Slough
Deer Creek
Friant-Kern Canal
Kaweah River
137
43
99
190
65
155

1 inch = 3 miles
0 1.5 3 Miles
N
Created by 4Creeks 7/9/2022
Well Data Source: GAMA

Tule Subbasin
Sustainable Groundwater Management Act

Tule Subbasin
Groundwater Quality Analysis

Ambient PCE (Tetrachloroethene) 2017-2022

Drinking Water MCL: 5 µg/L

Legend
- Tule Subbasin
- Lake Success
- Major Roads
- Roads
- Friant-Kern Canal
- Waterways
- Constituent Sampling Wells

Tetrachloroethene (µg/L)
- 0 - 1.25
- 1.25 - 2.5
- 2.50 - 3.75
- 3.75 - 5.0
- 5.0+

4CREEKS

Waukena
Corcoran
Plainview
Strathmore
Woodville
LAKE SUCCESS
Porterville
Tipton
Poplar
Pixley
Teviston
Terra Bella
Ducor
Alpaugh
Earlimart
Allensworth
Richgrove
Delano
Kings County
Tulare County
Tulare County
Kern County
North Fork Tule River
Middle Fork Tule River
Tule River
Porter Slough
Deer Creek
Friant-Kern Canal
Mille River
137
43
99
190
65
155

1 inch = 3 miles
N
0 1.5 3 Miles
Created by 4Creeks 7/8/2022
Well Data Source: GAMA

Tule Subbasin
Sustainable Groundwater Management Act

Tule Subbasin
Groundwater Quality Analysis

Ambient Perchlorate 2017-2022

Drinking Water MCL: 6 µg/L

Legend
- Tule Subbasin
- Lake Success
- Major Roads
- Roads
- Friant-Kern Canal
- Waterways
- Constituent Sampling Wells

Perchlorate (µg/L)
- 0.0 - 1.5
- 1.5 - 3.0
- 3.0 - 4.5
- 4.5 - 6.0
- 6.0+

4CREEKS

Waukena
Corcoran
Plainview
Strathmore
Woodville
Tipton
Poplar
Porterville
LAKE SUCCESS
Pixley
Teviston
Terra Bella
Ducor
Alpaugh
Earlimart
Allensworth
Richgrove
Delano
Kings County
Tulare County
Tulare County
Kern County
North Fork Tule River
Middle Fork Tule River
Tule River
Porter Slough
Deer Creek
Friant-Kern Canal
Mille River
137
43
99
190
65
155

1 inch = 3 miles
N
0 1.5 3 Miles
Created by 4Creeks 7/8/2022
Well Data Source: GAMA

Tule Subbasin
Sustainable Groundwater Management Act

Tule Subbasin
Groundwater Quality Analysis

Ambient Sodium 2017-2022

Agricultural Water Quality Goal: 69 mg/L

Legend
- Tule Subbasin
- Lake Success
- Major Roads
- Roads
- Friant-Kern Canal
- Waterways
- Constituent Sampling Wells

Sodium (mg/L)
- 0 - 17.25
- 17.25 - 34.5
- 34.5 - 51.75
- 51.75 - 69.0
- 69.0+

4CREEKS

Waukena
Corcoran
Plainview
Strathmore
Woodville
Tipton
Poplar
Porterville
LAKE SUCCESS
Pixley
Teviston
Terra Bella
Ducor
Alpaugh
Earlimart
Allensworth
Richgrove
Delano
Kings County
Tulare County
Tulare County
Kern County
North Fork Tule River
Middle Fork Tule River
Tule River
Porter Slough
Deer Creek
Friant-Kern Canal
White River
137
43
99
190
65
155

N
1 inch = 3 miles
0 1.5 3 Miles
Created by 4Creeks 7/7/2022
Well Data Source: GAMA

Tule Subbasin
Sustainable Groundwater Management Act

Tule Subbasin
Groundwater Quality Analysis

Ambient
1,2,3-Trichloropropane
2017-2022

Drinking Water MCL:
0.005 µg/L

Legend
- Tule Subbasin
- Lake Success
- Major Roads
- Roads
- Friant-Kern Canal
- Waterways
- Constituent Sampling Wells

1,2,3-Trichloropropane (µg/L)
- 0.0 - 0.00125
- 0.00125 - 0.0025
- 0.0025 - 0.00375
- 0.00375 - 0.005
- 0.005+

4CREEKS

Waukena
Corcoran
Plainview
Strathmore
Woodville
Tipton
Poplar
Porterville
LAKE SUCCESS
Pixley
Terra Bella
Teviston
Alpaugh
Earlimart
Ducor
Allensworth
Richgrove
Delano
Kings County
Tulare County
Tulare County
Kern County
North Fork Tule River
Middle Fork Tule River
Tule River
Deer Creek
Friant-Kern Canal
Porter Slough
White River
137
43
99
190
65
155

1 inch = 3 miles
0 1.5 3 Miles
N
Created by 4Creeks 7/8/2022
Well Data Source: GAMA

Tule Subbasin
Sustainable Groundwater Management Act

Tule Subbasin
Groundwater Quality Analysis

Ambient
Total Dissolved Solids
2017-2022

Agricultural Water Quality Goal:
450 mg/L

Legend
- Tule Subbasin
- Lake Success
- Major Roads
- Roads
- Friant-Kern Canal
- Waterways
- Constituent Sampling Wells

Total Dissolved Solids (mg/L)
- 0 - 112.5
- 112.5 - 225
- 225 - 337.5
- 337.5 - 450
- 450+

4CREEKS

Waukena
Corcoran
Plainview
Strathmore
Woodville
Tipton
Poplar
Porterville
LAKE SUCCESS
Pixley
Teviston
Terra Bella
Ducor
Alpaugh
Earlimart
Allensworth
Richgrove
Delano
Kings County
Tulare County
Tulare County
Kern County
North Fork Tule River
Middle Fork Tule River
Tule River
Deer Creek
Friant-Kern Canal
Porter Slough
137
43
99
65
190
155

1 inch = 3 miles
0 1.5 3 Miles
N
Created by 4Creeks 7/9/2022
Well Data Source: GAMA

Tule Subbasin
Sustainable Groundwater Management Act

Tule Subbasin
Groundwater Quality Analysis

Ambient
Total Dissolved Solids
2017-2022

SMCL: 1000 mg/L

Legend
- Tule Subbasin
- Lake Success
- Major Roads
- Roads
- Friant-Kern Canal
- Waterways
- Constituent Sampling Wells

Total Dissolved Solids (mg/L)
- 0 - 250
- 250 - 500
- 500 - 750
- 750 - 1,000
- 1,000+

4CREEKS

Waukena
Corcoran
Plainview
Strathmore
Woodville
Tipton
Poplar
Porterville
LAKE SUCCESS
Pixley
Teviston
Terra Bella
Ducor
Alpaugh
Earlimart
Allensworth
Richgrove
Delano
Kings County
Tulare County
Tulare County
Kern County
North Fork Tule River
Middle Fork Tule River
Tule River
Deer Creek
Friant-Kern Canal
Porter Slough
Kaweah River
137
43
99
65
190
155

1 inch = 3 miles
0 1.5 3 Miles
N
Created by 4Creeks 7/8/2022
Well Data Source: GAMA

Exhibit 3-3: Well Impact Analysis

For the well impact analysis, DEID GSA compared several interpolated surfaces based on observed groundwater levels, GFM model results, and minimum thresholds to well-specific "Protective Levels" developed for all existing known wells in the DEID GSA. As previously described, this analysis assumed that a minimum of 30 ft of saturated screen interval is required to maintain groundwater production rates for agricultural, domestic, and M&I wells. The analysis evaluated 143 agricultural wells, 83 domestic wells, 9 M&I wells and 3 wells of unknown type for a total of 238 wells. There were 43 wells without depth information that were not included in the analysis. The analysis was completed using five interpolation scenarios to compare the potential impacts under varying conditions:

1. Original GSP Minimum Thresholds
2. 2015 Representative Groundwater Levels
3. 2022 Representative Groundwater Levels
4. Modeled decline to 2040 – New Minimum Threshold (Transitional Pumping Scenario)
5. Modeled decline to 2040 – New Measurable Objective (Safe Yield Scenario)

The following steps were taken to evaluate potential impacts to wells for each of the five scenarios:

1. A surface was generated:
    a. For the original GSP minimum thresholds (scenario #1 above), a surface was generated based on the minimum thresholds assigned to each RMS location (from the originally submitted GSP) for both the upper and lower aquifers, using the kriging method[2].
    b. For the representative groundwater levels (scenarios #2 and #3 above), observed groundwater levels at monitoring wells within the DEID for the selected time frame, including representative groundwater levels (extrapolated based on observed data) assigned to 8 RMS locations (6 Upper Aquifer and 2 Lower Aquifer) and 3 control points outside the DEID GSA extrapolated based on previously mapped contours, were used to develop a potentiometric (water table) surface over the entire DEID GSA using the kriging method.
2. For the modeled decline to 2040 (scenarios #4 and #5 above), the projected decline (the difference between 2040 and 2022 modeled values) was subtracted from the 2022 representative groundwater level data at each RMS location and a new surface was generated based on the values at each RMS location for the upper and lower aquifers using the kriging method.
3. The Protective Level maintaining a saturated screen interval of a minimum of 30 ft above the total depth of the well was determined for 238 wells.
4. The Protective Level at each existing well site was compared to the interpolated surface under each of the five scenarios previously described to determine the number of Upper Aquifer and Lower Aquifer wells potentially impacted by well type.
5. A first-order cost estimate[3] was developed by well type to mitigate impacted wells.

[2] Kriging gives the best linear unbiased prediction at unsampled locations by distance average-weighting.
[3] First-order cost estimate has an accuracy of plus/minus 50 percent.

A summary of the existing well analysis potential impacts based on the five scenarios evaluated is provided in **Table 1.**

Table 1: Existing Wells Impact Analysis

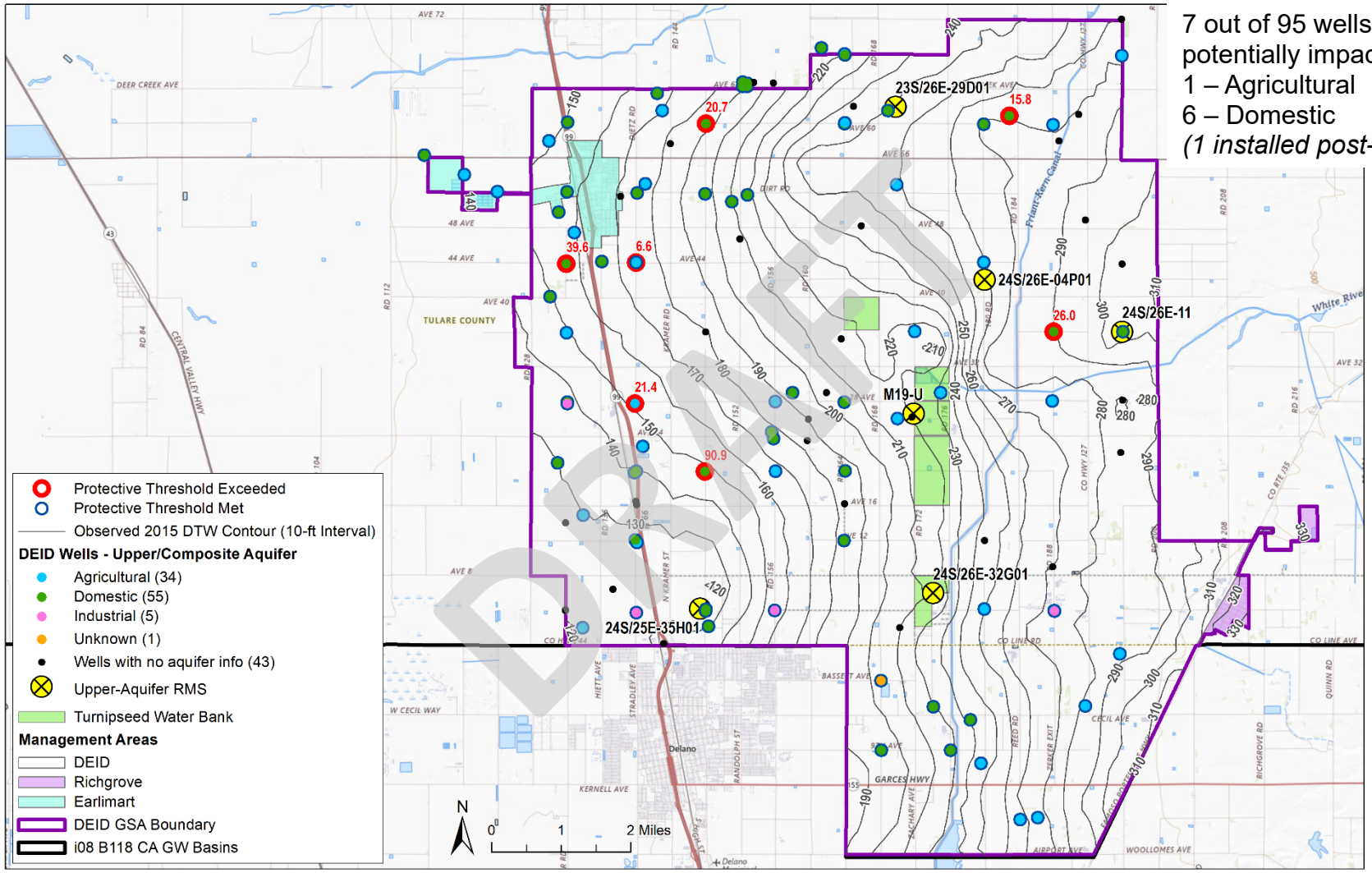
Upper/Composite Aquifer Potential Impacts					
	2015 Observed	*2022 Observed*	*New MT*	*Safe Yield Scenario*	*Original GSP MT*
Ag	1	1	**1**	0	1
Domestic	6	10	**9**	4	30
Unknown	0	0	**0**	0	0
M&I	0	0	**0**	0	0
Sub-Total	*7*	*11*	*10*	*4*	*31*
Lower Aquifer Potential Impacts					
Ag	0	0	**0**	0	1
Domestic	0	1	**2**	0	3
Unknown	0	0	**0**	0	0
M&I	0	0	**0**	0	1
Sub-Total	*0*	*1*	*2*	*0*	*5*
TOTAL	**7**	**12**	**12**	**4**	**36**

The well impact analysis reveals that under the original GSP minimum threshold scenario #1, 31 wells in the Upper Aquifer and 5 wells in the Lower Aquifer are potentially impacted. For the four other scenarios, few to no wells are impacted in the Lower Aquifer. Significantly fewer wells are impacted for the four other scenarios.

Based on the well impact analysis, the DEID GSA has revised the original minimum threshold to be more protective of beneficial uses and users and minimize the potential financial impact from the need to mitigate adversely impacted wells. The new minimum threshold resulted in potential impacts to 2 wells screened in the Lower Aquifer whereas the original minimum threshold resulted in potential impacts to 5 wells, including both agricultural and domestic type wells. While the results indicate that impacts to wells screened solely in the Upper Aquifer may occur under the new minimum threshold, those impacts are similar to the baseline conditions under the 2015 and 2022 observed water level scenarios. In particular, the new minimum threshold is more protective of domestic well users who are the most sensitive to well impacts because they often lack alternative supply and the financial means to replace wells. This GSP recognizes that significant and unreasonable effects including well failure and dry wells have historically occurred and will likely occur during GSP implementation. The Tule Subbasin GSAs have prepared a Mitigation Program Framework (**Appendix A-7**) to address claims of adverse well impacts. The DEID GSA will finalize a Mitigation Plan as required by the Mitigation Program Framework as a project and management action.

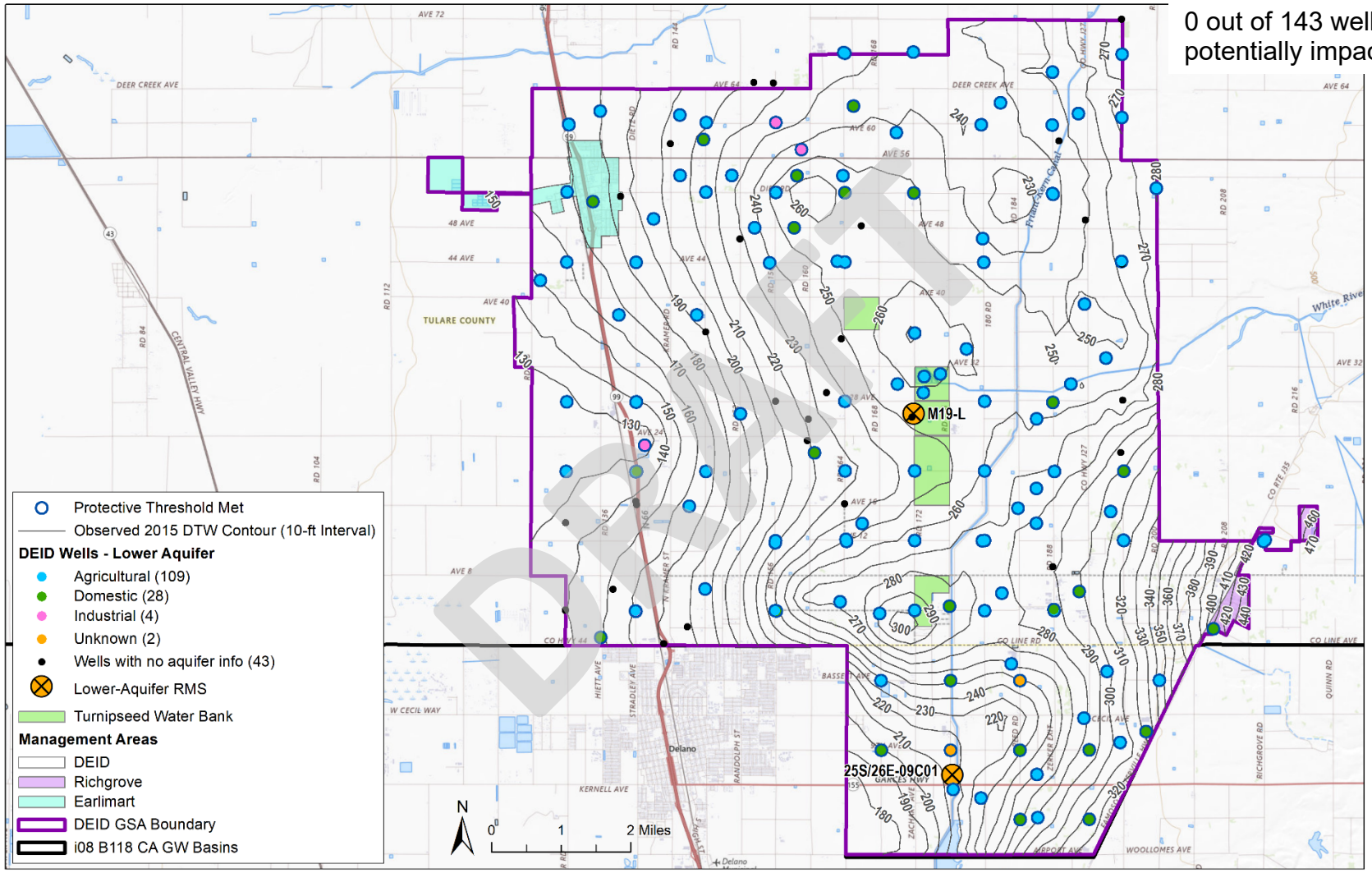
The DEID GSA has completed a rough order of magnitude cost estimate for the existing well impacts evaluation. The cost estimate is presented in **Subsection 5.2.1.7**.

2015 Groundwater Levels – Upper/Composite Aquifer



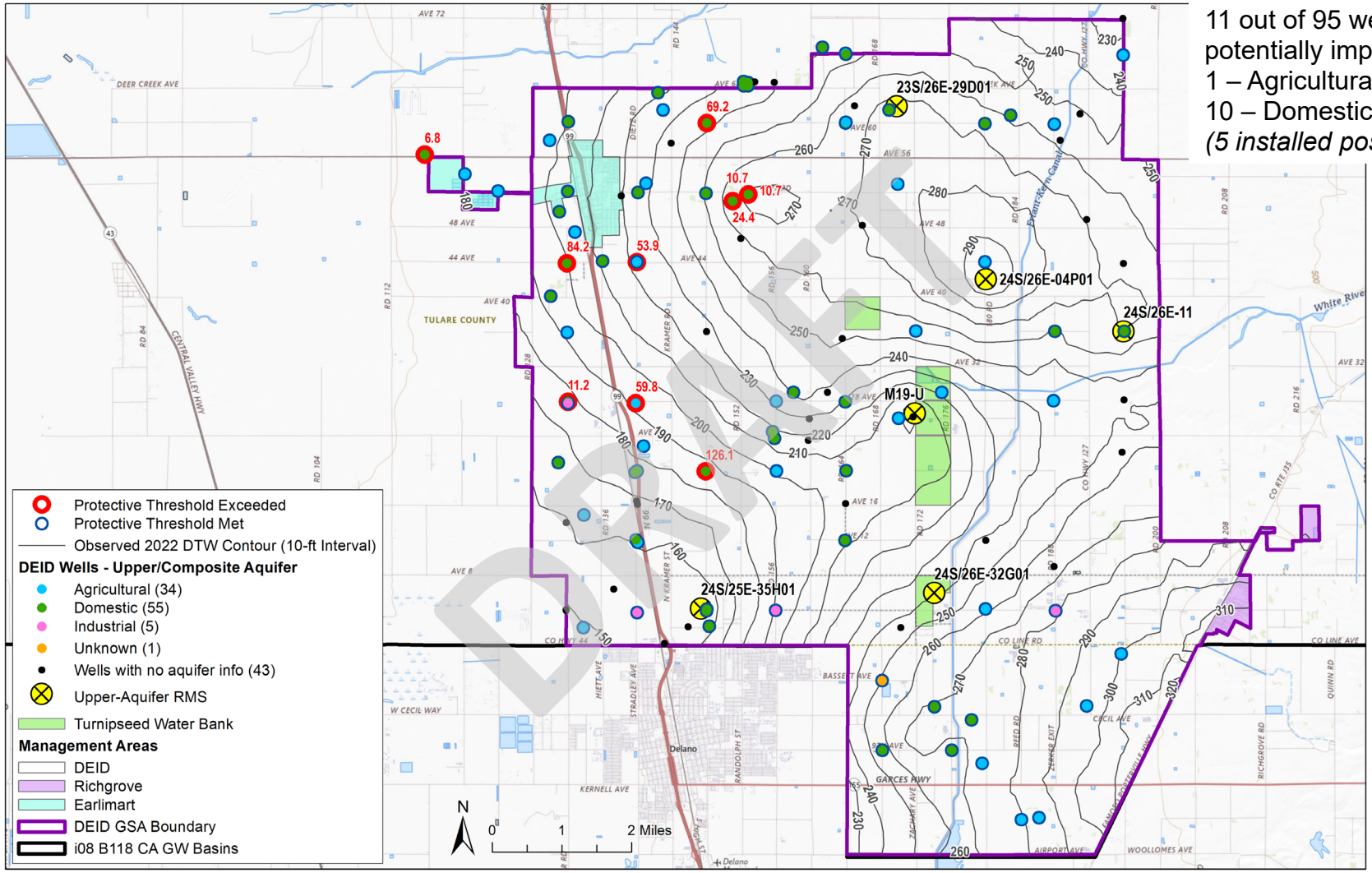
7 out of 95 wells potentially impacted
1 – Agricultural
6 – Domestic
(1 installed post-2000)

2015 Groundwater Levels – Lower Aquifer



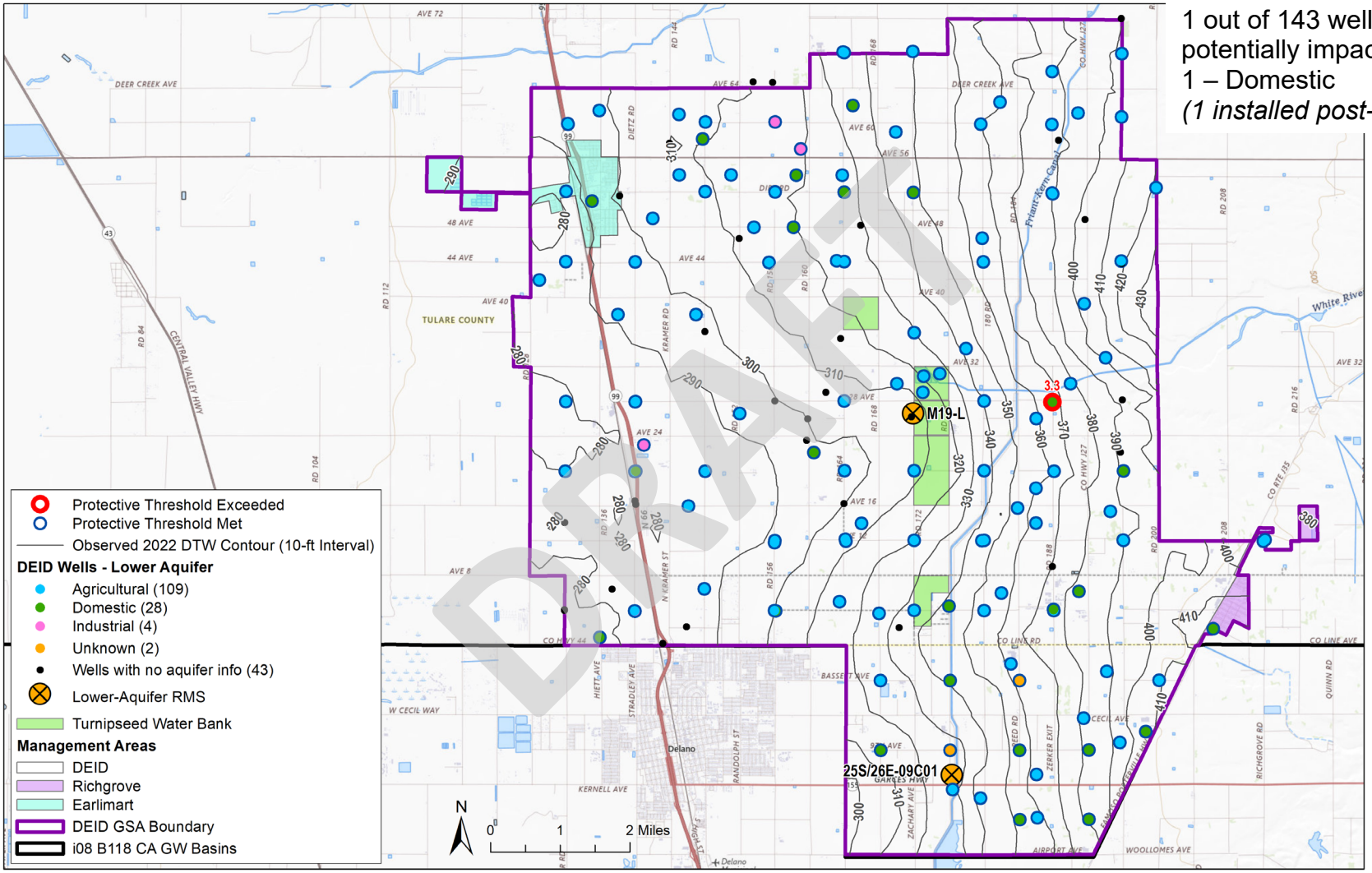
0 out of 143 wells potentially impacted

2022 Groundwater Levels – Upper/Composite Aquifer



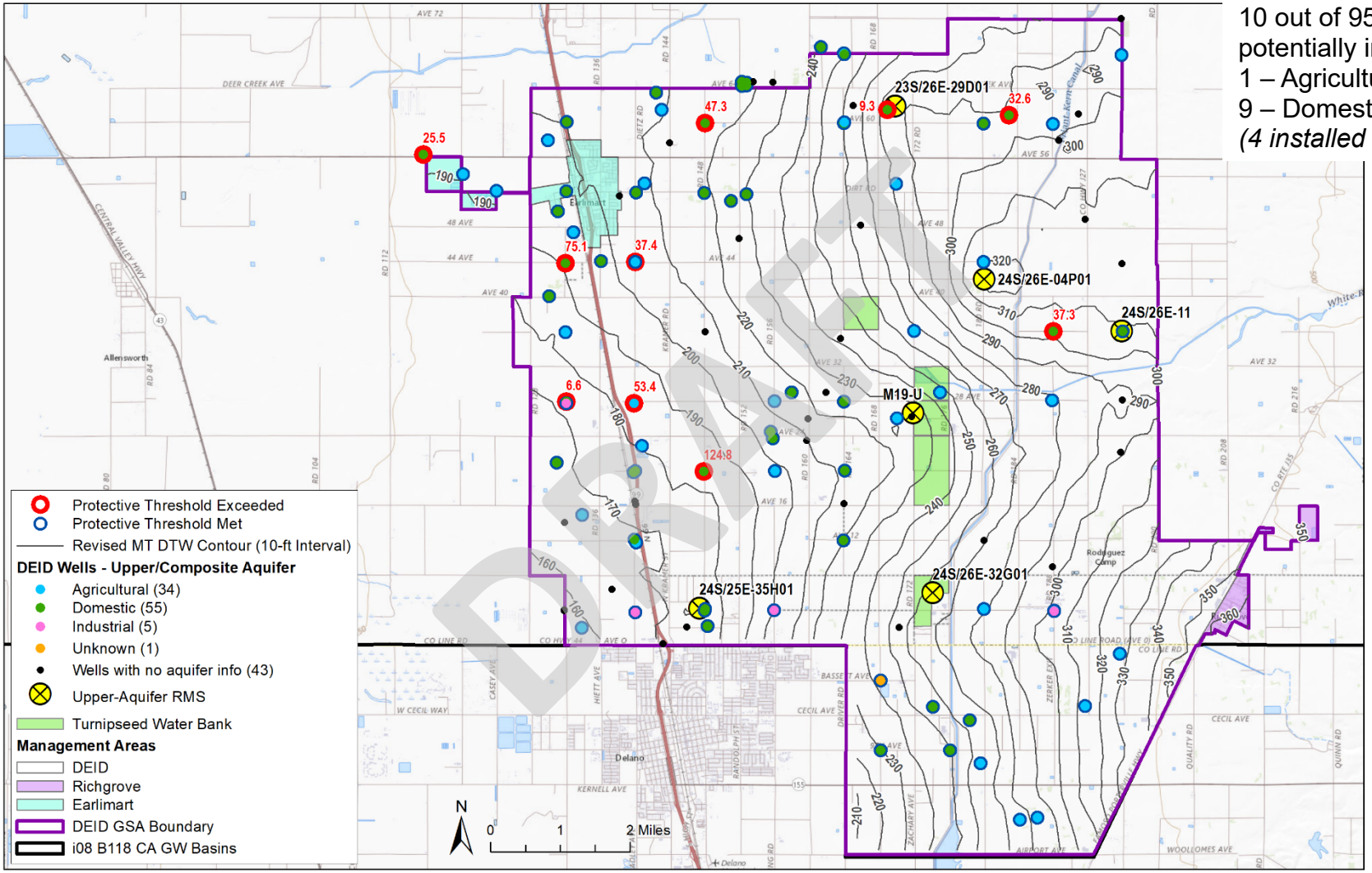
11 out of 95 wells potentially impacted
1 – Agricultural
10 – Domestic
(5 installed post-2000)

2022 Groundwater Levels – Lower Aquifer



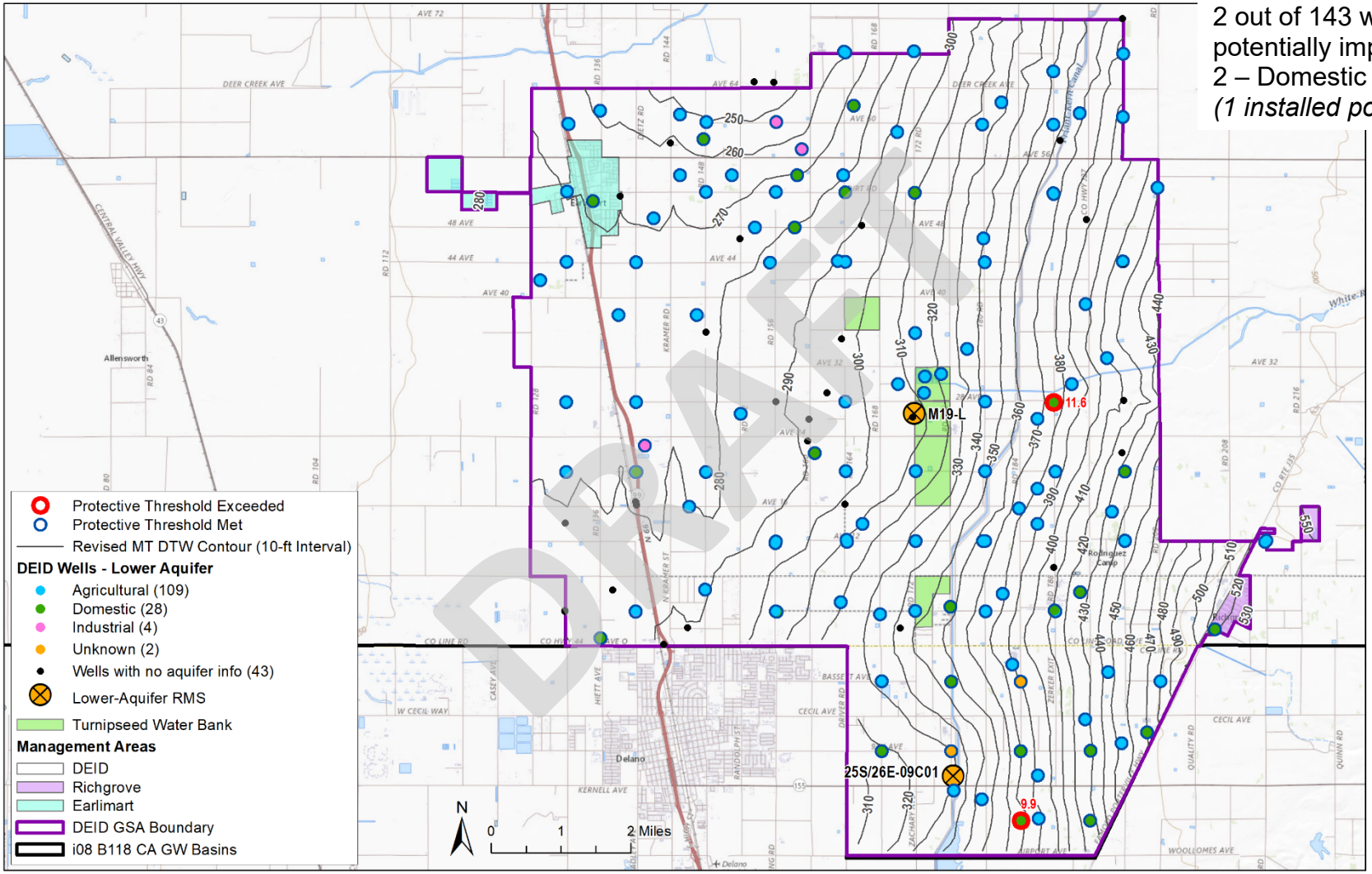
1 out of 143 wells potentially impacted
1 – Domestic
(1 installed post-2000)

Revised Minimum Threshold – Upper/Composite Aquifer



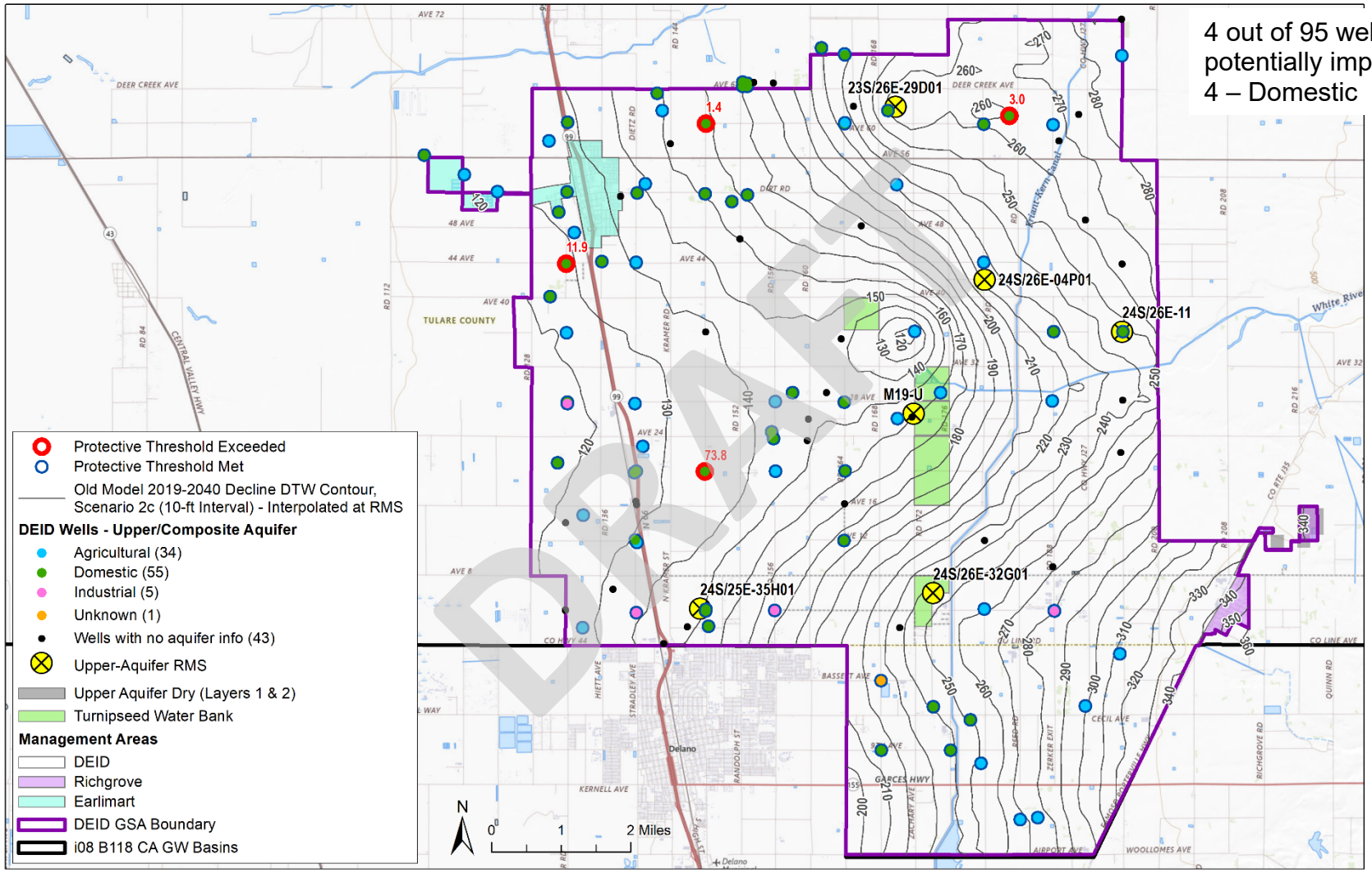
10 out of 95 wells potentially impacted
1 – Agricultural
9 – Domestic
(4 installed post-2000)

Revised Minimum Threshold – Lower Aquifer

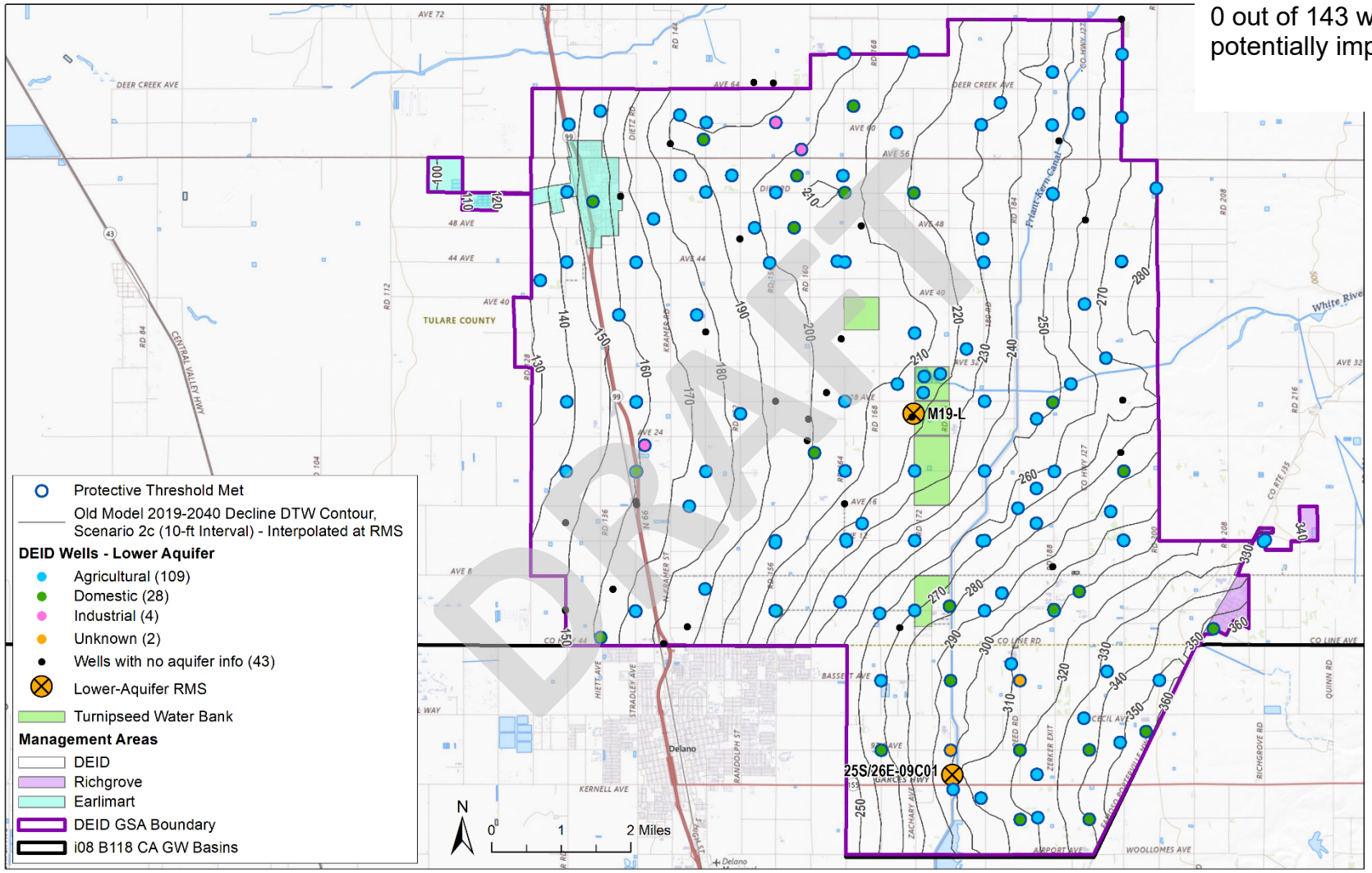


2 out of 143 wells potentially impacted
2 – Domestic
(1 installed post-2000)

Safe Yield Pumping Scenario – Upper/Composite Aquifer



Safe Yield Pumping Scenario – Lower Aquifer



0 out of 143 wells potentially impacted

Section 4 Monitoring Networks

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List of Tables

Subsection 4.1 Introduction to Monitoring Networks *[23 CCR § 354.32]*

> **23 Cal. Code Regs. § 354.32 Introduction to Monitoring Networks.** *This Subarticle describes the monitoring network that shall be developed for each basin, including monitoring objectives, monitoring protocols, and data reporting requirements. The monitoring network shall promote the collection of data of sufficient quality, frequency, and distribution to characterize groundwater and related surface water conditions in the basin and evaluate changing conditions that occur through implementation of the Plan.*

This section of the GSP summarizes the DEID GSA monitoring network, which addresses the four applicable sustainability indicators and is informed by existing monitoring programs and SGMA-specific monitoring initiatives. Of the six sustainability indicators defined by SGMA, only four are applicable in the DEID GSA (**Figure 4-1**). Information on existing monitoring initiatives is available in **Subsection 1.4.2**.

For more information on the Subbasin-wide monitoring network, see Attachment 1 to the Tule Subbasin Coordination Agreement (**Appendix A-1**).

Figure 4-1: Sustainability Indicators Applicable in DEID GSA

Subsection 4.2 Monitoring Network

Subsection 4.2.1 Monitoring Network Objective *[23 CCR § 354.34 (a), (b)]*

> **23 Cal. Code Regs. § 354.34 Monitoring Network**. **(a)** *Each Agency shall develop a monitoring network capable of collecting sufficient data to demonstrate short-term, seasonal, and long-term trends in groundwater and related surface conditions, and yield representative information about groundwater conditions as necessary to evaluate Plan implementation*.
>
> **(b)** *Each Plan shall include a description of the monitoring network objectives for the basin, including an explanation of how the network will be developed and implemented to monitor groundwater and related surface conditions, and the interconnection of surface water and groundwater, with sufficient temporal frequency and spatial density to evaluate the affects and effectiveness of Plan implementation.*

The objective of the DEID GSA monitoring network is to have sufficient spatial and temporal coverage of groundwater level, groundwater quality, land surface elevation, surface water data, and water use data to effectively assess progress towards sustainability by comparing monitoring results to sustainable management criteria.

More information on the monitoring network objectives for the entire Subbasin is available in Attachment 1 of the Coordination Agreement (**Appendix A**-1).

Subsection 4.2.1.1 Progress Towards Achieving Measurable Objective *[23 CCR § 354.34 (b)(1)(2)(3)(4)]*

> **23 Cal. Code Regs. § 354.34 Monitoring Network**. **(b)** *…The monitoring network objectives shall be implemented to accomplish the following:*
>
> **(1)** *Demonstrate progress toward achieving measurable objectives described in the Plan.*
>
> **(2)** *Monitor impacts to the beneficial uses or users of groundwater.*
>
> ***(3)*** *Monitor changes in groundwater conditions relative to measurable objectives and minimum thresholds.*
>
> ***(4)*** *Quantify annual changes in water budget components.*

Annually, the GSA prepares reports documenting the results from the prior year monitoring activities. To generate these reports and assess progress towards implementation, the GSA utilizes the data collected each year from existing monitoring programs, DEID GSA's monitoring and operations documentation, data from new tools and technologies (such as AEM, Land-IQ, InSAR), and the Groundwater Flow Model (GFM).

Each year, results from annual monitoring are compared to the interim milestones and minimum threshold numerical targets established in **Section 3: Sustainability Management Criteria**. If results from several monitoring events provide data more representative of actual conditions than what was available or predicted during development of this Updated GSP, the numerical targets may be adjusted. If data indicate an exceedance of a minimum threshold, the Project and Management Actions described under **Section 5: Projects and Management Actions** will be evaluated by the DEID GSA and implemented as determined necessary. It is important to clarify that DEID GSA has been operating sustainably for decades; however, the surrounding GSAs have been continually overdrafting at steadily increasing rates during that same period, inducing impacts within DEID GSA's jurisdictional boundary.

This results in instances of minimum threshold exceedances induced by the actions outside of DEID GSA. DEID GSA is continuing to invest in water banking, recharge, and efficiency improvements to protect the GSA's sustainability and climate resiliency; however, the benefits of DEID GSA's numerous proactive measures are at risk due to the significant level of continued overdraft allowed by groundwater management policies of neighboring GSAs within the Tule subbasin.

Quantitative minimum thresholds, interim milestones, and measurable objectives were established at each RMS within the GSA and are listed in **Section 3: Sustainability Management Criteria** for each applicable sustainability indicator. Criteria for selecting RMSs were based on GSA-established management areas which correlate to the beneficial uses and users of groundwater within the area. Additional discussion for potential impacts to beneficial uses and users of groundwater relative to the established minimum threshold for each of the applicable sustainability indicators is provided in **Section 3: Sustainable Management Criteria.**

Subsection 4.2.2 Monitoring Network Design *[23 CCR § 354.34 (j)]*

> **23 Cal. Code Regs. § 354.34 Monitoring Network**. **(j)** *An Agency that has demonstrated that undesirable results related to one or more sustainability indicators are not present and are not likely to occur in a basin, as described in Section 354.26, shall not be required to establish a monitoring network related to those sustainability indicators*.

The DEID GSA monitoring network has been established to monitor data from the four applicable sustainability indicators (**Figure 4-1**) that may have potential to cause significant and unreasonable effects within the Tule Subbasin (defined in **Section 5.2**):

- Chronic lowering of groundwater levels;
- Reduction of groundwater storage;
- Degraded groundwater quality; and
- Land subsidence.

The sustainability indicators of depletion of interconnected surface water and seawater intrusion are not applicable to DEID GSA:

- **Interconnected surface water:** There are no identified and likely no potential interconnected surface waters or GDEs within DEID GSA that existed as of January 1, 2015, as evidenced by the depth to the first encountered groundwater exceeding hundreds of feet, even during and following historic wet year conditions, like what was experienced in 2023. Nevertheless, DEID GSA's revised GSP includes improvements in the GDE and interconnected surface water evaluation through (1) further review of aerial imagery during the historically wet 2023 conditions to assess the presence of potential GDEs, (2) comparing surface conditions to upper aquifer groundwater level conditions, (3) reviewing The Nature Conservancy's GDE Pulse 2.2 Tool, which was designed to be an update from the Natural Communities Dataset Viewer tool that displays the NCCAG dataset with greater accuracy.
- **Seawater intrusion:** DEID GSA is located approximately 102 miles from the Pacific coast, separated by miles and geologic formations from the potential of seawater intrusion.

The following sections provide a summary of the process, information, and procedures that were incorporated into the development of the DEID GSA monitoring network.

The DEID GSA is intended to adapt to the data being collected, allowing for the addition or removal of monitoring features, changes in monitoring frequency, and updates to alternative monitoring methodologies, as the monitoring evolves during the Plan implementation period.

Subsection 4.2.2.1 Monitoring Network Rationale *[23 CCR § 354.34 (g)(1)(3)]*

> **23 Cal. Code Regs. § 354.34 Monitoring Network**. **(g)** *Each Plan shall describe the following information about the monitoring network:*
>
> **(1)** *Scientific rationale for the monitoring site selection process.*
>
> **(3)** *For each sustainability indicator, the quantitative values for the minimum threshold, measurable objective, and interim milestones that will be measured at each monitoring site or representative monitoring sites established pursuant to Section 354.36.*

DEID GSA's rationale and process for selecting RMSs for each sustainability indicator is summarized in **Table 4-1.** For each sustainability indicator established, quantitative values for minimum thresholds, measurable objectives, and interim milestones were set for the RMSs described in Section 3.5 of this Plan.

The Tule Subbasin rationale and process for selecting RMSs for each sustainability indicator is described in Chapter 2.0 of the TSMP (**Appendix A-1**).

Table 4-1: Rationale and Process for Selecting RMS for Each Applicable Sustainability Indicator

Sustainability Indicator	Rationale for Selecting RMS	Process for Selecting RMS
Chronic Lowering of Groundwater Levels	The RMS Network must have effective temporal, spatial, and aquifer designation coverage to assess progress towards implementation, plan for continued sustainability and climate resiliency, and assess risk.	Each potential RMS well was considered for inclusion based on the following questions: 1. Is there sufficient spatial density of the network? 2. Is there sufficient data coverage for each primary aquifer? 3. Does the potential RMS have a reliable, historic record? 4. Is there reliable access to the site to monitor the well? 5. Have all potential RMS wells been considered to address data gaps?
Reduction of Groundwater Storage	The rationale for chronic lowering of groundwater levels RMS well selection also applies to groundwater storage, as groundwater levels are used to assess changes in groundwater storage.	The process for chronic lowering of groundwater levels RMS well selection also applies to groundwater storage, as groundwater levels are used to assess changes in groundwater storage.
Degraded Groundwater Quality	The RMS network must have effective temporal and spatial coverage and represent conditions for the various groundwater users and uses in the DEID GSA. These RMS wells must be representative of where most residents receive drinking water supplies (communities of Earlimart and Richgrove wells), rural domestic wells, and agricultural wells. Additionally, wells that can be used to assess the relationship between DEID's substantial recharge activities and the groundwater quality in the underlying aquifer are considered a priority data gap that DEID GSA is in the process of filling (see Section 5: Projects and Management Actions) for more information.	Each potential RMS well was considered for inclusion based on the following questions: 1. Is there sufficient spatial density of the network? 2. Is there sufficient data coverage for each primary aquifer? 3. Does the potential RMS have a reliable, historic record? 4. Is there reliable access to the site to monitor the well? 5. Is the RMS network representative of all beneficial users, uses and property interests? 6. For data from external programs, Is there reliable access to the monitoring data in the future? 7. Have all potential RMS wells been considered to address data gaps? 8. Are there plans to fill data gaps?
Land Subsidence	The RMS network must have effective temporal and spatial coverage with increase granularity around most vulnerable critical infrastructure, such as the Friant-Kern Canal and with effective coverage to relate land surface elevation changes with lower aquifer groundwater level elevation changes.	Each potential RMS well was considered for inclusion based on the following questions: 1. Is there effective spatial density of the network? 2. Is there sufficient temporal coverage of the network? 3. For data from external programs, Is there reliable access to the monitoring data in the future? 4. Are there new tools and technologies that can be added to the network?

Subsection 4.2.2.2 Spatial Density and Frequency of Measurement *[23 CCR § 354.34 (d), (f)(1)(2)(3), (h)]*

> **23 Cal. Code Regs. § 354.34 Monitoring Network**. **(d)** *The monitoring network shall be designed to ensure adequate coverage of sustainability indicators. If management areas are established, the quantity and density of monitoring sites in those areas shall be sufficient to evaluate conditions of the basin setting and sustainable management criteria specific to that area***.**
>
> **(f)** *The Agency shall determine the density of monitoring sites and frequency of measurements required to demonstrate short-term, seasonal, and long-term trends based upon the following factors:*
>
> **(1)** *Amount of current and projected groundwater use.*
>
> **(2)** *Aquifer characteristics, including confined or unconfined aquifer conditions, or other physical characteristics that affect groundwater flow.*
>
> **(3)** *Impacts to beneficial uses and users of groundwater and land uses and property interests affected by groundwater production, and adjacent basins that could affect the ability of that basin to meet the sustainability goal.*
>
> **(h)** *The location and type of each monitoring site within the basin displayed on a map, and reported in tabular format, including information regarding the monitoring site type, frequency of measurement, and the purposes for which the monitoring site is being used.*

A map depicting the spatial density of the RMS sites in DEID GSA is available in **Figure 4-2.** Existing monitoring features were used as RMSs based on the conditions outlined in **Section 2**. The locations of RMSs throughout the Tule Subbasin are provided in **Appendix A-1's** Figure A1-2, Figure A1-5, Figure A1-7, Figure A1-8, and Figure A1-9, with additional details listed in Table A1-1, Table A1-2, Table A1-3, and Table A1-6 of the TSMP.

The areas where existing monitoring features and networks did not provide adequate coverage of sustainability indicators were identified as data gaps and described in more detail in **Subsection 4.3.1**.

The frequency of monitoring for each applicable sustainability indicator is summarized in **Table 4-2**. The frequency of monitoring, spatial coverage, and plans to fill data gaps (**Subsection 4.3.1**) are intended to provide sufficient data and information to measure and analyze trends in short-term, seasonal, and long-term groundwater conditions, groundwater use changes, groundwater flow patterns and head gradients, and potential risks of impacts to beneficial users, uses, and property interests.

Table 4-2: Monitoring Frequency

Sustainability Indicator	RMS Type	Monitoring Frequency
Chronic Lowering of Groundwater Levels	Monitoring, Community, Domestic, and Agricultural Wells	Bi-Annually Spring: March 1st – April 30th Fall: September 1st – October 30th
Reduction of Groundwater Storage		
Degraded Groundwater Quality	Community, Domestic, and Agricultural Wells	Annually
Land Subsidence	Survey Benchmark, Extensometer, Points derived from InSAR Raster	Annually

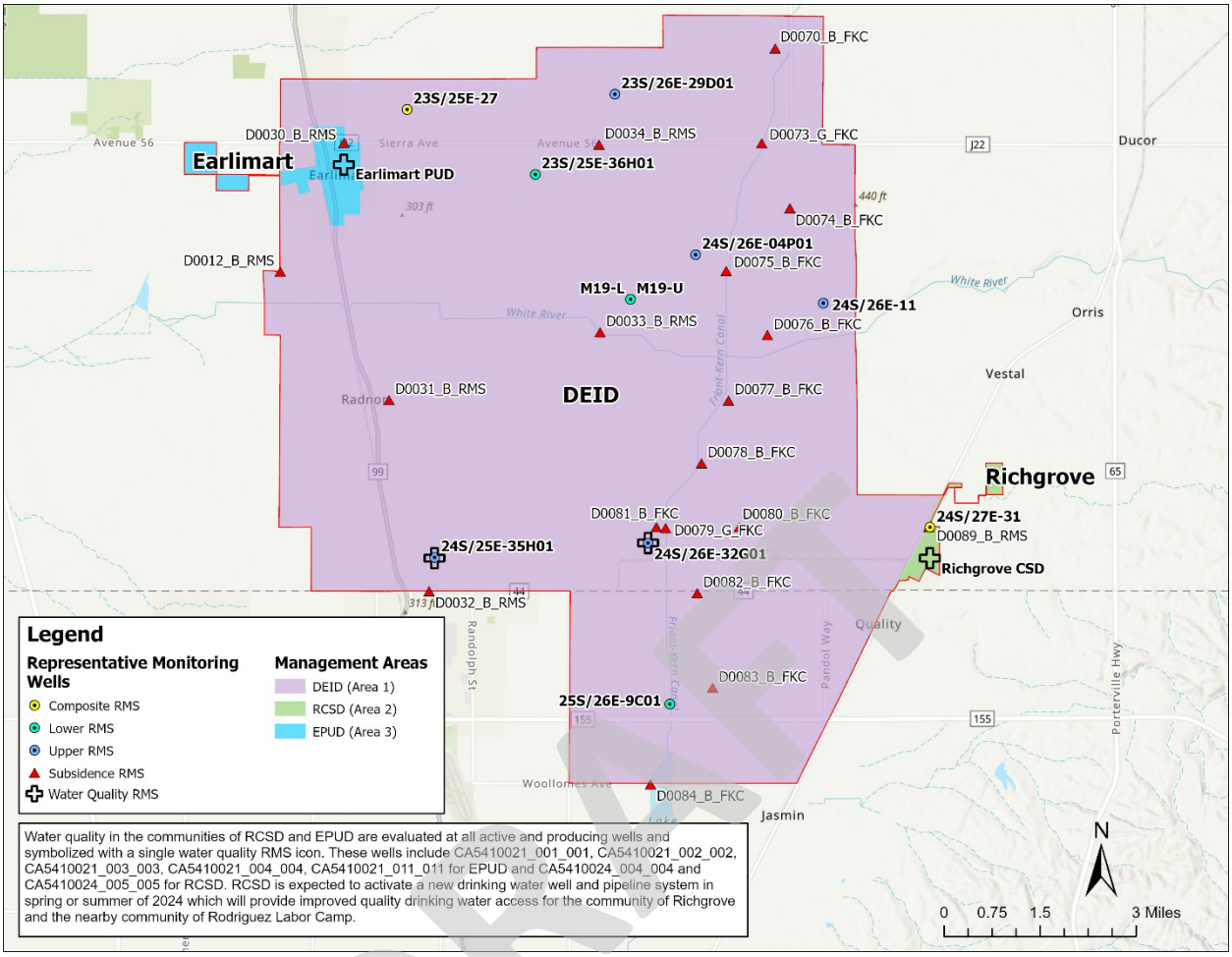

Figure 4-2: DEID GSA Representative Monitoring Network

Subsection 4.2.2.3 Monitoring Protocols and Reporting Standards *[23 CCR § 354.34 (g)(2), (i)]*

> **23 Cal. Code Regs. § 354.34 Monitoring Network. (g)** *Each Plan shall describe the following information about the monitoring network:*
>
> **(2)** *Consistency with data and reporting standards described in Section 352.4. If a site is not consistent with those standards, the Plan shall explain the necessity of the site to the monitoring network, and how any variation from the standards will not affect the usefulness of the results obtained.*
>
> **(i)** *The monitoring protocols developed by each Agency shall include a description of technical standards, data collection methods, and other procedures or protocols pursuant to Water Code Section 10727.2(f) for monitoring sites or other data collection facilities to ensure that the monitoring network utilizes comparable data and methodologies.*

Monitoring protocols relative to each sustainability indicator are described in Chapter 2.0 of the TSMP. Additionally, a Subbasin-wide DMS developed to provide a common database for the Tule Subbasin GSAs to store data is described in Chapter 5.0 of the TSMP (**Appendix A-1**).

Subsection 4.2.2.4 Existing Monitoring *[23 CCR § 354.34 (e), (f)(4)]*

> **23 Cal. Code Regs. § 354.34 Monitoring Network**. **(e)** *A Plan may utilize site information and monitoring data from existing sources as part of the monitoring network.*
>
> **(f)** *The Agency shall determine the density of monitoring sites and frequency of measurements required to demonstrate short-term, seasonal, and long-term trends based upon the following factors:*
>
> **(4)** *Whether the Agency has adequate long-term existing monitoring results or other technical information to demonstrate an understanding of aquifer response***.**

Existing water resource monitoring and management programs specific to the DEID GSA are introduced and described in **Section 1.4.9.** Additionally, Attachment 1 of **Appendix A-1** in Table A1-9 in Chapter 5.3 of the TSMP includes more information about the Tule Subbasin's coordinated monitoring protocols, frequency of measurements, and data storage.

Subsection 4.2.3 Representative Monitoring *[23 CCR § 354.36 (a), (b)(1)(2), (c)]*

> **23 Cal. Code Regs. § 354.36 Representative Monitoring**. *Each Agency may designate a subset of monitoring sites as representative of conditions in the basin or an area of the basin, as follows:*
>
> **(a)** *Representative monitoring sites may be designated by the Agency as the point at which sustainability indicators are monitored, and for which quantitative values for minimum thresholds, measurable objectives, and interim milestones are defined.*
>
> **(b)** *Groundwater elevations may be used as a proxy for monitoring other sustainability indicators if the Agency demonstrates the following:*
>
> **(1)** *Significant correlation exists between groundwater elevations and the sustainability indicators for which groundwater elevation measurements serve as a proxy.*
>
> **(2)** *Measurable objectives established for groundwater elevation shall include a reasonable margin of operational flexibility taking into consideration the basin setting to avoid undesirable results for the sustainability indicators for which groundwater elevation measurements serve as a proxy.*
>
> **(c)** *The designation of a representative monitoring site shall be supported by adequate evidence demonstrating that the site reflects general conditions in the area.*

RMSs are depicted in **Figure 4-2.** The rationale for RMS selection is available in **Table 4-1**. These RMSs are designated as points at which sustainability indicators are monitored and the measurements are compared to the quantitative sustainable management criteria explained in **Section 3: Sustainable Management Criteria**.

Groundwater levels monitoring data are used as a proxy to assess reductions in groundwater storage, as groundwater levels are the base information needed to calculate storage change. Lower aquifer groundwater levels are not used as a proxy for land subsidence monitoring and vice versa; however, the two are analyzed in parallel when assessing risk of impacts, progress towards implementation, and assessments of existing sustainability and resiliency strategies, given the direct relationship between lower aquifer groundwater level declines and land subsidence.

There are no monitoring distinctions between the management areas within DEID GSA. The GSA is assessed on a GSA-scale, Subbasin-wide scale, and regional scale when assessing risk of impacts, progress towards implementation, and review of existing sustainability and resiliency planning.

For Tule Subbasin-wide monitoring information, visit Attachment 1 of **Appendix A-1**'s Chapter 3.0 of the TSMP, which describes representative monitoring in the Tule Subbasin by identifying one or more RMS within each management area for monitoring sustainability indicators.

Subsection 4.2.3.1 Chronic Lowering of Groundwater Levels *[23 CCR § 354.34 (c)(1)(A)(B)]*

> **23 Cal. Code Regs. § 354.34 Monitoring Network**. **(c)** *Each monitoring network shall be designed to accomplish the following for each sustainability indicator:*
>
> **(1)** *Chronic Lowering of Groundwater Levels. Demonstrate groundwater occurrence, flow directions, and hydraulic gradients between principal aquifers and surface water features by the following methods:*
>
> **(A)** *A sufficient density of monitoring wells to collect representative measurements through depth-discrete perforated intervals to characterize the groundwater table or potentiometric surface for each principal aquifer.*
>
> **(B)** *Static groundwater elevation measurements shall be collected at least two times per year, to represent seasonal low and seasonal high groundwater conditions.*

Table 4-2 details the rationale and process for RMS selection for the groundwater level representative monitoring network. Groundwater levels are monitored at a minimum of twice a year, during the seasonal high and seasonal low periods for the groundwater table. This includes September-October for the seasonal low and March-April for the seasonal high (**Table 4-2**).

Table 4-3 lists the 10 groundwater level RMSs, identifies the aquifer and management area, latitude and longitude, and well construction details. Groundwater levels will continue to be monitored as described in Chapter 2.1 of the TSMP. The GSA will continue monitoring groundwater levels at RMSs within management areas shown on **Figure 4-2.** The methods used to establish the RMSs and the frequency of monitoring are discussed in Chapter 3.1 of the TSMP. Existing and proposed RMSs identified for monitoring groundwater levels in the upper and lower aquifer in the Tule Subbasin are included in Table A1-1 and Table A1-3 and mapped in Figure A1-2 and Figure A1-5 of the TSMP (**Appendix A-1**).

Table 4-3: RMSs for Monitoring Groundwater Levels

RMS Well ID	Management Area	Aquifer	Lat	Long	Ground Surface Elevation	Total Depth	Top of Screen	Bottom of Screen
					(ft amsl)	*(ft bgs)*	*(ft bgs)*	*(ft bgs)*
24S/26E-32G01	DEID	Upper	35.80142	-119.18346	397.836	470	23	461
24S/26E-04P01	DEID	Upper	35.86655	-119.17041	388	393	216	393
24S/25E-35H01	DEID	Upper	35.79836	-119.24277	318	340	160	320
23S/26E-29D01	DEID	Upper	35.90218	-119.19274	345.567	300	160	300
24S/26E-11	DEID	Upper	35.85590	-119.13475	436	399	301	399
M19-U	DEID	Upper	35.85595	-119.18824	369	805	200	350
M19-L	DEID	Lower	35.85595	-119.18824	369	805	705	805
25S/26E-9C01	DEID	Lower	35.76495	-119.17725	395.903	1,002	450	1,002
23S/25E-27	DEID	Composite	35.89947	-119.25076	294	800	300	800
24S/27E-31	Richgrove	Composite	35.80513	-119.10438	505.249	850	480	830

Subsection 4.2.3.2 Reduction in Groundwater Storage *[23 CCR § 354.34 (c)(2)]*

> **23 Cal. Code Regs. § 354.34 Monitoring Network**. **(c)** *Each monitoring network shall be designed to accomplish the following for each sustainability indicator:*
>
> **(2)** *Reduction of Groundwater Storage. Provide an estimate of the change in annual groundwater in storage.*

Groundwater level monitoring is used as a proxy for monitoring groundwater storage because groundwater levels serve as the basis for calculating groundwater storage change.

Annual and cumulative changes in groundwater storage of each primary aquifer are completed using two methodologies, and both results are reported in the DEID GSA Annual Reports.

- **Method 1:** Change in groundwater storage calculated by assessing the difference in seasonal high groundwater level contour maps with specific yield applied. This method is consistent with Section 3.6 of the Tule Subbasin Coordination Agreement, utilizing groundwater level data as a proxy for the calculation.
- **Method 2:** Change in groundwater storage calculated using GFM water balance results. This method is included to provide context into DEID GSA's water banking activities, which isn't as clearly presented using Method 1.

Subsection 4.2.3.3 Seawater Intrusion *[23 CCR § 354.34 (c)(3)]*

> **23 Cal. Code Regs. § 354.34 Monitoring Network**. **(c)** *Each monitoring network shall be designed to accomplish the following for each sustainability indicator:*
>
> **(3)** *Seawater Intrusion. Monitor seawater intrusion using chloride concentrations, or other measurements convertible to chloride concentrations, so that the current and projected rate and extent of seawater intrusion for each applicable principal aquifer may be calculated.*

DEID GSA is located approximately 102 miles from the Pacific coast, separated by miles and geologic formations from the potential of seawater intrusion. Therefore, there are no RMSs or sustainable management criteria designated to study seawater intrusion in DEID GSA.

Subsection 4.2.3.4 Degraded Water Quality *[23 CCR § 354.34 (c)(4)]*

> **23 Cal. Code Regs. § 354.34 Monitoring Network**. **(c)** *Each monitoring network shall be designed to accomplish the following for each sustainability indicator:*
>
> **(4)** *Degraded Water Quality. Collect sufficient spatial and temporal data from each applicable principal aquifer to determine groundwater quality trends for water quality indicators, as determined by the Agency, to address known water quality issues.*

The degraded groundwater quality RMS locations within DEID GSA are included in **Figure 4-1.** In addition to the data from these sites, the GSA will continue to evaluate supplemental data to assess local and regional groundwater quality conditions using data collected under separate groundwater quality regulatory programs. These programs include (1) public water systems, for compliance with the

requirements of Title 22[1], (2) Tule Basin Water Quality Coalition (TBWQC, 2017) for compliance with the requirements of General order R5-2013-0120; and (3) other sources that may be applicable.

The rationale and process to define groundwater quality representative monitoring network is described in **Table 4-1.** Well types are categorized as drinking water, agricultural, or not applicable based on breakdown in **Table 4-4.** Monitoring to better understand the relationship between DEID GSA's recharge activities and groundwater quality in the underlying aquifer is considered a data gap and is expected to be addressed via new management action(s) described in **Section 5: Projects and Management Actions.** At this time, the data gaps associated with groundwater quality in DEID GSA include groundwater quality data representative of domestic well depths and groundwater quality data near the Turnipseed Water Banking Facility. More information on these data gaps and the efforts to fill them is available in **Subsection 4.3.1. Table 4-5** lists the four RMS wells, identifies the aquifer and management area, latitude and longitude, and well construction details.

Within the DEID GSA, four RMSs have been identified for monitoring groundwater quality annually. Three of the four have been designated as drinking water RMS, two being wells that supply the communities of Earlimart and Richgrove, and one being a domestic supply well. Drinking water quality standards are more stringent than agricultural groundwater quality standards; hence, the focus of the DEID GSA's groundwater quality RMS being based on the primary drinking water supply for the residents of DEID GSA. 85-90% of the residents within the GSA are supplied by a community well (mostly Earlimart and Richgrove), while the remaining residents are supplied by rural domestic wells.

Although drinking water quality is the focus, it is important for DEID GSA to assess the groundwater quality conditions to meet other beneficial uses, like irrigation for agriculture. The fourth groundwater quality RMS well is designated as an agricultural RMS well, which is monitored for agricultural constituents of concern and representative of the surrounding beneficial use.

Domestic wells that experience groundwater quality contamination induced by groundwater management activities, such as pumping, recharge, land subsidence, or other physical mechanism, may qualify for mitigation via the DEID GSA Mitigation Plan. More information on this is available in **Appendix A-5: DEID GSA Mitigation Plan**.

[1] California Division of Drinking Water, 2018

Table 4-4: Categories of Well Types

Drinking Water	Agricultural	Not Applicable
Domestic Public Water Supply Water Supply Domestic Water Supply Public	Irrigation - Agricultural Other Irrigation Water Supply Irrigation - Agricultural Water Supply Irrigation - Agriculture Water Supply Stock or Animal Watering	Cathodic Protection Destruction Monitoring Destruction Unknown Soil Boring Monitoring Other Destruction Test Well Test Well Unknown Unknown Vapor Extraction Vapor Extraction n/a Water Supply Industrial Blanks

Table 4-5: RMSs for Monitoring Groundwater Quality

RMS ID	Management Area	Well Use	Aquifer	Lat	Long	Well Depth	Top of Perforation	Bottom of Perforation
						(ft bgs)	*(ft bgs)*	*(ft bgs)*
E0083349	DEID	Domestic (Drinking Water)	Upper	35.88429	-119.23127	305	265	305
1095774	DEID	Agriculture	Upper	35.79809	-119.24255	340	160	320
RCSD CCR	Richgrove	Community (Drinking Water)	N/A	N/A	N/A	N/A	N/A	N/A
EPUD CCR	Earlimart	Community (Drinking Water)	N/A	N/A	N/A	N/A	N/A	N/A

Subsection 4.2.3.5 Land Subsidence *[23 CCR § 354.34 (c)(5)]*

23 Cal. Code Regs. § 354.34 Monitoring Network. (c) *Each monitoring network shall be designed to accomplish the following for each sustainability indicator:*

(5) *Land Subsidence. Identify the rate and extent of land subsidence, which may be measured by extensometers, surveying, remote sensing technology, or other appropriate method.*

Land subsidence within DEID GSA is attributed to groundwater management in neighboring GSAs. More information on this determination is available in **Subsection 2.2 Groundwater Conditions,** including an attribution analysis that determined land subsidence within DEID GSA from 1986 through 2017 was within the measurement accuracy limit, while much of it is attributed to overdraft in neighboring GSAs.

Land subsidence will continue to be monitored via multiple tools and resources, including data from survey, extensometer measurements, and InSAR.

The land subsidence monitoring network is depicted in **Figure 4-2** and listed in **Table 4-6.** The rationale for establishing this network is included in **Table 4-1**. It is important to clarify that InSAR's spatial coverage is not depicted in **Figure 4-2**; however, it covers the entirety of DEID GSA via raster files.

Table 4-6: RMSs for Monitoring Land Subsidence

RMS ID	Management Area	GPS Coordinates		Baseline Elevation
		Latitude	Longitude	*(ft amsl)*
D0070_B_FKC	DEID	35.91343	-119.148269	396
D0073_G_FKC	DEID	35.892022	-119.151852	395
D0081_B_FKC	DEID	35.805089	-119.180813	399
D0078_B_FKC	DEID	35.819486	-119.168215	405
D0077_B_FKC	DEID	35.834073	-119.161183	401
D0076_B_FKC	DEID	35.84863	-119.150061	409
D0074_B_FKC	DEID	35.877256	-119.143982	418
D0079_G_FKC	DEID	35.805073	-119.178585	400
D0080_B_FKC	DEID	35.80553	-119.157965	432
D0082_B_FKC	DEID	35.790221	-119.169645	422
D0083_B_FKC	DEID	35.769064	-119.165418	417
D0084_B_FKC	DEID	35.747001	-119.182358	387
D0089_B_RMS	Richgrove	35.805288	-119.105225	505
D0033_B_RMS	DEID	35.849263	-119.196881	361
D0034_B_RMS	DEID	35.891666	-119.196996	346
D0030_B_RMS	Earlimart	35.891982	-119.268016	281
D0012_B_RMS	DEID	35.862818	-119.285763	273
D0031_B_RMS	DEID	35.833956	-119.255191	300
D0032_B_RMS	DEID	35.79103	-119.24428	317

Subsection 4.2.3.6 Interconnected Surface Water *[23 CCR § 354.34 (c)(6)]*

23 Cal. Code Regs. § 354.34 Monitoring Network. (c) *Each monitoring network shall be designed to accomplish the following for each sustainability indicator:*

(6) *Depletions of Interconnected Surface Water. Monitor surface water and groundwater, where interconnected surface water conditions exist, to characterize the spatial and temporal exchanges between surface water and groundwater, and to calibrate and apply the tools and methods necessary to calculate depletions of surface water caused by groundwater extractions. The monitoring network shall be able to characterize the following:*

(A) *Flow conditions including surface water discharge, surface water head, and baseflow contribution.*

(B) *Identifying the approximate date and location where ephemeral or intermittent flowing streams and rivers cease to flow, if applicable.*

(C) *Temporal change in conditions due to variations in stream discharge and regional groundwater extraction.*

(D) *Other factors that may be necessary to identify adverse impacts on beneficial uses of the surface water.*

Depletion of interconnected surface water does not apply to DEID GSA because of the rarity of water present in the natural surface water body footprints within DEID GSA and depth to groundwater. More information and rationale, including maps, aerial imagery, and analysis results that informed this determination is available in **Subsection 2.2 Groundwater Conditions**.

Subsection 4.3 Assessment and Improvement of Monitoring Network *[23 CCR § 354.38 (a), (e)(1)(2)(3)(4)]*

23 Cal. Code Regs. § 354.38 Assessment and Improvement of Monitoring Network. **(a)** *Each Agency shall review the monitoring network and include an evaluation in the Plan and each five-year assessment, including a determination of uncertainty and whether there are data gaps that could affect the ability of the Plan to achieve the sustainability goal for the basin.*

(e) *Each Agency shall adjust the monitoring frequency and density of monitoring sites to provide an adequate level of detail about site-specific surface water and groundwater conditions and to assess the effectiveness of management actions under circumstances that include the following:*

(1) *Minimum threshold exceedances.*

(2) *Highly variable spatial or temporal conditions.*

(3) *Adverse impacts to beneficial uses and users of groundwater.*

(4) *The potential to adversely affect the ability of an adjacent basin to implement its Plan or impede achievement of sustainability goals in an adjacent basin.*

All analyses and groundwater management planning and analyses require sufficient data and information to reduce uncertainty and improve accuracy. All data gaps identified by DEID GSA and the GSA's plan to fill these data gaps are listed in **Subsection 4.3.1** and **Table 4-7**.

Subsection 4.3.1 Data Gaps and Plan to Fill Them *[23 CCR § 354.38 (b), (c)(1)(2),]*

23 Cal. Code Regs. § 354.38 Assessment and Improvement of Monitoring Network. **(b)** *Each Agency shall identify data gaps wherever the basin does not contain a sufficient number of monitoring sites, does not monitor sites at a sufficient frequency, or utilizes monitoring sites that are unreliable, including those that do not satisfy minimum standards of the monitoring network adopted by the Agency.*

(c) *If the monitoring network contains data gaps, the Plan shall include a description of the following:*

(1) *The location and reason for data gaps in the monitoring network.*

(2) *Local issues and circumstances that limit or prevent monitoring.*

(d) *Each Agency shall describe steps that will be taken to fill data gaps before the next five-year assessment, including the location and purpose of newly added or installed monitoring sites.*

Table 4-7 lists the data gaps within DEID GSA by sustainability indicator and the efforts to fill these data gaps.

Table 4-7: Data Gaps and Plans to Fill Them

Sustainability Indicator	Data Gaps	Plan to Fill Data Gaps
Chronic Decline of Groundwater Levels & Reduction of Groundwater Storage	Domestic well location, ownership/contact information, construction, and groundwater level data	DEID GSA has initiated a new Management Action (Action 9: Well Registration Program), which is intended to gather previously unavailable groundwater quality, groundwater level, well location, ownership, and construction data and information through a voluntary registration program designed to address the domestic well data gaps; however, is open to all well types. Additionally, implementation of the DEID Mitigation Plan (Action 7) includes groundwater level monitoring and installation of transducers on all mitigated wells.
Land Subsidence	No notable data gaps within DEID GSA; however, more sufficient lower aquifer monitoring is needed in neighboring GSAs to monitor and assess the risk of future land subsidence impacts within DEID GSA as well as to enforce policies required by the Tule Subbasin Subsidence Management Plan. More information on the Tule Subbasin Subsidence Management Plan is available in the Coordination Agreement (**Appendix A-1**).	DEID GSA will continue to advocate for and support initiatives to better understand the lower aquifer well presence, use, and groundwater levels throughout the Tule Subbasin in and around critical infrastructure of which DEID GSA is a beneficial user, such as the Friant-Kern Canal.
Groundwater Quality	Groundwater quality by aquifer designation/well depth	DEID GSA has initiated a new Management Action (Action 9: Well Registration Program), which is intended to gather previously unavailable groundwater quality, groundwater level, well location, ownership, and construction data and information through a voluntary registration program designed to address the domestic well data gaps; however, is open to all well types. Additionally, implementation of the DEID Mitigation Plan (Action 7) includes groundwater quality monitoring for all mitigated sites.
	Relationship between recharge activities and underlying groundwater quality	DEID GSA has initiated a new Management Action (Action 10: Recharge Relational Groundwater Quality Monitoring Program), which is intended to install new monitoring wells or identify existing wells that can be used for monitoring the relationship between the recharge activities in the Turnipseed Water Banking Facilities and the groundwater quality in the underlying aquifer and flow path.

Subsection 4.4 Reporting Monitoring Data to the Department

[23 CCR § 354.40]

23 Cal. Code Regs. § 354.40 Reporting Monitoring Data to the Department. *Monitoring data shall be stored in the data management system developed pursuant to Section 352.6. A copy of the monitoring data shall be included in the Annual Report and submitted electronically on forms provided by the Department.*

DEID GSA produces an Annual Report that is submitted to DWR and made publicly available via the SGMA Portal by April 1 every year, which compiles the monthly, seasonal, and annual data collected from the representative monitoring network and supplemental resources, as needed. These Annual Reports include comparisons of the monitoring results to sustainable management criteria, qualitative descriptions of progress towards implementation, and updates on projects and management actions.

Section 5 Projects and Management Actions

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Subsection 5.1 Introduction *[Reg. § 354.42]*

23 Cal. Code Regs. § 354.42 Introduction to Projects and Management Actions. *This Subarticle describes the criteria for projects and management actions to be included in a Plan to meet the sustainability goal for the basin in a manner that can be maintained over the planning and implementation horizon.*

This Section describes the projects and management actions the DEID GSA intends to continue operating or newly undertake which are designed to maintain sustainable groundwater conditions within the DEID GSA over the planning and implementation horizon and thereafter. Specifically, the projects and management actions described herein are proactive measures to avoid impacts on the GSA's most vulnerable beneficial users, uses, and property interests.

Subsection 5.2 Projects and Management Actions *[Reg. § 354.44]*

23 Cal. Code Regs § 354.44 Projects and Management Actions. (a) *Each Plan shall include a description of the projects and management actions the Agency has determined will achieve the sustainability goal for the basin, including projects and management actions to respond to changing conditions in the basin.*

DEID GSA is a unique circumstance of being in a sustainable position in a critically overdraft subbasin. DEID GSA has achieved decades of sustainable management through significant investments in groundwater recharge, banking, and surface water use in lieu of groundwater. DEID GSA intends to maintain this sustainability, despite increasing pressure from neighboring GSAs' unsustainable groundwater management and allowable overdraft.

The projects and management actions fall into the following general categories of actions:

1. Current Surface Water Supply Optimization
2. Development of Additional Surface Water Supplies
3. Existing and Future Managed Aquifer Recharge
4. Municipal Water Supply and Quality Projects
5. Mitigation
6. Plan to Fill Data Gaps

Each of the identified projects and management actions will benefit and continue to maintain the sustainability goal of the DEID GSA as well as assist the Tule Subbasin in its overall ability to achieve its sustainability through one or more of the following effects:

- Increased or optimized availability of sustainable water supplies;
- Improved balance of water demands with available water supplies;
- Assisting the Subbasin in achieving improved or stabilized groundwater levels;
- Assisting the Subbasin in reduction or cessation of subsidence near critical infrastructure and across the Tule Subbasin;
- Improved or stabilized water quality for domestic, agronomic and municipal purposes;
- Increased or more efficient use of available funding for local water management;

- Improved quantities, quality, and transparency of relevant regional water management data;
- Mitigate individual impacts to beneficial users within the DEID GSA area induced by groundwater management, which is expected to be caused by neighboring GSA management exclusively;
- Fill data gaps to improve understanding of the relationship between recharge activities and groundwater quality;
- Fill data gaps to improve understanding of groundwater levels and quality at rural domestic wells;
- Provide information necessary to more accurately assess impact risk to domestic wells and initiate proactive measures.

Because of the unique attributes, water assets, and needs of the three individual Management Areas that compose the DEID GSA, proposed projects and management actions are arranged by and presented for each Management Area. The three Management Areas in the DEID GSA are:

- DEID Management Area: the service area of DEID;
- EPUD Management Area: the service area of EPUD;
- RCSD Management Area: the service area of RCSD.

Each individual project and management action includes a description that meets the DWR GSP Regulations' requirements and provides:

- A general summary of the action [Reg. § 354.44(a)]
- A description of the circumstances that have or will lead to the consideration and/or trigger the implementation of the action [Reg. § 354.44(b)(1)(A)]
- A summary of the anticipated process of public notice regarding the consideration and implementation of the action [Reg. § 354.44(b)(1)(B)]
- If applicable, a quantification of the anticipated groundwater demand to be reduced as a result implementing of the action [Reg. § 354.44(b)(2)]
- A summary of the permitting and regulatory processes that may be required to undertake the action [Reg. § 354.44(b)(3)]
- A timeline summarizing the expected initiation, completion, and accrual of expected benefits for the action [Reg. § 354.44(b)(4)]
- An explanation of the benefits that are expected to be realized and how those benefits will be evaluated for the action [Reg. § 354.44(b)(5)]
- A general explanation of how the action will be accomplished and, if applicable, the source and reliability of waters relied upon from outside of the Agency's jurisdiction to accomplish the action [Reg. § 354.44(b)(6)]
- A summary of the legal authority to undertake the action [Reg. § 354.44(b)(7)]
- An estimate of the cost and funding source anticipated to undertake the action [Reg. § 354.44(b)(8)]

- If applicable, an explanation of how groundwater extractions and/or recharge during periods of drought will be offset during other periods to ensure the avoidance of chronic lowering of groundwater levels and/or the depletion of supplies [Reg. § 354.44(b)(9)]

Subsection 5.2.1 Delano-Earlimart Irrigation District Management Area: DEID Service Area *[Reg. § 354.44(b)(1)]*

> **23 Cal. Code Regs § 354.44 Projects and Management Actions. (b)** *Each Plan shall include a description of the projects and management actions that include the following:*
>
> **(1)** *A list of projects and management actions proposed in the Plan with a description of the measurable objective that is expected to benefit from the project or management action. The list shall include projects and management actions that may be utilized to meet interim milestones, the exceedance of minimum thresholds, or where undesirable results have occurred or are imminent.*

Projects and management actions for the DEID Management Area (DEID MA) are associated with the following general categories of actions:

- Optimization of existing imported water supplies
- Development of additional imported water supplies
- Existing and future managed aquifer recharge
- Mitigation of identified adverse conditions

Successful implementation of the projects and management actions for the DEID MA will ensure its continued sustainability.

The following project and management actions have been identified for the DEID MA:

Action 1 Continued importation and optimization of imported water supplies to meet consumptive use requirements

Action 2 Actions to increase imported water quantities above historic operations to meet consumptive use requirements and new water demands (including the Fallowed Area Recharge Management program)

Action 3 Continued operations of existing in-district recharge/banking operations for future groundwater extraction needs

Action 4 Actions to increase in-district recharge/banking operations for future groundwater extraction needs

Action 5 Continued operations of existing out-of-district banking operations to augment future imported water supplies

Action 6 Actions to increase out-of-district groundwater banking operations to augment future imported water supplies

Action 7 Implementation of mitigation plan for impacts induced by groundwater management

Action 8 ***New** Actions to support Tulare County well permit effectiveness by reviewing all new agricultural and domestic well permit applications and assessing if proposed well may elevate risk of inducing water level decline or subsidence impacts to nearby wells and/or critical infrastructure

Action 9 ***New** Well Registration Program

Action 10 ***New** Groundwater Quality Monitoring Program

Action 11 ***New** Exceedance Policy and Investigation

Subsection 5.2.1.1 Action 1 – Continued Importation and Optimization of Imported Water Supplies

Subsection 5.2.1.1.1 Description

The DEID service area consists of approximately 56,500 acres that began receiving imported CVP water in 1950. DEID has the largest Class 1 contract in the Friant Division and a sizeable Class 2 contract. Additionally, DEID's CVP water contract provides opportunity to access other water supplies that, depending on hydrologic conditions, are available to it, including flood waters, unreleased restoration flows, Section 215 water, and recaptured/recirculated water. Other non-CVP water supplies are also accessible on an opportunistic basis. These additional sources of water are defined, along with further description of DEID's CVP contract, in **Subsection 1.4.3 Conjunctive Use Programs**.

Water records from DEID indicate that from 1987 to 2023 DEID imported nearly 4.0 million acre-feet or an average of approximately 110,000 acre-feet per year. This figure is comprised of two categories: approximately 105,000 acre-feet of irrigation deliveries, and approximately 5,000 acre-feet of deliveries to in-District recharge facilities. Note that this average in-District recharge value encompasses two very distinct periods of District operations. From 1987 and up to the passage of SGMA in 2014, DEID's in-District recharge area had grown from nothing to 160 acres, with average annual deliveries of 1,490 acre-feet during this period. In 2015, following the passage of SGMA, DEID began to prioritize in-District recharge operations, maximizing the use of the existing facilities and implementing an aggressive plan to develop new facilities. The sixth and final phase of this expansion project will be completed in late summer of 2024, increasing the total in-District recharge area to 944 acres. From 2015 to 2023, average in-District recharge deliveries increased to nearly 13,000 acre-feet per year. During this same period of 2015 – 2023, which was comprised of primarily dry or critically dry year types, DEID continued to maintain deliveries to Out-of-District water banks averaging more than 14,000 acre-feet per year. When taking into consideration all available water to the DEID MA during the period of 1987-2023, which includes imported surface water used for irrigation and in-District recharge, precipitation, and sustainable yield, the amount of water available on an average annual basis was 154,842 acre-feet. Over the same 37-year period, the average annual consumptive demand of the District was 135,690 acre-feet per year. Comparing these values yields an average net surplus of 19,152 acre-feet per year, indicating that DEID MA has been, on average, a net contributor of imported water to the Subbasin. The

DEID MA will continue its current practice of importing available water supplies from both CVP and non-CVP sources and optimize those supplies for use within the DEID MA.

The Friant Water Authority released a report in 2018 to support GSAs in future surface water supply planning and management. The report evaluated the projected supplies for each Friant Division Contractor under various scenarios, with constraints[1] including five climate change conditions in the modeling (Friant Water Authority, 2018). The results for Delano-Earlimart Irrigation District are reported below in **Table 5-1.**

[1] Constraints included natural variability of annual precipitation, changes in climate and hydrology, implementation of the San Joaquin River Restoration Settlement (SJRRS) restoration goal, implementation of the SJRRS water management goal, and interruptions in Delta Water Supplies.

Table 5-1: Projected Reliability of DEID's Class 1 and Class 2 Surface Water Supplies

Summary of Delano-Earlimart Irrigation District Impacts per Climate Change and Mediator's Report (Friant Water Authority, 2018)					
	Long-Term Average Class 1 and Class 2/Other Impacts				
	2015 Condition	Near-Future Condition (2030)	Late-Future Condition (2070)	Late-Future Condition (2070) *Drier/ Extreme Warming Scenario*	Late-Future Condition (2070) Wetter/ Moderate Warming Scenario
Volumetric Impacts (Acre-Feet)	10,530	11,960	12,470	13,100	10,970
Percent Contract Volume Impact	7.06%	7.46%	7.97%	9.55%	7.18%

Source: FWA 2018

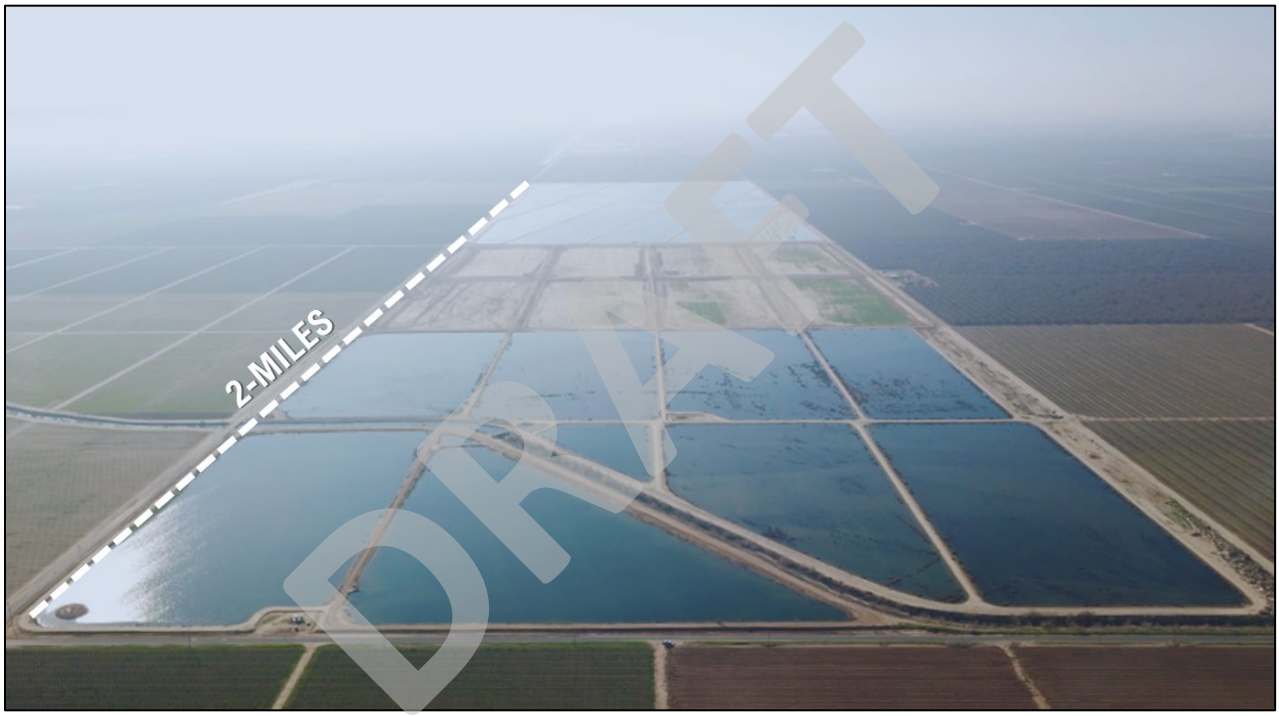

Figure 5-1: Turnipseed Recharge Facility Photo

Subsection 5.2.1.1.2 Circumstantial Considerations *[Reg. § 354.44(b)(1)(A)]*

23 Cal. Code Regs § 354.44 Projects and Management Actions. (b) *Each Plan shall include a description of the projects and management actions that include the following:*

(1) *…The Plan shall include the following:*

(A) *A description of the circumstances under which projects or management actions shall be implemented, the criteria that would trigger implementation and termination of projects or management, and the process by which the Agency shall determine that conditions requiring the implementation of particular projects or management actions have occurred.*

Given the need for the DEID MA to remain sustainable as required by SGMA, the continued importation and optimization of imported water supplies management action will be implemented as an ongoing and historical practice.

Subsection 5.2.1.1.3 Public Notice Process *[Reg. § 354.44(b)(1)(B)]*

> **23 Cal. Code Regs § 354.44 Projects and Management Actions. (b)** *Each Plan shall include a description of the projects and management actions that include the following:*
>
> **(1)** *…The Plan shall include the following:*
>
> **(B)** *The process by which the Agency shall provide notice to the public and other agencies that the implementation of projects or management actions is being considered or has been implemented, including a description of the actions to be taken***.**

No additional public notice is necessary to implement this ongoing action.

Subsection 5.2.1.1.4 Quantification of Water Budget Impact *[Reg. § 354.44(b)(2)]*

> **23 Cal. Code Regs § 354.44 Projects and Management Actions. (b)** *Each Plan shall include a description of the projects and management actions that include the following:*
>
> **(2)** *If overdraft conditions are identified through the analysis required by Section 354.18, the Plan shall describe projects or management actions, including a quantification of demand reduction or other methods, for the mitigation of overdraft.*

As a result of this action, it is anticipated that there will be a net contribution of approximately 17,000 acre-feet per year of imported water on average stored in the Subbasin for future recovery and use by customers of the DEID MA through the continuation of importing water by DEID. After taking into account future reductions in supplies from a fully restored San Joaquin River and climate change, an average annual net contribution of approximately 17,000 acre-feet of stored imported water will be used for future water budgets. This estimate of net contribution is based off the total available water to DEID MA of 128,775 acre-feet per year over the recent historical 20-year period compared to the 2017 crop consumptive use in the DEID MA of 111,126 acre-feet. DEID MA makes up more than 98-percent of the acreage of DEID GSA and more than 99-percent of the water use within the GSA, for context.

The conveyance capacity of the Friant-Kern Canal during that 20-year historical period was hindered by subsidence-induced sinking upstream of DEID GSA. This has since been mitigated via the Middle Reach Improvement Project, which is expected to increase the volume of surface water available to DEID for deliveries and banking. It is important to note that despite the benefits of the Middle Reach Improvement Project, the full extent of the mitigation efforts' benefits are compromised by continued subsidence induced by neighboring GSA's overpumping of the lower aquifer during the construction period.

Subsection 5.2.1.1.5 Permitting and Regulatory Process *[Reg. § 354.44(b)(3)]*

> **23 Cal. Code Regs § 354.44 Projects and Management Actions. (b)** *Each Plan shall include a description of the projects and management actions that include the following:*
>
> **(3)** *A summary of the permitting and regulatory process required for each project and management action.*

No additional permitting or regulatory process is necessary to implement this ongoing action.

Subsection 5.2.1.1.6 Timeline *[Reg. § 354.44(b)(4)]*

> **23 Cal. Code Regs § 354.44 Projects and Management Actions. (b)** *Each Plan shall include a description of the projects and management actions that include the following:*
>
> **(4)** *The status of each project and management action, including a time-table for expected initiation and completion, and the accrual of expected benefits.*

Implementation of the action is historical and ongoing and will continue throughout the SGMA implementation period and beyond.

Subsection 5.2.1.1.7 Anticipated Benefits & Evaluation *[Reg. § 354.44(b)(5)]*

> **23 Cal. Code Regs § 354.44 Projects and Management Actions. (b)** *Each Plan shall include a description of the projects and management actions that include the following:*
>
> **(5)** *An explanation of the benefits that are expected to be realized from the project or management action, and how those benefits will be evaluated.*

As noted above, the DEID MA is a net contributor to the Tule Subbasin, fully offsetting all DEID MA pumping on an annual average basis. Historically and projected into the future, any pumping required in the DEID MA is offset from past and future imported water deposits to the Tule Subbasin and then recovered by pumping in water years when surface water imports and other available supplies are insufficient to meet crop demands. By continuing importation and optimization of surface water supplies, DEID expects to increase/stabilize groundwater levels and water in storage in the Basin, notwithstanding the effect of anticipated continued over-pumping that will occur during the SGMA implementation period by others adjacent to the DEID MA as well as projected reductions in Tule Subbasin groundwater levels post-2020 as adjacent GSA's implement transitional pumping programs and their other projects and management actions over time and groundwater levels continue to equilibrate in the Tule Subbasin and adjoining subbasins.

Evaluation of the benefits of this action will occur through continued evaluation of impacts to the DEID MA and the Tule Subbasin relating to annual CVP water importation, use and storage, and other water deliveries into the DEID MA. A full accounting of said deliveries, including sources of supply and final use of all water obtained, will be described in the annual reports and 5-year periodic reviews of the GSP required by the Regulations. Benefits from this action will also be evaluated through review of groundwater level and groundwater quality data.

Subsection 5.2.1.1.8 Accomplishment *[Reg. § 354.44(b)(6)]*

> **23 Cal. Code Regs § 354.44 Projects and Management Actions. (b)** *Each Plan shall include a description of the projects and management actions that include the following:*
>
> **(6)** *An explanation of how the project or management action will be accomplished. If the project or management actions rely on water from outside the jurisdiction of the Agency, an explanation of the source and reliability of that water shall be included.*

Accomplishment and implementation of this action will be documented as noted in the above sections.

Subsection 5.2.1.1.9 Legal Authority *[Reg. § 354.44(b)(7)]*

> **23 Cal. Code Regs § 354.44 Projects and Management Actions. (b)** *Each Plan shall include a description of the projects and management actions that include the following:*
>
> **(7)** *A description of the legal authority required for each project and management action, and the basis for that authority within the Agency.*

DEID has the contractual right to specific quantities of water under its contract with the Bureau of Reclamation. Contract number I75r-3327D provides the DEID MA with up to 108,800 acre-feet of Class 1 water and up to 74,500 of Class 2 water annually. This CVP contract also provides access to other water supplies that may be available on an annual basis dependent on hydrology.

Subsection 5.2.1.1.10 Cost & Funding *[Reg. § 354.44(b)(8)]*

> **23 Cal. Code Regs § 354.44 Projects and Management Actions. (b)** *Each Plan shall include a description of the projects and management actions that include the following:*
>
> **(8)** *A description of the estimated cost for each project and management action and a description of how the Agency plans to meet those costs.*

Because the jurisdictional boundaries of DEID and those of the DEID MA are coterminous, cost and funding of Action 1 will be fully the responsibility of DEID.

Cost: Implementation of this action is an ongoing cost for the DEID, which includes the cost of the supply as well as the distribution of that supply through DEID's dedicated pipeline distribution system and related pumping plants, regulating reservoirs, and related operational and maintenance expenses. Cost of implementing this action (and other actions identified in this section) composes most of the annual budgeted expense of DEID, which totals $27,855,308 in 2024. Components of this budget total that are associated with implementation of this action are:

- Water Supply (variable) - $11,139,091
- Water Supply (fixed) - $4,764,586
- Energy Supply - $1,372,855
- Water Operations - $324,401
- System Maintenance - $1,140,222
- System Maintenance Support - $104,404
- Administration - $2,317,526
- Buildings and Yards - $51,338
- Long-term Bond annual expense - $1,452,500
- Capital Expenditures - $4,918,088
- Non-Operating Expenses - $270,297.

A current summary of capital and implementation costs over a longer period of time is available in **Table 6-1** of **Section 6**.

Funding: The total cost of Action 1 is budgeted and funded annually. There are four primary categories of funding currently used and will continue to be used to fund this action:

- Revenue from annual water sales – includes sales to individual water users, other districts, and other sales - $11,920,000
- Other operating revenue – includes income from participation in energy projects, pumping charges paid by water users, and grant revenue -$6,956,833
- Non-operating revenues – Income from investments and rents/leases - $1,066,224
- Fixed revenues – income from property assessments, standby charges, and voter-approved special benefit and supplemental assessments - $7,952,149

Total current funding from these sources is $27,895,206, which is sufficient to fund this action.

Subsection 5.2.1.1.11 Drought Offset Measures *[Reg. § 354.44(b)(9)]*

> **23 Cal. Code Regs § 354.44 Projects and Management Actions. (b)** *Each Plan shall include a description of the projects and management actions that include the following:*
>
> **(9)** *A description of the management of groundwater extractions and recharge to ensure that chronic lowering of groundwater levels or depletion of supply during periods of drought is offset by increases in groundwater levels or storage during other periods.*

DEID adjusts expenses and revenues annually to reach a balanced budget. Drought years are managed accordingly, both with respect to maximizing water supplies and fiscal responsibility. DEID MA has already reached long-term sustainability and is a net contributor of water to the Subbasin, which is a function of in-lieu recharge, irrigation return flows and direct groundwater recharge/banking projects both inside and outside of the DEID boundaries. Through its importation of water, DEID has historically placed a lesser burden, and in many years no to little burden, on native groundwater, whose sustainability is the focus of SGMA.

The DEID MA's drought offset measures are primarily centered in exercising its stored water recovery rights of previously deposited imported water in the Subbasin and recovery of banked water in other subbasins where out-of-district banking projects are located. Future operations anticipate continued recovery of stored water when necessary in drought years.

Subsection 5.2.1.1.12 Corresponding Attachments *[Reg. § 354.44(c)]*

> **23 Cal. Code Regs § 354.44 Projects and Management Actions. (c)** *Projects and management actions shall be supported by best available information and best available science.*

There are no attachments associated with this action. See Executive Summary for historical background on DEID's CVP conjunctive use protocols, groundwater banking, and story of sustainability.

Subsection 5.2.1.2 Action 2 – Increase Importation of Imported Waters and Fallowed Area Recharge Management

Action 2 of the DEID MA consists of increasing imported water quantities above historical operations to meet consumptive use requirements and new water demands, and reduce reliance on groundwater

pumping through two primary actions: 1) Irrigation demand time shifting and 2) Fallowed Area Recharge Management.

Subsection 5.2.1.2.1 Description

The DEID service area consists of approximately 56,500 acres that began receiving imported CVP water in 1950. DEID has the largest Class 1 contract in the Friant Division and a sizeable Class 2 contract as well. Additionally, DEID's CVP water contract provides opportunity to access other water supplies that, depending on hydrologic conditions, are sometimes available to it, including flood waters, unreleased restoration flows, Section 215 water, and recaptured/recirculated water. Other non-CVP water supplies are also accessible on an opportunistic basis.

Water records from DEID indicate that from 1987 to 2023 DEID imported nearly 4.0 million acre-feet or an average of approximately 110,000 acre-feet per year. As noted in Action 1, the DEID MA has been historically sustainable and is projected to remain so throughout the SGMA planning and implementation horizon. Despite this fact, the DEID MA will continue to take advantage of opportunities to increase importation of surface water by accessing maximum amounts of imported water through its CVP contract as those supplies become available. In this management action, the focus will be on meeting additional demands within the DEID MA. Examples of this additional demand are:

- **Purchase of Water In Addition To Contract Supplies** – The DEID MA has and will continue to purchase supplemental water in addition to water available under its CVP contract.
- **Fallowed Area Recharge Management Program** – The DEID MA began a new program in 2019 to promote the use of lands that are periodically fallowed as part of a crop rotation/ replacement program as recharge sites. The Fallowed Area Recharge Management (FARM) Program encourages short-term groundwater recharge on private lands for the benefit of the DEID MA.
- **Irrigation Demand Time Shifting Protocols** – Irrigation demands within DEID in the peak irrigation season may sometimes exceed the delivery capacity of the FKC due to current canal capacity constraints caused by subsidence impacts upstream of the DEID, including subsidence-related impacted induced during construction and after completion of the Middle Reach Correction Project (completed in May 2024). So that full demands for irrigation water may be met with surface water (and therefore limit groundwater pumping), the DEID MA may create incentives to encourage irrigation demands be shifted from mid-week to weekends when there is typically unused capacity in the FKC. Successful implementation would result in reduced reliance on native groundwater use during times when current FKC capacity constraints restrict full delivery of imported water to customers in the DEID MA.

These and other opportunistic programs and projects will be sought out for implementation in the DEID MA.

Subsection 5.2.1.2.2 Circumstantial Considerations *[Reg. § 354.44(b)(1)(A)]*

23 Cal. Code Regs § 354.44 Projects and Management Actions. (b) *Each Plan shall include a description of the projects and management actions that include the following:*

(1) *…The Plan shall include the following:*

(A) *A description of the circumstances under which projects or management actions shall be implemented, the criteria that would trigger implementation and termination of projects or management, and the process by which the Agency shall determine that conditions requiring the implementation of particular projects or management actions have occurred.*

Assessment of the feasibility and acceptance of irrigation demand time shifting by DEID customers began in 2020, with landowner participation steadily increasing.

The FARM program was successfully tested in 2019 with two pilot projects. These pilot projects were operated as an extension of the Turnipseed Water Banking facilities, such that water recharged on grower owned parcels was made available to all District landowners for later well recovery. During the 2019 pilot projects, a total of 3,358 acre-ft of imported surface water was recharged, indicating the viability to continue the program.

Since that time, the FARM program has remained open to all DEID landowners with land suitable for this purpose and landowners are regularly reminded of the program via email blasts, newsletters, and other outreach materials. At this time, DEID considers the program to be a success and will continue to coordinate with growers, especially during wet years, to maximize the District's recharge opportunities through the use of this program.

Given the continuing need for the DEID MA to remain sustainable as required by SGMA, this management action anticipates assessment of potential Action 2 opportunities on a continuing basis.

Subsection 5.2.1.2.3 Public Notice Process *[Reg. § 354.44(b)(1)(B)]*

23 Cal. Code Regs § 354.44 Projects and Management Actions. (b) *Each Plan shall include a description of the projects and management actions that include the following:*

(1) *…The Plan shall include the following:*

(B) *The process by which the Agency shall provide notice to the public and other agencies that the implementation of projects or management actions is being considered or has been implemented, including a description of the actions to be taken***.**

Public notification of supplemental water purchases to increase importation of surface water will be done if required. In most cases, the DEID MA's actions to increase importation of surface water is administrative and done consistent with the policies set forth by the board of directors.

Opportunities to participate in the FARM program are noticed to all DEID MA water users through direct contact and other available means. Additional public notice is provided through DEID's compliance with the Brown Act's noticing requirements for DEID Board meetings.

Subsection 5.2.1.2.4 Quantification of Water Budget Impact *[Reg. § 354.44(b)(2)]*

23 Cal. Code Regs § 354.44 Projects and Management Actions. (b) *Each Plan shall include a description of the projects and management actions that include the following:*

(2) *If overdraft conditions are identified through the analysis required by Section 354.18, the Plan shall describe projects or management actions, including a quantification of demand reduction or other methods, for the mitigation of overdraft.*

While not in overdraft, the DEID MA's actions to increase importation of surface water through supplemental purchases will further increase its positive net position. For the period of 2015 through 2023, resulted in an additional surface water importation of approximately 155,000 acre feet.

While not in overdraft, the DEID MA has historically transferred to others an annual average amount of just over 16,000 acre-feet of imported CVP water supplies that were available to DEID but were in excess of its ability to use. Action 2 projects are designed to increase the use of imported water, which would use CVP water supplies that have been historically transferred to others and thereby increase the overall water supply to the DEID MA.

Subsection 5.2.1.2.5 Permitting and Regulatory Process *[Reg. § 354.44(b)(3)]*

> **23 Cal. Code Regs § 354.44 Projects and Management Actions. (b)** *Each Plan shall include a description of the projects and management actions that include the following:*
>
> **(3)** *A summary of the permitting and regulatory process required for each project and management action.*

It is anticipated that periodic approval of Action 2 projects by the DEID board of directors may be required. Action 2 projects may also be subject to California Environmental Quality Act (CEQA) and/or National Environmental Policy Act (NEPA) requirements.

Subsection 5.2.1.2.6 Timeline *[Reg. § 354.44(b)(4)]*

> **23 Cal. Code Regs § 354.44 Projects and Management Actions. (b)** *Each Plan shall include a description of the projects and management actions that include the following:*
>
> *(4) The status of each project and management action, including a time-table for expected initiation and completion, and the accrual of expected benefits.*

Action 2 began implementation prior to 2015, in the case of actions to increase importation of surface water through supplemental purchases, and in 2019 at the time of the pilot FARM program's successful implementation.

Subsection 5.2.1.2.7 Anticipated Benefits and Evaluation *[Reg. § 354.44(b)(5)]*

> **23 Cal. Code Regs § 354.44 Projects and Management Actions. (b)** *Each Plan shall include a description of the projects and management actions that include the following:*
>
> **(5)** *An explanation of the benefits that are expected to be realized from the project or management action, and how those benefits will be evaluated.*

Actions to increase importation of surface water through supplemental purchases will result in greater volumes of water delivered to DEID MA growers and/or banked for future use.

Stored imported water in the DEID MA is recovered in water years when surface water imports and other available supplies are insufficient to meet crop demands. By acquiring new and/or optimizing existing imported water supplies, the district expects to increase/stabilize groundwater levels and groundwater storage in its portion of the Tule Subbasin, notwithstanding the effect of anticipated continued over-pumping that will occur during the SGMA implementation period by others adjacent to the DEID MA, as well as reductions in Tule Subbasin groundwater levels post-2020 as groundwater levels continue to equilibrate in the Tule Subbasin and adjoining subbasins.

Evaluation of the benefits of this action will occur through continued evaluation of annual CVP water and other water deliveries into the DEID MA and a full accounting of said deliveries, including sources of supply and final use of all water obtained and will be addressed as needed in the annual reports and 5-year updates provided to DWR. Benefits from this action will also be evaluated through review of groundwater level and groundwater quality data.

Subsection 5.2.1.2.8 Accomplishment *[Reg. § 354.44(b)(6)]*

> **23 Cal. Code Regs § 354.44 Projects and Management Actions. (b)** *Each Plan shall include a description of the projects and management actions that include the following:*
>
> **(6)** *An explanation of how the project or management action will be accomplished. If the project or management actions rely on water from outside the jurisdiction of the Agency, an explanation of the source and reliability of that water shall be included.*

This action will be accomplished by optimizing existing and acquiring new imported water supplies.

Actions to increase importation of surface water through supplemental purchases for delivery to DEID MA growers and/or banked for future use are subject to availability of water on the market from willing sellers. The reliability of these supplies are variable and potentially uncertain. However, the DEID MA's demonstrated expenditure of $18,561,806 for the procurement of approximately 155,000 acre feet of additional supply during the period of 2015 through 2023 illustrates that the DEID MA has both the funding and institutional capacity of effectuate the importation of large volumes of water under this action.

As previously described, DEID has historically transferred to others an annual average amount of just over 16,000 acre-feet of imported CVP water supplies that were available to DEID but were in excess of its ability to use. Through the proposed irrigation demand time shifting and FARM programs, DEID will optimize use of its existing available CVP water supplies. New imported water supplies will be identified on a case-by-case basis and will be dependent on hydrology and will need to consider other factors to be transferred to DEID. DEID has contractual rights to certain quantities of water under its contract with the Bureau of Reclamation. Contract number I75r-3327D provides the DEID MA with up to 108,800 acre-feet of Class 1 water and up to 74,500 of Class 2 water annually. This CVP contract also provides access to other water supplies that may be available on an annual basis dependent on hydrology. The reliability of this water source is high because of these contractual water rights.

Subsection 5.2.1.2.9 Legal Authority *[Reg. § 354.44(b)(7)]*

> **23 Cal. Code Regs § 354.44 Projects and Management Actions. (b)** *Each Plan shall include a description of the projects and management actions that include the following:*
>
> **(7)** *A description of the legal authority required for each project and management action, and the basis for that authority within the Agency.*

DEID has the contractual right to specific quantities of water under its contract with the Bureau of Reclamation. Contract number I75r-3327D provides the DEID MA with up to 108,800 acre-feet of Class 1 water and up to 74,500 of Class 2 water annually. This CVP contract also provides access to other water supplies that may be available on an annual basis dependent on hydrology.

Subsection 5.2.1.2.10 Cost & Funding *[Reg. § 354.44(b)(8)]*

> **23 Cal. Code Regs § 354.44 Projects and Management Actions. (b)** *Each Plan shall include a description of the projects and management actions that include the following:*
>
> **(8)** *A description of the estimated cost for each project and management action and a description of how the Agency plans to meet those costs.*

Cost:

The cost to increase importation of surface water through supplemental purchases of water delivered to DEID MA growers and/or banked for future use can be evaluated based upon the DEID MA's actual successful implementation during the period of 2015 through 2023. During this period, the DEID MA expended $18,561,806 and procured approximately 155,000 acre feet of additional supply.

The cost to implement the FARM program is anticipated to primarily be the additional cost of the water supply. Labor expense to implement the program is negligible. Cost of the supply is anticipated to be $49.00 per acre-foot (2024 dollars). Program demand is expected to be a function of the following physical/operational parameters:

- Operating 3 months in any given year when excess water is available, which is anticipated to be 3 out of every 10 years.
- Deliveries totaling 200 acre-feet per month per participating metered connection.
- Targeted number of participating connections is ten.

The anticipated amount of water that will be used under Action 2 is 6,000 acre-feet in any year the FARM program is operational (3 months x 200 acre-feet/month X 10 participating connections). At $49 per acre-foot, full implementation of this action is anticipated to cost $294,000 (6,000 acre-feet x $49/acre-feet).

Using the estimated opportunity window of 3 out of every 10 years for the FARM program to be utilized, the average annual cost of this action is $72,000 ($240,000/year x 3 years/10 years).

Funding:

Funding of the additional cost of the increase importation of surface water through supplemental purchases is sizable and is derived from the DEID MA revenue obtained through water sales to DEID customers and is included in the DEID annual budget and/or reserve accounts.

Funding of the additional cost of the water supply for the FARM program is minor and is likely to be absorbed into the existing annual budget of DEID MA and potentially funded through annual adjustments in the water rate charged to DEID customers. Pumping fees are not considered necessary to implement this action.

Subsection 5.2.1.2.11 Drought Offset Measures *[Reg. § 354.44(b)(9)]*

> **23 Cal. Code Regs § 354.44 Projects and Management Actions. (b)** *Each Plan shall include a description of the projects and management actions that include the following:*

(9) *A description of the management of groundwater extractions and recharge to ensure that chronic lowering of groundwater levels or depletion of supply during periods of drought is offset by increases in groundwater levels or storage during other periods.*

DEID adjusts expenses and revenues annually to reach a balanced budget. Drought years are managed accordingly, both with respect to maximizing water supplies and fiscal responsibility. DEID MA has already reached long-term sustainability and is a net contributor of water to the Subbasin, which is a function of in-lieu recharge, irrigation return flows and direct recharge/banking projects both inside and outside of the DEID boundaries. Accordingly, the DEID MA's drought offset measures are primarily centered in exercising its stored water recovery rights of previously deposited imported water in the Subbasin and recovery of banked water in other subbasins where out-of-district banking projects are located. Future operations anticipate continued recovery of banked water when necessary in drought years.

Subsection 5.2.1.2.12 Corresponding Attachments *[Reg. § 354.44(c)]*

23 Cal. Code Regs § 354.44 Projects and Management Actions. (c) *Projects and management actions shall be supported by best available information and best available science.*

There are no attachments associated with this action.

Subsection 5.2.1.3 Action 3 – Continued In-District Recharge/Banking Operations

Action 3 for the DEID MA consists of continued historical and current operations of existing in-district recharge/banking operations for future groundwater extraction needs.

Subsection 5.2.1.3.1 Description

Since SGMA was enacted, DEID has invested more than $44 million in projects that expand DEID's ability to honor the sustainability commitment described in **Figure 0-3**. This investment includes 944-acres of recharge and water banking facilities, referred to as the "Turnipseed Water Banking Facility" or "Turnipseed Recharge Basins" in this Plan. Phases 1-5 of the Turnipseed Water Banking Facility are complete and currently operating. Phase 6 of the Turnipseed Water Bank is currently under construction with completion scheduled for September 2024. Upon the completion of Phase 6, the 944-acre facility will be capable of percolating 12,928 acre-feet per month and, at an average recharge opportunity of 2.41 months per year[2]*, will allow the District to deposit an average of 31,157 acre-feet per year into the aquifer. Accounting for operational losses and a conservative leave-behind factor, the average net supply available for future recovery in dry years is 28,041 acre-feet per year (of the 31,157 acre-feet per year stored water). It is important to note that the surface water delivered to these recharge facilities and stored in the aquifer is of very good quality, being sourced directly from the Sierra Nevada snowmelt and diverted through the Friant Kern Canal. Action 3 contributes to the past, present, and future sustainability of the DEID MA. The DEID

[2] The average number of months per year during which recharge opportunities are available to the District is derived from historic DEID recharge operations data, starting in 1993. On average, from 1993 to present, DEID has been able to conduct recharge operations for 2.41 months per year.

MA will continue its current practice of importing available water supplies from both CVP and non-CVP and optimizing those supplies for use within the DEID MA, including in-district recharge/banking.

Subsection 5.2.1.3.2 Circumstantial Considerations *[Reg. § 354.44(b)(1)(A)]*

> **23 Cal. Code Regs § 354.44 Projects and Management Actions. (b)** *Each Plan shall include a description of the projects and management actions that include the following:*
>
> **(1)** *…The Plan shall include the following:*
>
> **(A)** *A description of the circumstances under which projects or management actions shall be implemented, the criteria that would trigger implementation and termination of projects or management, and the process by which the Agency shall determine that conditions requiring the implementation of particular projects or management actions have occurred.*

Given the continuing need for the DEID MA to remain sustainable as required by SGMA, this management action will be implemented as an ongoing and historical practice.

Subsection 5.2.1.3.3 Public Notice Process *[Reg. § 354.44(b)(1)(B)]*

> **23 Cal. Code Regs § 354.44 Projects and Management Actions. (b)** *Each Plan shall include a description of the projects and management actions that include the following:*
>
> **(1)** *…The Plan shall include the following:*
>
> **(B)** *The process by which the Agency shall provide notice to the public and other agencies that the implementation of projects or management actions is being considered or has been implemented, including a description of the actions to be taken***.**

This action was publicly noticed through the project approval process conducted by the DEID Board of Directors beginning in 1993 and at other various times when new project elements were added. No further approvals are required at this time.

Subsection 5.2.1.3.4 Quantification of Water Budget Impact *[Reg. § 354.44(b)(2)]*

> **23 Cal. Code Regs § 354.44 Projects and Management Actions. (b)** *Each Plan shall include a description of the projects and management actions that include the following:*
>
> **(2)** *If overdraft conditions are identified through the analysis required by Section 354.18, the Plan shall describe projects or management actions, including a quantification of demand reduction or other methods, for the mitigation of overdraft.*

See **Table 5-2** for a summary of the recharge benefits from continued recharge by phase and implementation date.

Subsection 5.2.1.3.5 Permitting and Regulatory Process *[Reg. § 354.44(b)(3)]*

> **23 Cal. Code Regs § 354.44 Projects and Management Actions. (b)** *Each Plan shall include a description of the projects and management actions that include the following:*
>
> **(3)** *A summary of the permitting and regulatory process required for each project and management action.*

Permitting for this action was completed through the project approval process conducted by the DEID board of directors beginning in 1993 and as was required at other various times when new project elements were added. No further permitted is required at this time.

Subsection 5.2.1.3.6 Timeline *[Reg. § 354.44(b)(4)]*

> **23 Cal. Code Regs § 354.44 Projects and Management Actions. (b)** *Each Plan shall include a description of the projects and management actions that include the following:*
>
> **(4)** *The status of each project and management action, including a time-table for expected initiation and completion, and the accrual of expected benefits.*

Implementation of the action is historical and ongoing throughout the SGMA implementation period and beyond.

Subsection 5.2.1.3.7 Anticipated Benefits and Evaluation *[Reg. § 354.44(b)(5)]*

> **23 Cal. Code Regs § 354.44 Projects and Management Actions. (b)** *Each Plan shall include a description of the projects and management actions that include the following:*
>
> **(5)** *An explanation of the benefits that are expected to be realized from the project or management action, and how those benefits will be evaluated.*

Stored imported water in the DEID MA is recovered in water years when surface water imports and other available supplies are insufficient to meet crop demands. By continuing operations of in-district water recharge banking, the district expects to increase/stabilize Subbasin groundwater levels and groundwater in storage, notwithstanding the effect of anticipated continued groundwater over-pumping that will occur during the SGMA implementation period by others adjacent to the DEID MA as well as projected reductions in Tule Subbasin groundwater levels post-2020 as groundwater levels continue to equilibrate in the Tule Subbasin and adjoining subbasins.

Evaluation of the benefits of this action will occur through continued evaluation of annual CVP water and other water deliveries into the DEID MA and a full accounting of said deliveries, including sources of supply and final use of all water obtained. Benefits from this action will also be evaluated through review of groundwater level and groundwater quality data.

Subsection 5.2.1.3.8 Accomplishment *[Reg. § 354.44(b)(6)]*

> **23 Cal. Code Regs § 354.44 Projects and Management Actions. (b)** *Each Plan shall include a description of the projects and management actions that include the following:*
>
> **(6)** *An explanation of how the project or management action will be accomplished. If the project or management actions rely on water from outside the jurisdiction of the Agency, an explanation of the source and reliability of that water shall be included.*

Basic to the existing and future accomplishments achieved by the action is the contractual right to certain quantities of water that DEID has under its contract with the Bureau of Reclamation. Contract number I75r-3327D provides the DEID MA with up to 108,800 acre-feet of Class 1 water and up to 74,500 acre-feet of Class 2 water annually. This CVP contract also provides access to other water supplies that may be available on an annual basis dependent on hydrology. Reliability of continued accomplishments associated with this action are high because of these contractual water rights.

How this action will be accomplished and implemented will be documented as noted above.

Subsection 5.2.1.3.9 Legal Authority *[Reg. § 354.44(b)(7)]*

> **23 Cal. Code Regs § 354.44 Projects and Management Actions. (b)** *Each Plan shall include a description of the projects and management actions that include the following:*
>
> **(7)** *A description of the legal authority required for each project and management action, and the basis for that authority within the Agency.*

DEID has the contractual right to certain quantities of water under its contract with the Bureau of Reclamation. Contract number I75r-3327D provides the DEID MA with up to 108,800 acre-feet of Class 1 water and up to 74,500 acre-feet of Class 2 water annually. This CVP contract also provides access to other water supplies that may be available on an annual basis dependent on hydrology.

Subsection 5.2.1.3.10 Cost & Funding *[Reg. § 354.44(b)(8)]*

> **23 Cal. Code Regs § 354.44 Projects and Management Actions. (b)** *Each Plan shall include a description of the projects and management actions that include the following:*
>
> **(8)** *A description of the estimated cost for each project and management action and a description of how the Agency plans to meet those costs.*

Cost: The cost is anticipated to primarily be the additional cost of the water supply. Labor expenses to implement the program are included as a part of Action 1. Cost of the supply is anticipated to be $49.00 per acre-foot (2024 dollars). When the final phase of the is online in 2024, the anticipated annual deliveries to the Turnipseed Project will be approximately 29,613 acre-feet on an average annual basis. Based on these values, implementation of this action is anticipated to cost $1,451,037 (29,613 acre-feet x $49/acre-feet) on an average annual basis but can be significantly more in years where significant water banking opportunities exist.

Funding: The total cost of Action 3 is budgeted and funded annually. There are four primary categories of funding currently used and will continue to be used to fund this action. These are:

- Revenue from annual water sales – includes sales to individual water users, other districts, and other sales - $11,920,000
- Other operating revenue – includes income from participation in energy projects, pumping charges paid by water users, and grant revenue -$6,956,833
- Non-operating revenues – Income from investments and rents/leases - $1,066,224
- Fixed revenues – income from property assessments, standby charges, and voter-approved special benefit and supplemental assessments - $7,952,149

Because of the historical methods of funding this action by DEID as noted above, it does not appear that well pumping fees as allowed by SGMA will be necessary to sustain this program.

Subsection 5.2.1.3.11 Drought Offset Measures *[Reg. § 354.44(b)(9)]*

> **23 Cal. Code Regs § 354.44 Projects and Management Actions. (b)** *Each Plan shall include a description of the projects and management actions that include the following:*

(9) *A description of the management of groundwater extractions and recharge to ensure that chronic lowering of groundwater levels or depletion of supply during periods of drought is offset by increases in groundwater levels or storage during other periods.*

DEID adjusts expenses and revenues annually to reach a balanced budget. Drought years are managed accordingly, both with respect to maximizing water supplies and fiscal responsibility. DEID MA has already reached long-term sustainability and is a net contributor of water to the Subbasin, which is a function of in-lieu recharge, irrigation return flows and direct water recharge/banking projects both inside and outside of the DEID boundaries. Accordingly, the DEID MA's drought offset measures are primarily centered in exercising its stored water recovery rights of previously deposited imported water in the Tule Subbasin and recovery of banked water in other subbasins where out-of-district banking projects are located. Future operations anticipate continued recovery of stored water deposits when necessary in drought years.

Subsection 5.2.1.3.12 Corresponding Attachments *[Reg. § 354.44(c)]*

23 Cal. Code Regs § 354.44 Projects and Management Actions. (c) *Projects and management actions shall be supported by best available information and best available science.*

There are no attachments associated with this action.

Subsection 5.2.1.4 Action 4 – Increase In-District Recharge/Banking Operations

Action 4 for the DEID MA consist of efforts to increase in-district recharge/banking operations at the Turnipseed Groundwater Recharge/Banking Project for future groundwater extraction needs.

Subsection 5.2.1.4.1 Description

DEID has recently increased in-District Banking operations beyond the two first-built 80-acre recharge basins (Phases I and II) with four additional phases (Phases III through VI).

In April of 2020, construction began on a 320-acre site (Phase III) located one half mile south of the original two phases and directly adjacent to an existing 72-inch mainline from the FKC. Construction of Phase III was completed in February 2021. Recent percolation data on Phases I – III, collected during recharge operations in 2021, 2022, 2023 and 2024 supports a percolation rate of 0.55 ft/day, which is equivalent to 220 acre-feet per day when all three phases are in steady state operation.

Following the completion of Phase III, development of an additional 160-acre site (Phase IV) began on the parcel immediately north of Phase III, which shares the same 72-inch mainline. Construction of Phase IV was completed in June 2022, increasing the total footprint of in-District recharge facilities to 640 acres.

Construction of Phase V, a 156-acre site located on DEID's Ave 8 mainline lateral and immediately west of the Friant-Kern Canal, began in December of 2022 and was completed in April of 2024. Lastly, Phase VI of this project is a 148-acre site located on DEID's Ave 40 west mainline lateral and 2 miles west of the Friant-Kern Canal. Construction on Phase VI began in January of 2024 with completion expected in early September of 2024. Altogether, Phases I – VI comprise a 944-acre recharge facility capable of recharging 13,000 ac-ft per month

This action will build upon the historical direct water recharge projects described in Action 3 to enhance the water resources available to the DEID MA. Future direct water recharge projects will increase the amount of water in storage through utilization of unused CVP imported water supplies available to the DEID MA through its long-term CVP water contract with the U.S. Department of the Interior. Other non-CVP supplies will also be used when and if available.

As noted in Action 1, the DEID MA has been historically sustainable and is projected to remain so throughout the 2020-2040 GSP implementation period and beyond. Despite this fact, the DEID MA will continue to explore opportunities to increase importation of water by accessing maximum amounts through its CVP contract as those supplies become available; which will, in turn, be utilized in part for this action item. This will further add to the sustainability of water in the DEID MA.

Action 4 documents current and ongoing activities that will expand the footprint of the DEID MA's current direct recharge/banking project. This and other future additions to the DEID MA's historic in-lieu, conjunctive use project will significantly increase its importation of water supplies to the DEID MA.

As described in Action 3, the original Turnipseed Groundwater Recharge/Banking Project was constructed in two phases: the first Phase comprised of 80 acres in 1993 and the second phase adding another 80 acres in 2007. Phases III – V came online starting in February 2021 and ending in April of 2024. Phase VI is currently in construction and anticipated to come online in September of 2024, resulting in a total 944 acres of recharge and water banking facilities.

As with all of DEID's investments in sustainable water management, DEID may expand this project with additional phases. DEID is currently assessing opportunities to construct additional water banking facilities in and adjacent to the communities of Earlimart and Richgrove.

Action 4 contributes to the past, present, and future sustainability of water in the DEID MA and the groundwater dependent disadvantaged communities within and adjacent to DEID MA. The DEID MA will continue its current practice of importing available CVP and non-CVP water supplies and optimize those supplies for use within the DEID MA, including in-district groundwater recharge/banking.

Subsection 5.2.1.4.2 Circumstantial Considerations *[Reg. § 354.44(b)(1)(A)]*

> **23 Cal. Code Regs § 354.44 Projects and Management Actions. (b)** *Each Plan shall include a description of the projects and management actions that include the following:*
>
> **(1)** *…The Plan shall include the following:*
>
> **(A)** *A description of the circumstances under which projects or management actions shall be implemented, the criteria that would trigger implementation and termination of projects or management, and the process by which the Agency shall determine that conditions requiring the implementation of particular projects or management actions have occurred.*

Given the continuing need for the DEID GSA to remain sustainable as required by SGMA, this management action will be implemented as a continuation and potential expansion of an ongoing and historical practice. Further expansion of the Turnipseed Groundwater Recharge/Banking Project will consider the future availability of CVP water, timing of availability (e.g., excess wet year supply), balance of the future water budget over multiple years, status of SMC thresholds, and other relevant factors to adaptively manage and maximize water supply for the DEID GSA.

Subsection 5.2.1.4.3 Public Notice Process *[Reg. § 354.44(b)(1)(B)]*

> **23 Cal. Code Regs § 354.44 Projects and Management Actions. (b)** *Each Plan shall include a description of the projects and management actions that include the following:*
>
> **(1)** *…The Plan shall include the following:*
>
> **(B)** *The process by which the Agency shall provide notice to the public and other agencies that the implementation of projects or management actions is being considered or has been implemented, including a description of the actions to be taken***.**

Construction of Phases III – VI of the Turnipseed Project was subject to CEQA compliance under the laws of the State of California, which includes public notice requirements. Additional public notice is also provided through posted DEID Board of Directors agendas that are made available to the public. The CEQA has been completed on Phases III – VI with all public notices made in accordance with state law.

Subsection 5.2.1.4.4 Quantification of Water Budget Impact *[Reg. § 354.44(b)(2)]*

> **23 Cal. Code Regs § 354.44 Projects and Management Actions. (b)** *Each Plan shall include a description of the projects and management actions that include the following:*
>
> **(2)** *If overdraft conditions are identified through the analysis required by Section 354.18, the Plan shall describe projects or management actions, including a quantification of demand reduction or other methods, for the mitigation of overdraft.*

Phases III – VI of the Turnipseed Project have been studied for projected performance, which are summarized as follows:

- Site testing and historical operations supports using an average infiltration rate of 0.55 feet per day.
- Accounting for setbacks and levee footprints reduces the gross acreage of Phases III – VI from 784 to a net recharge area of 643 acres.
- An initial analysis of available surplus CVP supplies (such as Class 1, Class 2, and section 215 water) and past operations of the Turnipseed Project indicates that opportunity to conduct recharge operations will be available for 2.41 months on an average annual basis (72.3 days per year).
- Net amount of recharge has been reduced to 90 percent after assuming a 10 percent loss from evaporation and other losses.

Using these parameters, the anticipated average annual net deposit to the DEID MA is:

0.55 feet/day x 643 acres x 72.3 days = 25,569 ac-ft (23,012 ac-ft net recoverable after 10% losses)

An estimate of average annual recharge volume as of March 2024 is included in **Table 5-2**.

Table 5-2: Average Annual Recharge of Turnipseed Recharge Facilities

Turnipseed Phase	Gross Area	Effective Recharge Area	Acre-Feet/Day	Acre-Feet/Year	Net Returnable Supply
[-]	[ac]	[ac]	[ac-ft]	[ac-ft]	[ac-ft]
I	80	66	37	2,640	2,376
II	80	66	37	2,640	2,376
III	320	266	146	10,562	9,505
IV	160	133	73	5,281	4,753
V	156	129	71	5,149	4,634
VI	148	123	68	4,885	4,396
			Total	**31,157**	**28,041**

Subsection 5.2.1.4.5 Permitting and Regulatory Process *[Reg. § 354.44(b)(3)]*

> **23 Cal. Code Regs § 354.44 Projects and Management Actions. (b)** *Each Plan shall include a description of the projects and management actions that include the following:*
>
> **(3)** *A summary of the permitting and regulatory process required for each project and management action.*

Phase III – VI and other future phases complied with CEQA.

Subsection 5.2.1.4.6 Timeline *[Reg. § 354.44(b)(4)]*

> **23 Cal. Code Regs § 354.44 Projects and Management Actions. (b)** *Each Plan shall include a description of the projects and management actions that include the following:*
>
> **(4)** *The status of each project and management action, including a time-table for expected initiation and completion, and the accrual of expected benefits.*

Completion dates by phase are available in **Table 5-3.**

Subsection 5.2.1.4.7 Anticipated Benefits and Evaluation *[Reg. § 354.44(b)(5)]*

> **23 Cal. Code Regs § 354.44 Projects and Management Actions. (b)** *Each Plan shall include a description of the projects and management actions that include the following:*
>
> **(5)** *An explanation of the benefits that are expected to be realized from the project or management action, and how those benefits will be evaluated.*

Stored imported water in the DEID MA is recovered in water years when surface water imports and other available supplies are insufficient to meet crop demands. By increasing in-district water recharge and banking the district expects to increase/stabilize groundwater levels and groundwater in storage, notwithstanding the effect of anticipated continued groundwater over-pumping that will occur during the SGMA implementation period by others adjacent to the DEID MA as well as projected reductions in Tule Subbasin groundwater levels post-2020 as groundwater levels continue to equilibrate in the Tule Subbasin and adjoining subbasins.

Evaluation of the benefits of this action will occur through continued evaluation of annual CVP water and other water deliveries into the DEID MA and a full accounting of said deliveries, including sources of supply and final use of all water obtained. Benefits from this action will also be evaluated through review of groundwater level and groundwater quality data.

Average annual recharge volume by phase is summarized in **Table 5-2**.

Subsection 5.2.1.4.8 Accomplishment *[Reg. § 354.44(b)(6)]*

> **23 Cal. Code Regs § 354.44 Projects and Management Actions. (b)** *Each Plan shall include a description of the projects and management actions that include the following:*
>
> **(6)** *An explanation of how the project or management action will be accomplished. If the project or management actions rely on water from outside the jurisdiction of the Agency, an explanation of the source and reliability of that water shall be included.*

Basic to the existing and future accomplishments achieved by the action is the contractual right to certain quantities of water that DEID has under its contract with the Bureau of Reclamation. Contract number I75r-3327D provides the DEID MA with up to 108,800 acre-feet of Class 1 water and up to 74,500 acre-feet of Class 2 water annually. This CVP contract also provides access to other water supplies that may be available on an annual basis dependent on hydrology. Reliability of continued accomplishments associated with this action are high because of these contractual water rights as explained in Section 1.4.3.

How this action will be accomplished and implemented will be documented as noted above.

Subsection 5.2.1.4.9 Legal Authority *[Reg. § 354.44(b)(7)]*

> **23 Cal. Code Regs § 354.44 Projects and Management Actions. (b)** *Each Plan shall include a description of the projects and management actions that include the following:*
>
> **(7)** *A description of the legal authority required for each project and management action, and the basis for that authority within the Agency.*

DEID has the contractual right to specific quantities of water under its contract with the Bureau of Reclamation. Contract number I75r-3327D provides the DEID MA with up to 108,800 acre-feet of Class 1 water and up to 74,500 acre-feet of Class 2 water annually. This CVP contract also provides access to other water supplies that may be available on an annual basis dependent on hydrology. The DEID board of directors will evaluate all phases of this action as legally required.

Subsection 5.2.1.4.10 Cost & Funding *[Reg. § 354.44(b)(8)]*

> **23 Cal. Code Regs § 354.44 Projects and Management Actions. (b)** *Each Plan shall include a description of the projects and management actions that include the following:*
>
> **(8)** *A description of the estimated cost for each project and management action and a description of how the Agency plans to meet those costs.*

Cost: The cost is anticipated to be (1) the additional cost of the water supply, (2) capital investment in the acquisition of the land for additional phases, (3) project development costs, and (4) ongoing maintenance.

Cost of the supply is anticipated to be $49.00 per acre-foot (2024 dollars). As noted above, the anticipated average annual deliveries to Turnipseed Project-Phases I - VI will be 31,157 acre-feet. Based on these values, full implementation of this action is anticipated to cost approximately $1,526,693 (31,157 acre-feet x $49/acre-feet).

See **Table 6-1** in **Section 6** for a breakdown of capital costs and historic, current, and future operations and maintenance costs.

Funding: Funding of the additional cost of the water supply is minor and is anticipated to be initially absorbed into the existing annual budget for the DEID MA, and potentially funded through annual adjustments in the water rate charged water users in the DEID MA. Funding for Phases III – VI capital investment was provided through 2019-2021 DEID cash. Ongoing annual maintenance will be incorporated into the annual budget for the DEID MA.

In 2020, DEID was awarded a $1.1M Integrated Regional Water Management Grant available under California's Proposition 1, which was applied toward the development of Phase III.

In 2021, DEID was awarded an additional $2M WaterSMART grant through the Bureau of Reclamation, applied to the development costs of Phase V.

In 2022, DEID was awarded $2.1M of State funding available through California's Proposition 68 for SGMA Implementation in Critically Over Drafted Basins. These funds are to be used in tandem with above mentioned federal funds to offset development costs on Phase V.

DEID was awarded 2.3M under the FY2023 WaterSMART program for Phase VI development from the USBR. Additionally, DEID, as a member of the Poso Creek Integrated Regional Water Management Group, sought approximately $2M of funding for Phase VI development through Round 2 of California's Proposition 1 funding available to Regional Water Management Groups. However, the Poso Creek Integrated Regional Water Management Group was not awarded any Prop 1 Round 2 funding. Meanwhile, DEID continues to search for land with the appropriate soil types and proximity to existing infrastructure in preparation for further expansion of the in-District banking project.

Subsection 5.2.1.4.11 Drought Offset Measures *[Reg. § 354.44(b)(9)]*

> **23 Cal. Code Regs § 354.44 Projects and Management Actions. (b)** *Each Plan shall include a description of the projects and management actions that include the following:*
>
> **(9)** *A description of the management of groundwater extractions and recharge to ensure that chronic lowering of groundwater levels or depletion of supply during periods of drought is offset by increases in groundwater levels or storage during other periods.*

DEID adjusts expenses and revenues annually to reach a balanced budget. Drought years are managed accordingly, both with respect to maximizing water supplies and fiscal responsibility. DEID MA has already reached long-term sustainability and is a net depositor of groundwater to the Subbasin, which is a function of in-lieu recharge, irrigation return flows and direct water recharge/banking projects both inside and outside of the DEID boundaries. Accordingly, the DEID MA's drought offset measures are primarily centered in exercising its stored water recovery rights of previously deposited imported water in the Subbasin and recovery of banked water in other subbasins where out-of-district banking projects

are located. Future operations anticipate continued recovery of stored water deposits when necessary, in drought years.

Subsection 5.2.1.4.12 Corresponding Attachments *[Reg. § 354.44(b)(1)(A)]*

> **23 Cal. Code Regs § 354.44 Projects and Management Actions. (b)** *Each Plan shall include a description of the projects and management actions that include the following:*
>
> **(1)** *…The Plan shall include the following:*

There are no attachments associated with this action.

Subsection 5.2.1.5 Action 5 – Continued Out-of-District Banking Operations

Subsection 5.2.1.5.1 Description

As with the DEID MA's in-district water banking projects, the purpose of out-of-district (OOD) projects is to bank water in wet years that is surplus to the DEID MA's needs for later recovery in dry years.

The DEID MA has been involved in banking water in OOD projects since 2006. DEID's OOD projects have a total banking capacity of 154,000 acre-feet. A total of 263,717 acre-feet have been banked over the life of the two OOD projects through 2023. From 2006 to 2023 110,832 acre-feet were recovered from OOD projects.

Action 5 contributes to the past, present, and future sustainability of water in the DEID MA. The DEID MA will continue its current practice of OOD banking of surplus CVP water supplies (and potentially non-CVP water) and recovering those supplies for use within the DEID MA in years when imported supplies are inadequate to meet crop demand.

Subsection 5.2.1.5.2 Circumstantial Considerations *[Reg. § 354.44(b)(1)(A)]*

> **23 Cal. Code Regs § 354.44 Projects and Management Actions. (b)** *Each Plan shall include a description of the projects and management actions that include the following:*
>
> **(1)** *…The Plan shall include the following:*
>
> **(A)** *A description of the circumstances under which projects or management actions shall be implemented, the criteria that would trigger implementation and termination of projects or management, and the process by which the Agency shall determine that conditions requiring the implementation of particular projects or management actions have occurred.*

Given the continuing need for the DEID MA to remain sustainable as required by SGMA, this management action will be implemented as an ongoing and historical practice.

Subsection 5.2.1.5.3 Public Notice Process *[Reg. § 354.44(b)(1)(B)]*

> **23 Cal. Code Regs § 354.44 Projects and Management Actions. (b)** *Each Plan shall include a description of the projects and management actions that include the following:*
>
> **(1)** *…The Plan shall include the following:*

> **(B)** *The process by which the Agency shall provide notice to the public and other agencies that the implementation of projects or management actions is being considered or has been implemented, including a description of the actions to be taken***.**

Beginning with the initial OOD project in 2006 and thereafter as other OOD projects were added, public notices were provided as required through CEQA and/or NEPA processes as well as public notices provided as part of Brown Act compliance by the DEID Board of Directors. No further approvals are necessary for continuation of OOD projects.

Subsection 5.2.1.5.4 Quantification of Water Budget Impact *[Reg. § 354.44(b)(2)]*

> **23 Cal. Code Regs § 354.44 Projects and Management Actions. (b)** *Each Plan shall include a description of the projects and management actions that include the following:*
>
> **(2)** *If overdraft conditions are identified through the analysis required by Section 354.18, the Plan shall describe projects or management actions, including a quantification of demand reduction or other methods, for the mitigation of overdraft.*

During the period of 2006 through 2023, OOD water banking projects have yielded an annual average supply of 14,200 acre-feet. With a surplus of stored water available for recovery and available space in OOD banking, water supply from OOD projects is forecast to meet or exceed the historical annual average supply over the SGMA planning and implementation horizon.

Subsection 5.2.1.5.5 Permitting and Regulatory Process *[Reg. § 354.44(b)(3)]*

> **23 Cal. Code Regs § 354.44 Projects and Management Actions. (b)** *Each Plan shall include a description of the projects and management actions that include the following:*
>
> **(3)** *A summary of the permitting and regulatory process required for each project and management action.*

No additional permitting or regulatory approvals are required to implement historical OOD projects.

Subsection 5.2.1.5.6 Timeline *[Reg. § 354.44(b)(4)]*

> **23 Cal. Code Regs § 354.44 Projects and Management Actions. (b)** *Each Plan shall include a description of the projects and management actions that include the following:*
>
> **(4)** *The status of each project and management action, including a time-table for expected initiation and completion, and the accrual of expected benefits.*

Implementation of the action is historical and ongoing throughout the SGMA planning and implementation horizon.

Subsection 5.2.1.5.7 Anticipated Benefits and Evaluation *[Reg. § 354.44(b)(5)]*

> **23 Cal. Code Regs § 354.44 Projects and Management Actions. (b)** *Each Plan shall include a description of the projects and management actions that include the following:*
>
> **(5)** *An explanation of the benefits that are expected to be realized from the project or management action, and how those benefits will be evaluated.*

Surplus imported water that is banked in OOD banking projects serves the same purpose as surplus imported water that is banked within DEID: to provide additional water supplies to lands within the DEID

MA in water years where available imported water supplies are insufficient to meet crop demands. Recovery of banked water from OOD projects offsets a like amount of groundwater that would have otherwise been extracted. By continuing participation in OOD water banking projects, DEID expects to increase/stabilize groundwater levels and groundwater storage, notwithstanding the effect of anticipated continued groundwater over-pumping that will occur during the SGMA implementation period by others adjacent to the DEID MA as well as projected reductions in Tule Subbasin groundwater levels post-2020 as groundwater levels continue to equilibrate in the Tule Subbasin and adjoining subbasins. Continued participation in OOD banking projects will also assist in stabilizing groundwater levels in adjacent subbasins where these projects exist through the net amount of water left within OOD banking project boundaries ("leave-behind" water that is typically a part of OOD project agreements).

Evaluation of the benefits of this action will occur through continued evaluation of annual CVP water and other water deliveries into the DEID MA and a full accounting of said deliveries, including sources of supply and final use of all water obtained. Benefits from this action will also be evaluated through groundwater measurements.

Subsection 5.2.1.5.8 Accomplishment *[Reg. § 354.44(b)(6)]*

> **23 Cal. Code Regs § 354.44 Projects and Management Actions. (b)** *Each Plan shall include a description of the projects and management actions that include the following:*
>
> **(6)** *An explanation of how the project or management action will be accomplished. If the project or management actions rely on water from outside the jurisdiction of the Agency, an explanation of the source and reliability of that water shall be included.*

How this action will be accomplished and implemented will be documented as noted above.

Subsection 5.2.1.5.9 Legal Authority *[Reg. § 354.44(b)(7)]*

> **23 Cal. Code Regs § 354.44 Projects and Management Actions. (b)** *Each Plan shall include a description of the projects and management actions that include the following:*
>
> **(7)** *A description of the legal authority required for each project and management action, and the basis for that authority within the Agency.*

DEID has the contractual right to certain quantities of water under its contract with the Bureau of Reclamation. Contract number I75r-3327D provides the DEID MA with up to 108,800 acre-feet of Class 1 water and up to 74,500 of Class 2 water annually. This CVP contract also provides access to other water supplies that may be available on an annual basis dependent on hydrology.

Subsection 5.2.1.5.10 Cost & Funding *[Reg. § 354.44(b)(8)]*

> **23 Cal. Code Regs § 354.44 Projects and Management Actions. (b)** *Each Plan shall include a description of the projects and management actions that include the following:*
>
> **(8)** *A description of the estimated cost for each project and management action and a description of how the Agency plans to meet those costs.*

Cost: The cost is anticipated to primarily be the additional cost of the water supply dedicated to OOD projects. Cost of the supply is anticipated to be $36.85 per acre-foot (2024 dollars). The average annual

cost of water banked in OOD projects is projected to be $526,900 based on historical annual average "put" amounts (14,298 acre-feet x $36.85/acre-foot).

Funding: Total cost of Action 5 has been considered a part of the cost of annual water operations which is funded by water rates charged to water users in the DEID MA. Future costs of Action 5 will be funded in the same manner. For example, revenue from annual water sales which includes sales to individual water users, other districts, and other sales was budgeted at $16,190,88 (2019).

Subsection 5.2.1.5.11 Drought Offset Measures *[Reg. § 354.44(b)(9)]*

> **23 Cal. Code Regs § 354.44 Projects and Management Actions. (b)** *Each Plan shall include a description of the projects and management actions that include the following:*
>
> **(9)** *A description of the management of groundwater extractions and recharge to ensure that chronic lowering of groundwater levels or depletion of supply during periods of drought is offset by increases in groundwater levels or storage during other periods.*

DEID adjusts expenses and revenues annually to reach a balanced budget. Drought years are managed accordingly, both with respect to maximizing water supplies and fiscal responsibility. DEID MA has already reached long-term sustainability and is a net contributor of water to the Subbasin, which is a function of in-lieu recharge, irrigation return flows and direct water recharge/banking projects both inside and outside of the DEID boundaries. Accordingly, the DEID MA's drought offset measures is primarily centered in exercising its stored water recovery rights of previously deposited imported water in the Subbasin and recovery of banked water in other subbasins where OOD banking projects are located. Future operations anticipate continued recovery of stored water deposits when necessary, in drought years.

Subsection 5.2.1.5.12 Corresponding Attachments *[Reg. § 354.44(c)]*

> **23 Cal. Code Regs § 354.44 Projects and Management Actions. (c)** *Projects and management actions shall be supported by best available information and best available science.*

There are no attachments associated with this action.

Subsection 5.2.1.6 Action 6 – Increase Out-of-District Groundwater Banking Operations

Subsection 5.2.1.6.1 Description

This action will build upon the historical OOD water banking projects described in Action 5 to enhance the water resources available to the DEID MA. Future OOD water recharge projects will increase the amount of water in storage through utilization of unused CVP imported water supplies available to the DEID MA through its long-term CVP water contract with the Bureau of Reclamation. Other non-CVP supplies will also be used when and if available.

As noted in Action 1, the DEID MA has been historically sustainable and is projected to remain so throughout the 2020-2040 SGMA-GSP implementation period and beyond. Despite this fact, the DEID MA will continue to explore opportunities to increase importation of water by accessing maximum

amounts through its CVP contract as those supplies become available which will, in turn, be utilized in part for this action. This will further enhance the sustainability of the DEID MA.

Action 6 documents the intent to expand the DEID MA's use of OOD banking projects. Potential future additions to the DEID MA's historical use of OOD projects will increase its goal of increasing importation of water supplies to the DEID MA.

As described in Action 5, current OOD projects and long-term exchanges have used to supplement inadequate water supplies in years of drought. Opportunities to expand this capability in the future will be sought out throughout the 20-year SGMA implementation period.

Action 6 has the potential to contribute to the future sustainability of the DEID MA. The DEID MA will continue its current practice of importing available water supplies from both CVP and non-CVP and optimizing those supplies for use within the MA, including OOD banking.

Subsection 5.2.1.6.2 Circumstantial Considerations *[Reg. § 354.44(b)(1)(A)]*

> **23 Cal. Code Regs § 354.44 Projects and Management Actions. (b)** *Each Plan shall include a description of the projects and management actions that include the following:*
>
> **(1)** *…The Plan shall include the following:*
>
> **(A)** *A description of the circumstances under which projects or management actions shall be implemented, the criteria that would trigger implementation and termination of projects or management, and the process by which the Agency shall determine that conditions requiring the implementation of particular projects or management actions have occurred.*

Given the continuing need for the DEID MA to remain sustainable as required by SGMA, this management action will be implemented as an expansion of an ongoing historical practice.

Subsection 5.2.1.6.3 Public Notice Process *[Reg. § 354.44(b)(1)(B)]*

> **23 Cal. Code Regs § 354.44 Projects and Management Actions. (b)** Each Plan shall include a description of the projects and management actions that include the following:
>
> **(1)** …The Plan shall include the following:
>
> **(B)** The process by which the Agency shall provide notice to the public and other agencies that the implementation of projects or management actions is being considered or has been implemented, including a description of the actions to be taken.

Any future expansion of OOD banking projects is likely to require compliance with either CEQA, NEPA, or both. Public notice of any specific project will be included as part of CEQA/NEPA compliance actions. Additional public notice will also be provided through posted DEID / DEID GSA Board of Directors agendas that are made available to the public.

Subsection 5.2.1.6.4 Quantification of Water Budget Impact *[Reg. § 354.44(b)(2)]*

> **23 Cal. Code Regs § 354.44 Projects and Management Actions. (b)** *Each Plan shall include a description of the projects and management actions that include the following:*

> **(2)** *If overdraft conditions are identified through the analysis required by Section 354.18, the Plan shall describe projects or management actions, including a quantification of demand reduction or other methods, for the mitigation of overdraft.*

Action 6 has not been quantified nor projected to have an impact on the DEID MA's water budget at this time. Any future OOD banking project will be quantified and added to the GSP once identified and implemented.

Subsection 5.2.1.6.5 As noted in the Water Balance for the DEID MA, the District has transferred to others an annual average amount of just over 16,000 acre-feet of CVP water supplies that were excess to its use. To the extent not utilized for another action already described, Action 6 will use some of these excess imported water supplies as its primary source of supply for any future Action 6 projects. Permitting and Regulatory Process *[Reg. § 354.44(b)(3)]*

> **23 Cal. Code Regs § 354.44 Projects and Management Actions. (b)** *Each Plan shall include a description of the projects and management actions that include the following:*
>
> **(3)** *A summary of the permitting and regulatory process required for each project and management action.*

Action 6 projects will likely need to comply with CEQA and/or NEPA regulatory requirements.

Subsection 5.2.1.6.6 Timeline *[Reg. § 354.44(b)(4)]*

> **23 Cal. Code Regs § 354.44 Projects and Management Actions. (b)** *Each Plan shall include a description of the projects and management actions that include the following:*
>
> **(4)** *The status of each project and management action, including a time-table for expected initiation and completion, and the accrual of expected benefits.*

While no specific timeline has been established for future Action 6 projects, it is likely some will occur during the SGMA planning and implementation horizon.

Subsection 5.2.1.6.7 Anticipated Benefits and Evaluation *[Reg. § 354.44(b)(5)]*

> **23 Cal. Code Regs § 354.44 Projects and Management Actions. (b)** *Each Plan shall include a description of the projects and management actions that include the following:*
>
> **(5)** *An explanation of the benefits that are expected to be realized from the project or management action, and how those benefits will be evaluated.*

Surplus imported water that is banked in OOD banking projects serves the same purpose as surplus imported water that is banked within DEID: to provide additional water supplies to lands within the DEID MA in water years where available imported water supplies are insufficient to meet crop demands. Recovery of banked water from OOD projects offsets a like amount of water that would have otherwise been extracted. By expanding participation in OOD water banking projects the district expects to increase/stabilize groundwater levels and groundwater storage, notwithstanding the effect of anticipated continued groundwater over-pumping that will occur during the GSP implementation period by others adjacent to the DEID MA as well as projected reductions in Tule Subbasin groundwater levels post-2020 as groundwater levels continue to equilibrate in the Tule Subbasin and adjoining subbasins.

Expanded participation in OOD banking projects will also assist in stabilizing groundwater levels in adjacent basins where these projects exist through the net amount of water left within the project boundaries ("leave-behind" water that is typically a part of OOD project agreements).

Evaluation of the benefits of this action will occur through continued evaluation of annual CVP water and other water deliveries into the DEID MA and a full accounting of said deliveries, including sources of supply and final use of all water obtained. Benefits from this action will also be evaluated through groundwater measurements.

Subsection 5.2.1.6.8 Accomplishment *[Reg. § 354.44(b)(6)]*

> **23 Cal. Code Regs § 354.44 Projects and Management Actions. (b)** *Each Plan shall include a description of the projects and management actions that include the following:*
>
> **(6)** *An explanation of how the project or management action will be accomplished. If the project or management actions rely on water from outside the jurisdiction of the Agency, an explanation of the source and reliability of that water shall be included.*

As previously described, DEID has the contractual right to certain quantities of water under its contract with the Bureau of Reclamation and has historically transferred to others an annual average amount of just over 16,000 acre-feet of imported CVP water supplies that were available to it DEID but were in excess to its ability to use. Reliability of expanding OOD water banking projects is high because of these contractual water rights.

Subsection 5.2.1.6.9 Legal Authority *[Reg. § 354.44(b)(7)]*

> **23 Cal. Code Regs § 354.44 Projects and Management Actions. (b)** *Each Plan shall include a description of the projects and management actions that include the following:*
>
> **(7)** *A description of the legal authority required for each project and management action, and the basis for that authority within the Agency.*

DEID has the contractual right to certain quantities of water under its contract with the Bureau of Reclamation. Contract number I75r-3327D provides the DEID MA with up to 108,800 acre-feet of Class 1 water and up to 74,500 acre-feet of Class 2 water annually. This CVP contract also provides access to other water supplies that may be available on an annual basis dependent on hydrology. Contractual authority allows OOD banking projects to be implemented subject to Bureau of Reclamation standards and authority.

Subsection 5.2.1.6.10 Cost & Funding *[Reg. § 354.44(b)(8)]*

> **23 Cal. Code Regs § 354.44 Projects and Management Actions. (b)** *Each Plan shall include a description of the projects and management actions that include the following:*
>
> **(8)** *A description of the estimated cost for each project and management action and a description of how the Agency plans to meet those costs.*

Cost: The cost is anticipated to primarily be the additional cost of the water supply used for new OOD banking projects.

Cost of the supply is anticipated to be $49 per acre-foot (2024 dollars). Total cost is unknown at this time.

Funding: Funding of the additional cost of the water supply is minor and is likely to be initially absorbed into the existing annual budget for the DEID MA, and potentially funded through annual adjustments in the water rate charged water users in the DEID MA.

Subsection 5.2.1.6.11 Drought Offset Measures *[Reg. § 354.44(b)(9)]*

> **23 Cal. Code Regs § 354.44 Projects and Management Actions. (b)** *Each Plan shall include a description of the projects and management actions that include the following:*
>
> **(9)** *A description of the management of groundwater extractions and recharge to ensure that chronic lowering of groundwater levels or depletion of supply during periods of drought is offset by increases in groundwater levels or storage during other periods.*

DEID adjusts expenses and revenues annually to reach a balanced budget. Drought years are managed accordingly, both with respect to maximizing water supplies and fiscal responsibility. DEID MA has already reached long-term sustainability and is a net contributor of water to the Subbasin, which is a function of in-lieu recharge, irrigation return flows and direct water recharge/banking projects both inside and outside of the DEID boundaries. Accordingly, the DEID MA's drought offset measures are primarily centered in exercising its stored water recovery rights of previously deposited imported water in the Subbasin and recovery of banked water in other subbasins where OOD banking projects are located. Future operations anticipate continued recovery of stored water deposits when necessary in drought years.

Subsection 5.2.1.6.12 Corresponding Attachments *[Reg. § 354.44(c)]*

> **23 Cal. Code Regs § 354.44 Projects and Management Actions. (c)** *Projects and management actions shall be supported by best available information and best available science.*

There are no attachments associated with this action.

Subsection 5.2.1.7 Action 7 – DEID GSA Mitigation Plan

Subsection 5.2.1.7.1 Description

Despite DEID GSA's decades of no net overdraft, the risk of impacts induced by the unsustainable groundwater management of neighboring GSAs requires that DEID GSA be prepared to address potential mitigation needs. The DEID GSA Mitigation Program will directly address the impacts of chronic lowering of groundwater levels, reduced groundwater in storage, groundwater quality, and land subsidence caused by lowered groundwater levels by providing funding for long term mitigation solutions to protect beneficial uses and users within DEID boundaries including all three management areas.

DEID GSA has partnered with Self-Help Enterprises (SHE) to administer the mitigation services for all domestic and multi-use domestic well claims and the DEID Mitigation Program. SHE services include emergency bottled water delivery (24-hour turnaround), interim supplies (such as a tank and hauled water, 72-hour turnaround), groundwater quality testing, long-term mitigation solutions (such as

installing a new well, lowering the pump, etc.), and translation services (for operating line, in-person field visits, and outreach efforts).

At this time, there is not an attribution-based funding structure established for the Tule Subbasin to mitigate for impacted beneficial users and uses; however, DEID GSA is advocating for policies to include that the GSAs representing pumpers or others attributable for inducing impacts be responsible for covering the mitigation costs in future iterations of the Mitigation Plan. The Tule Subbasin's current appetite for full mitigation is limited to domestic wells. DEID GSA is advocating for polies to include full mitigation of all beneficial users and uses, including for municipal wells, agricultural wells, and critical infrastructure. If DEID GSA is successful in convincing the Tule Subbasin that those overdrafting and causing undesirable results should mitigate for the results of their actions, the Mitigation Plan's full implementation will be successful.

Subsection 5.2.1.7.2 Circumstantial Considerations *[Reg. § 354.44(b)(1)(A)]*

23 Cal. Code Regs § 354.44 Projects and Management Actions. (b) *Each Plan shall include a description of the projects and management actions that include the following:*

(1) *…The Plan shall include the following:*

(A) *A description of the circumstances under which projects or management actions shall be implemented, the criteria that would trigger implementation and termination of projects or management, and the process by which the Agency shall determine that conditions requiring the implementation of particular projects or management actions have occurred.*

Given the continuing need for the DEID management areas to remain sustainable as required by SGMA, this management action will be implemented to protect beneficial uses and users of groundwater. DEID envisions this action to be protective of domestic wells and potentially other wells that may be adversely affected by measurable objectives and minimum thresholds established in this GSP. The number of domestic wells estimated to be impacted in the DEID MA is relatively low (see Exhibit 3-3 in Section 3), particularly in view of DEID's decision to modify its minimum thresholds in this updated GSP to be even more protective of groundwater levels. However, DEID GSA is prepared to mitigate considering the risk of impacts induced by the allowable overdraft policies of neighboring GSAs.

Subsection 5.2.1.7.3 Public Notice Process *[Reg. § 354.44(b)(1)(B)]*

23 Cal. Code Regs § 354.44 Projects and Management Actions. (b) Each Plan shall include a description of the projects and management actions that include the following:

(1) …The Plan shall include the following:

(B) The process by which the Agency shall provide notice to the public and other agencies that the implementation of projects or management actions is being considered or has been implemented, including a description of the actions to be taken.

While formal adoption of the Mitigation Program itself is likely not required to comply with either CEQA or NEPA, specific projects undertaken under this action may require environmental review and/or notice to the public on a project-by-project basis. Necessary environmental review and public notice will be undertaken and the time of project planning and implementation.

Subsection 5.2.1.7.4 Quantification of Water Budget Impact *[Reg. § 354.44(b)(2)]*

> **23 Cal. Code Regs § 354.44 Projects and Management Actions. (b)** *Each Plan shall include a description of the projects and management actions that include the following:*
>
> **(2)** *If overdraft conditions are identified through the analysis required by Section 354.18, the Plan shall describe projects or management actions, including a quantification of demand reduction or other methods, for the mitigation of overdraft.*

Action 7 has not been quantified nor projected to have an impact on the DEID GSA water budget at this time.

Subsection 5.2.1.7.5 Permitting and Regulatory Process *[Reg. § 354.44(b)(3)]*

> **23 Cal. Code Regs § 354.44 Projects and Management Actions. (b)** *Each Plan shall include a description of the projects and management actions that include the following:*
>
> **(3)** *A summary of the permitting and regulatory process required for each project and management action.*

Action 7 mitigation well replacements may require obtaining a County Well Permit and potentially review by the GSA to evaluate the sustainability of the action. Project may also need to comply with additional CEQA and/or NEPA regulatory requirements, if they are necessary for larger mitigation needs, such as critical infrastructure improvements.

Subsection 5.2.1.7.6 Timeline *[Reg. § 354.44(b)(4)]*

> **23 Cal. Code Regs § 354.44 Projects and Management Actions. (b)** *Each Plan shall include a description of the projects and management actions that include the following:*
>
> **(4)** *The status of each project and management action, including a time-table for expected initiation and completion, and the accrual of expected benefits.*

At the time of adopting this 2nd Amended GSP, the Mitigation Program is adopted concurrently, kicking off the implementation phase which will last through the duration of the GSP implementation period.

Subsection 5.2.1.7.7 Anticipated Benefits and Evaluation *[Reg. § 354.44(b)(5)]*

> **23 Cal. Code Regs § 354.44 Projects and Management Actions. (b)** *Each Plan shall include a description of the projects and management actions that include the following:*
>
> **(5)** *An explanation of the benefits that are expected to be realized from the project or management action, and how those benefits will be evaluated.*

The Mitigation Program is anticipated to maintain beneficial uses and uses of groundwater for domestic and municipal wells, agricultural wells, and critical infrastructure. Each claim filed to the DEID GSA will be documented and tracked in Annual Reporting including outcomes of mitigation implemented.

Subsection 5.2.1.7.8 Accomplishment *[Reg. § 354.44(b)(6)]*

> **23 Cal. Code Regs § 354.44 Projects and Management Actions. (b)** *Each Plan shall include a description of the projects and management actions that include the following:*

(6) *An explanation of how the project or management action will be accomplished. If the project or management actions rely on water from outside the jurisdiction of the Agency, an explanation of the source and reliability of that water shall be included.*

The Mitigation Plan will be implemented in accordance with the requirements outlined in **Appendix 5A**.

Once the need for mitigation is confirmed, suitable mitigation to alleviate groundwater level impacts impact may be any of the following:

- deepening a well,
- constructing a new well,
- modifying pumping equipment,
- providing temporary or permanent replacement water,
- coordinating consolidation of the domestic well owner with existing water systems; or
- with the consent of the affected user, providing other acceptable means of mitigation.

For land use impacts, this could be any of the following:

- repair to canals, turnouts, stream channels, water delivery pipelines, and basins,
- repair to damaged wells,
- addressing flood control impacts,
- repair to other damaged infrastructure including highways, roads, bridges, utilities, and buildings; or
- with the consent of the affected user, providing other acceptable means of mitigation.

For groundwater quality impacts (due to groundwater management/actions), this could be any of the following:

- adjusting groundwater pumping locations, rates, or schedules,
- modifying project operations,
- providing temporary or permanent replacement water,
- coordinating consolidation with existing water systems, or
- with the consent of the affected user, providing other acceptable means of mitigation.

Various factors may reflect the proper mitigation methods for the specific issue. For example, age, location, financial impact to the beneficial user as a result of mitigation, and the beneficial user may reflect which mitigation measures are optimal. It will be the responsibility of the DEID GSA to implement the Mitigation Plan in partnership with Self-Help Enterprises within its three management areas.

Subsection 5.2.1.7.9 Legal Authority *[Reg. § 354.44(b)(7)]*

23 Cal. Code Regs § 354.44 Projects and Management Actions. (b) *Each Plan shall include a description of the projects and management actions that include the following:*

(7) *A description of the legal authority required for each project and management action, and the basis for that authority within the Agency.*

The DEID has legal authority under SGMA and under other law to investigate claims and assess fees in order to implement the Mitigation Program.

Subsection 5.2.1.7.10 Cost & Funding *[Reg. § 354.44(b)(8)]*

> **23 Cal. Code Regs § 354.44 Projects and Management Actions. (b)** *Each Plan shall include a description of the projects and management actions that include the following:*
>
> **(8)** *A description of the estimated cost for each project and management action and a description of how the Agency plans to meet those costs.*

Cost: The cost of the program is anticipated to primarily be a function of the number and type of wells or other infrastructure adversely affected in the DEID GSA that require mitigation. Because DEID GSA's plan is to continue sustainable conditions throughout implementation and thereafter, the count of wells impacted and count of critical infrastructure impacted by groundwater management is expected to be zero due to DEID GSA's groundwater management. However, neighboring GSAs have adopted allowable overdraft policies which may induce impacts within the DEID GSA boundary. DEID GSA has estimated approximately $200,000 per year for groundwater well mitigation.

This figure is informed by an estimated impacted 2 domestic wells per year at a rate of $90,000 per well for full mitigation (which includes emergency drinking water supplies, 6-months of interim supplies, groundwater quality testing, well replacement with treatment, administrative and field services). An additional $20,000 has been added to this cost estimate to cover GSA administrative and technical assistance costs. Impacts to non-drinking water wells and critical infrastructure will be required to be paid for by the responsible party and cost estimates can be based off the Tule Subbasin Well Impact Analysis performed by Thomas Harder & Company to inform the groundwater level SMC.

Funding: At this time, the Tule Subbasin has not adopted a mitigation policy that would require GSAs responsible for inducing impacts within sustainable GSAs to cover the mitigation costs of their impacts. However, DEID GSA has advocated for this consideration. In the meantime, the DEID GSA will cover the costs of domestic well mitigation and multi-use domestic well mitigation, through reimbursements to Self-Help Enterprises. DEID GSA is advocating that an agreement be reached between the Tule Subbasin GSAs to require the responsible parties to cover the cost of the impacts they have induced before the need for non-drinking water well and critical infrastructure impacts require funding.

Subsection 5.2.1.7.11 Drought Offset Measures *[Reg. § 354.44(b)(9)]*

> **23 Cal. Code Regs § 354.44 Projects and Management Actions. (b)** *Each Plan shall include a description of the projects and management actions that include the following:*
>
> ***(9)*** *A description of the management of groundwater extractions and recharge to ensure that chronic lowering of groundwater levels or depletion of supply during periods of drought is offset by increases in groundwater levels or storage during other periods.*

DEID adjusts expenses and revenues annually to reach a balanced budget. Drought years are managed accordingly, both with respect to maximizing water supplies and fiscal responsibility. DEID MA has already reached long-term sustainability and is a net contributor of water to the Subbasin, which is a function of in-lieu recharge, irrigation return flows and direct water recharge/banking projects both inside and outside DEID boundaries.

Subsection 5.2.1.7.12 Corresponding Attachments *[Reg. § 354.44(c)]*

> **23 Cal. Code Regs § 354.44 Projects and Management Actions. (c)** *Projects and management actions shall be supported by best available information and best available science.*

The DEID GSA Mitigation Plan is included as **Appendix 5A**.

Subsection 5.2.1.8 Action 8 - Well Permit Application Review

Subsection 5.2.1.8.1 Description

DEID GSA has coordinated with Tulare County to receive all domestic and agricultural well permit applications within DEID GSA's service area which provides the GSA the information necessary to reach out to the landowner if the proposed well appears to be at-risk of experiencing impacts or if pumping from the well may induce impacts. In either case, the GSA will provide recommendations on well depth, location, opportunities to connect to a municipal or small community well/system, etc. to support the applicant's groundwater access while avoiding unintended impacts as a result of new wells drilled without GSA consultation.

Well permit application review by the GSAs will use both the permit application and available data and resources to review the consider the following:

- The proposed location of the new well.
- The planned depth and perforated interval of the new well; GSA will determine from which aquifer (Upper, Lower, or Single) the well is planned to extract.
- The planned use of the water from the well (domestic supply, agricultural irrigation, etc.).
- Identifying the closest Representative Monitoring Sites to the proposed well to determine minimum thresholds for groundwater levels, water quality and subsidence.
- Identifying existing domestic wells and critical infrastructure in the area.
- Estimating current groundwater levels around the proposed well.

Subsection 5.2.1.8.2 Circumstantial Considerations *[Reg. § 354.44(b)(1)(A)]*

> **23 Cal. Code Regs § 354.44 Projects and Management Actions. (b)** *Each Plan shall include a description of the projects and management actions that include the following:*
>
> **(1)** *…The Plan shall include the following:*
>
> **(A)** *A description of the circumstances under which projects or management actions shall be implemented, the criteria that would trigger implementation and termination of projects or management, and the process by which the Agency shall determine that conditions requiring the implementation of particular projects or management actions have occurred.*

As new wells are being proposed, the GSA is concerned that new wells may be installed at locations and depths that may not be in alignment with the sustainability mission. Additionally, new wells can also be drilled in locations and depths that elevate the risk of impacts. The GSA is in a unique position to support landowners who are installing new wells with data and information to inform their decision to minimize impacts and maximize sustainability for the landowner and the surrounding beneficial uses, users, and property interests.

Subsection 5.2.1.8.3 Public Notice Process *[Reg. § 354.44(b)(1)(B)]*

> **23 Cal. Code Regs § 354.44 Projects and Management Actions. (b)** *Each Plan shall include a description of the projects and management actions that include the following:*
>
> **(1)** *…The Plan shall include the following:*
>
> **(B)** *The process by which the Agency shall provide notice to the public and other agencies that the implementation of projects or management actions is being considered or has been implemented, including a description of the actions to be taken***.**

The public process for all GSA outreach activities is summarized in the C&E Plan (**Attachment 2E**).

Subsection 5.2.1.8.4 Quantification of Water Budget Impact *[Reg. § 354.44(b)(2)]*

> **23 Cal. Code Regs § 354.44 Projects and Management Actions. (b)** *Each Plan shall include a description of the projects and management actions that include the following:*
>
> **(2)** *If overdraft conditions are identified through the analysis required by Section 354.18, the Plan shall describe projects or management actions, including a quantification of demand reduction or other methods, for the mitigation of overdraft.*

This management action does not influence the groundwater budget directly.

Subsection 5.2.1.8.5 Permitting and Regulatory Process *[Reg. § 354.44(b)(3)]*

> **23 Cal. Code Regs § 354.44 Projects and Management Actions. (b)** *Each Plan shall include a description of the projects and management actions that include the following:*
>
> **(3)** *A summary of the permitting and regulatory process required for each project and management action.*

DEID GSA will continue to abide by existing Tulare County permitting code and requirements. The GSA does not have the authority to authorize or reject well permit applications. The role of the GSA is to provide information which may encourage long-term sustainability for the applicant.

Subsection 5.2.1.8.6 Timeline *[Reg. § 354.44(b)(4)]*

> **23 Cal. Code Regs § 354.44 Projects and Management Actions. (b)** *Each Plan shall include a description of the projects and management actions that include the following:*
>
> **(4)** *The status of each project and management action, including a time-table for expected initiation and completion, and the accrual of expected benefits.*

This management action is ongoing and expected to continue throughout the duration of the implementation period.

Subsection 5.2.1.8.7 Anticipated Benefits & Evaluation *[Reg. § 354.44(b)(5)]*

> **23 Cal. Code Regs § 354.44 Projects and Management Actions. (b)** *Each Plan shall include a description of the projects and management actions that include the following:*
>
> **(5)** *An explanation of the benefits that are expected to be realized from the project or management action, and how those benefits will be evaluated.*

It is challenging to quantify the benefit of this measure as there are many variables and the activities are proactive, in an effort to avoid future unknowable impacts.

Subsection 5.2.1.8.8 Accomplishment *[Reg. § 354.44(b)(6)]*

> **23 Cal. Code Regs § 354.44 Projects and Management Actions. (b)** *Each Plan shall include a description of the projects and management actions that include the following:*
>
> **(6)** *An explanation of how the project or management action will be accomplished. If the project or management actions rely on water from outside the jurisdiction of the Agency, an explanation of the source and reliability of that water shall be included.*

Accomplishment and implementation of this action will be documented as noted in the above sections.

Subsection 5.2.1.8.9 Legal Authority *[Reg. § 354.44(b)(7)]*

> **23 Cal. Code Regs § 354.44 Projects and Management Actions. (b)** *Each Plan shall include a description of the projects and management actions that include the following:*
>
> **(7)** *A description of the legal authority required for each project and management action, and the basis for that authority within the Agency.*

California Water Code Section 10725.2 provides GSAs with the powers and authorities to "perform any act necessary or proper" to implement SGMA regulations and allows GSAs to adopt rules, regulations, ordinances, and resolutions necessary for SGMA implementation. (23 CCR §355.4(b)(6).)

Subsection 5.2.1.8.10 Cost & Funding *[Reg. § 354.44(b)(8)]*

> **23 Cal. Code Regs § 354.44 Projects and Management Actions. (b)** *Each Plan shall include a description of the projects and management actions that include the following:*
>
> **(8)** *A description of the estimated cost for each project and management action and a description of how the Agency plans to meet those costs.*

Cost: The cost to implement this management action is included in the administrative and consultant ongoing costs.

Funding: This management action will be funded by DEID GSA.

Subsection 5.2.1.8.11 Drought Offset Measures *[Reg. § 354.44(b)(9)]*

> **23 Cal. Code Regs § 354.44 Projects and Management Actions. (b)** *Each Plan shall include a description of the projects and management actions that include the following:*
>
> **(9)** *A description of the management of groundwater extractions and recharge to ensure that chronic lowering of groundwater levels or depletion of supply during periods of drought is offset by increases in groundwater levels or storage during other periods.*

This management action is not expected to have a direct impact on drought offset; however, the potential avoidance of installing wells that are counter to sustainability or would be located in a compromising location/depth in DEID GSA may reduce potential impacts.

Subsection 5.2.1.8.12 Corresponding Attachments *[Reg. § 354.44(c)]*

23 Cal. Code Regs § 354.44 Projects and Management Actions. (c) *Projects and management actions shall be supported by best available information and best available science.*

There are no attachments associated with this action.

Subsection 5.2.1.9 Action 9 - Well Registration Program

Subsection 5.2.1.9.1 Description

DEID GSA is in the process of developing a Well Registration Program. The purpose of voluntary registration of wells is to create a baseline record for each well in the event of a future claim and to have the necessary information on file to identify at-risk domestic wells for notification and advance mitigation purposes. The Well Registration Program is designed to gather as much data on well construction, location, ownership, use, groundwater levels, and groundwater quality as available, which can be used to fill data gaps, perform analyses, assess risk, take proactive measures to avoid impacts based on risk analysis and notify landowners of risk.

This can be particularly beneficial for rural domestic drinking water wells, as many of these wells' construction, maintenance, exact location, site-specific groundwater levels and quality are considered a data gap. SGMA noted wells that extract less than 2 acre-ft per year for domestic use were deemed De Minimis, and not required to participate in the GSP process. Existing domestic well records available through the DWR include inactive and abandoned wells and documentation errors. The exact locations of most domestic wells are not well understood. The registration will require the well owner to provide information on well location, construction, water quality, and well maintenance history. Having a well registered will not be a prerequisite for Mitigation Plan qualification, but it should speed up the GSAs' assessment of claims, should they arise, because there is already background information on the well. Additionally, if a well is registered, it may be possible to apply for mitigation before the well goes dry. Although there is an emphasis on domestic wells, all well types will be asked to voluntarily enroll in the program, as the more data and information available can improve water management, planning, and proactive efforts.

This management action requires considerable time and resource commitments. The upfront effort is for the GSAs to continue work to build trust with rural landowners who may not be aware of the GSA's role and responsibility as well as in the local communities to communicate the benefits that well users will receive if enrolling (early notification and early processing). The GSAs are expecting there to be initial hesitation out of concern for the landowners' private data to become public and impact property values and future economic opportunities.

An important element of the partnership between the Tule Subbasin GSAs and SHE for the Mitigation Program is the data, information, and resource sharing across the agencies. This includes the opportunity for existing and future participants of SHE's emergency services to be educated on the importance of SGMA, data sharing, and existing GSA programs.

Subsection 5.2.1.9.2 Circumstantial Considerations *[Reg. § 354.44(b)(1)(A)]*

> **23 Cal. Code Regs § 354.44 Projects and Management Actions. (b)** *Each Plan shall include a description of the projects and management actions that include the following:*
>
> **(1)** *…The Plan shall include the following:*
>
> **(A)** *A description of the circumstances under which projects or management actions shall be implemented, the criteria that would trigger implementation and termination of projects or management, and the process by which the Agency shall determine that conditions requiring the implementation of particular projects or management actions have occurred.*

Domestic well groundwater level and quality is considered a data gap in DEID GSA. This makes it especially difficult to evaluate which domestic wells may be at risk and to garner the ability to reach out to domestic well owners to notify if their well is at risk. It is important to DEID GSA that sufficient data and information is gathered on all existing wells, with a particular focus on domestic wells, to best maintain sustainability and assess the need to take proactive measures if neighboring overdraft elevates impact risk of domestic wells.

Subsection 5.2.1.9.3 Public Notice Process *[Reg. § 354.44(b)(1)(B)]*

> **23 Cal. Code Regs § 354.44 Projects and Management Actions. (b)** *Each Plan shall include a description of the projects and management actions that include the following:*
>
> **(1)** *…The Plan shall include the following:*
>
> **(B)** *The process by which the Agency shall provide notice to the public and other agencies that the implementation of projects or management actions is being considered or has been implemented, including a description of the actions to be taken.*

The public process for all GSA outreach activities is summarized in the C&E Plan (**Attachment 2E**).

Subsection 5.2.1.9.4 Quantification of Water Budget Impact *[Reg. § 354.44(b)(2)]*

> **23 Cal. Code Regs § 354.44 Projects and Management Actions. (b)** *Each Plan shall include a description of the projects and management actions that include the following:*
>
> **(2)** *If overdraft conditions are identified through the analysis required by Section 354.18, the Plan shall describe projects or management actions, including a quantification of demand reduction or other methods, for the mitigation of overdraft.*

This management action does not influence the groundwater budget directly.

Subsection 5.2.1.9.5 Permitting and Regulatory Process *[Reg. § 354.44(b)(3)]*

> **23 Cal. Code Regs § 354.44 Projects and Management Actions. (b)** *Each Plan shall include a description of the projects and management actions that include the following:*
>
> **(3)** *A summary of the permitting and regulatory process required for each project and management action.*

No additional permitting or regulatory process is necessary to implement this ongoing action.

Subsection 5.2.1.9.6 Timeline *[Reg. § 354.44(b)(4)]*

> **23 Cal. Code Regs § 354.44 Projects and Management Actions. (b)** *Each Plan shall include a description of the projects and management actions that include the following:*
>
> **(4)** *The status of each project and management action, including a time-table for expected initiation and completion, and the accrual of expected benefits.*

Table 5-3 below summarizes the schedule for developing this management action.

Table 5-3: Well Registration Program Development Timeline

Management Action	Phase	Q2 2024 (Apr–Jun)	Q3 2024 (Jul-Sep)	Q4 2024 (Oct-Dec)	Q1 2025 (Jan-Mar)	Q2 2025 (Apr-Jun)	Q3 2025 (Jul-Sep)	Q4 2025 (Oct-Dec)
Well Registration Program	Phase 1 – Initial Outreach & Trust Building (Door Knocking, Flyers, Feedback Solicitation)							
	Phase 2 – Develop the Data Management Protocol to Store, Protect, and Access Private Well Data							
	Phase 3 – Develop Protocol to Assess At-Risk Wells and Notification to those Homeowners							
	Phase 4 – Gather Private Domestic Well Data and Landowner/Well User Information							
	Phase 5 – Implementation of Risk Assessment and Notification Protocol (ongoing)							complete

Subsection 5.2.1.9.7 Anticipated Benefits & Evaluation *[Reg. § 354.44(b)(5)]*

> **23 Cal. Code Regs § 354.44 Projects and Management Actions. (b)** *Each Plan shall include a description of the projects and management actions that include the following:*
>
> **(5)** *An explanation of the benefits that are expected to be realized from the project or management action, and how those benefits will be evaluated.*

No volumetric benefits are expected to be realized as a result of this management action; however, significant improvements in filling data gaps, risk notifications, and proactive measures are expected as a direct result.

Subsection 5.2.1.9.8 Accomplishment *[Reg. § 354.44(b)(6)]*

> **23 Cal. Code Regs § 354.44 Projects and Management Actions. (b)** *Each Plan shall include a description of the projects and management actions that include the following:*
>
> **(6)** *An explanation of how the project or management action will be accomplished. If the project or management actions rely on water from outside the jurisdiction of the Agency, an explanation of the source and reliability of that water shall be included.*

Accomplishment and implementation of this action will be documented as noted in the above sections.

Subsection 5.2.1.9.9 Legal Authority *[Reg. § 354.44(b)(7)]*

> **23 Cal. Code Regs § 354.44 Projects and Management Actions. (b)** *Each Plan shall include a description of the projects and management actions that include the following:*
>
> **(7)** *A description of the legal authority required for each project and management action, and the basis for that authority within the Agency.*

California Water Code Section 10725.2 provides GSAs with the powers and authorities to "perform any act necessary or proper" to implement SGMA regulations and allows GSAs to adopt rules, regulations, ordinances, and resolutions necessary for SGMA implementation (23 CCR §355.4(b)(6)). In addition, SGMA expressly authorizes GSAs to implement well registration programs (Water Code, section 10725.6).

Subsection 5.2.1.9.10 Cost & Funding *[Reg. § 354.44(b)(8)]*

> **23 Cal. Code Regs § 354.44 Projects and Management Actions. (b)** *Each Plan shall include a description of the projects and management actions that include the following:*
>
> **(8)** *A description of the estimated cost for each project and management action and a description of how the Agency plans to meet those costs.*

Cost: The cost to implement is expected to be approximately $80,000 in the development of the program, then $10,000 annually after that to continue solicitations for data, data maintenance, risk analyses and notifications.

Funding: This management action will be funded by DEID.

Subsection 5.2.1.9.11 Drought Offset Measures *[Reg. § 354.44(b)(9)]*

> **23 Cal. Code Regs § 354.44 Projects and Management Actions. (b)** *Each Plan shall include a description of the projects and management actions that include the following:*
>
> **(9)** *A description of the management of groundwater extractions and recharge to ensure that chronic lowering of groundwater levels or depletion of supply during periods of drought is offset by increases in groundwater levels or storage during other periods.*

This management action is not expected to have a direct impact on drought offset; however, by filling data gaps, the opportunities to improve drought analysis, well impact analyses, and notify at-risk landowners will be greatly improved.

Subsection 5.2.1.9.12 Corresponding Attachments *[Reg. § 354.44(c)]*

> **23 Cal. Code Regs § 354.44 Projects and Management Actions. (c)** *Projects and management actions shall be supported by best available information and best available science.*

There are no attachments associated with this action.

Subsection 5.2.1.10 Action 10 - Groundwater Quality Monitoring Program

Subsection 5.2.1.10.1 Description

DEID GSA recognizes that more data would be helpful in assessing the relationship between DEID's significant recharge activities and the underlying groundwater quality. To address this, DEID GSA has developed a new management action, "Groundwater Quality Monitoring Program". This management action includes the planning and installation of new groundwater monitoring wells, evaluation of previously inaccessible data, and monitoring and reporting associated with filling the data gap of the relationship between DEID GSA's extensive recharge activities and the underlying groundwater quality.

Subsection 5.2.1.10.2 Circumstantial Considerations *[Reg. § 354.44(b)(1)(A)]*

> **23 Cal. Code Regs § 354.44 Projects and Management Actions. (b)** *Each Plan shall include a description of the projects and management actions that include the following:*
>
> **(1)** *…The Plan shall include the following:*
>
> **(A)** *A description of the circumstances under which projects or management actions shall be implemented, the criteria that would trigger implementation and termination of projects or management, and the process by which the Agency shall determine that conditions requiring the implementation of particular projects or management actions have occurred.*

The relationship between DEID GSA's recharge activities and the influence on groundwater quality is a data gap. This management action is designed to fill this data gap.

Subsection 5.2.1.10.3 Public Notice Process *[Reg. § 354.44(b)(1)(B)]*

> **23 Cal. Code Regs § 354.44 Projects and Management Actions. (b)** *Each Plan shall include a description of the projects and management actions that include the following:*
>
> **(1)** *…The Plan shall include the following:*
>
> **(B)** *The process by which the Agency shall provide notice to the public and other agencies that the implementation of projects or management actions is being considered or has been implemented, including a description of the actions to be taken***.**

The public process for all GSA outreach activities is summarized in the C&E Plan (**Attachment 2E**).

Subsection 5.2.1.10.4 Quantification of Water Budget Impact *[Reg. § 354.44(b)(2)]*

> **23 Cal. Code Regs § 354.44 Projects and Management Actions. (b)** *Each Plan shall include a description of the projects and management actions that include the following:*

(2) *If overdraft conditions are identified through the analysis required by Section 354.18, the Plan shall describe projects or management actions, including a quantification of demand reduction or other methods, for the mitigation of overdraft.*

This management action does not influence the groundwater budget directly.

Subsection 5.2.1.10.5 Permitting and Regulatory Process *[Reg. § 354.44(b)(3)]*

23 Cal. Code Regs § 354.44 Projects and Management Actions. (b) *Each Plan shall include a description of the projects and management actions that include the following:*

(3) *A summary of the permitting and regulatory process required for each project and management action.*

All permitting associated with the installation of new monitoring wells or conversion of existing wells to monitoring wells will be appropriately addressed. No additional permitting or regulatory process is necessary to implement this ongoing action.

Subsection 5.2.1.10.6 Timeline *[Reg. § 354.44(b)(4)]*

23 Cal. Code Regs § 354.44 Projects and Management Actions. (b) *Each Plan shall include a description of the projects and management actions that include the following:*

(4) *The status of each project and management action, including a time-table for expected initiation and completion, and the accrual of expected benefits.*

Table 5-4 below summarizes the schedule for developing this management action.

Table 5-4: Groundwater Quality Monitoring Program Schedule and Phases

Management Action	Phase	Q2 2024 (Apr-Jun)	Q3 2024 (Jul-Sep)	Q4 2024 (Oct-Dec)	Q1 2025 (Jan-Mar)	Q2 2025 (Apr-Jun)	Q3 2025 (Jul-Sep)	Q4 2025 (Oct-Dec)	Q1 2025 (Jan-Mar)	Q2 2026 (Apr-Jun)
Groundwater Quality Monitoring Program	Phase 1 – Initial Identification of Ideal monitoring well density, monitoring depth(s), and locations									
	Phase 2 – Outreach to domestic well owners within recharged water flow path, and request to access to monitor groundwater quality at their well(s).									
	Phase 3 – Installation of groundwater monitoring wells consistent with results from Phase 1.									
	Phase 4 – Ongoing groundwater quality monitoring and evaluation of results.									complete

Subsection 5.2.1.10.7 Anticipated Benefits & Evaluation *[Reg. § 354.44(b)(5)]*

> **23 Cal. Code Regs § 354.44 Projects and Management Actions. (b)** *Each Plan shall include a description of the projects and management actions that include the following:*
>
> **(5)** *An explanation of the benefits that are expected to be realized from the project or management action, and how those benefits will be evaluated.*

No volumetric benefits are expected to be realized as a result of this management action; however, significant improvements in filling data gaps, risk notifications, and proactive measures are expected as a direct result.

Subsection 5.2.1.10.8 Accomplishment *[Reg. § 354.44(b)(6)]*

> **23 Cal. Code Regs § 354.44 Projects and Management Actions. (b)** *Each Plan shall include a description of the projects and management actions that include the following:*
>
> **(6)** *An explanation of how the project or management action will be accomplished. If the project or management actions rely on water from outside the jurisdiction of the Agency, an explanation of the source and reliability of that water shall be included.*

Accomplishment and implementation of this action will be documented as noted in the above sections.

Subsection 5.2.1.10.9 Legal Authority *[Reg. § 354.44(b)(7)]*

> **23 Cal. Code Regs § 354.44 Projects and Management Actions. (b)** *Each Plan shall include a description of the projects and management actions that include the following:*
>
> **(7)** *A description of the legal authority required for each project and management action, and the basis for that authority within the Agency.*

California Water Code Section 10725.2 provides GSAs with the powers and authorities to "perform any act necessary or proper" to implement SGMA regulations and allows GSAs to adopt rules, regulations, ordinances, and resolutions necessary for SGMA implementation (23 CCR §355.4(b)(6)).

Subsection 5.2.1.10.10 Cost & Funding *[Reg. § 354.44(b)(8)]*

> **23 Cal. Code Regs § 354.44 Projects and Management Actions. (b)** *Each Plan shall include a description of the projects and management actions that include the following:*
>
> **(8)** *A description of the estimated cost for each project and management action and a description of how the Agency plans to meet those costs.*

Cost: Based off a conceptual design of shallow and deep monitoring wells, an engineer's estimate of probable cost was developed for the monitoring wells project. The engineer's estimate assumed prevailing wage in the event that the project is funded with DEID funding or state or federal grants. The cost of one shallow and deep monitoring well cluster is approximately $500,000 to drill, construct, develop and perform baseline monitoring. The cost of an additional two shallow monitoring wells is approximately $400,000 to drill, construct, develop and perform baseline monitoring.

Additional on-site monitoring equipment, such as transducers in total add approximately $2,000 to $10,000 per well depending on whether remote telemetry is implemented.

In addition to the capital costs, the costs of monitoring for the constituents of concern listed in this GSP are approximately 1,500 per well per sampling event (including samplers time).

Therefore, the estimated capital cost for the new monitoring wells is approximately $900,000.

The monitoring cost is estimated to be $6,000 ($1,500 x 4 wells) annually or per sampling event, if more frequent sampling is necessary).

The cost for this action may be reduced significantly if existing private wells located near and within the flow path of the recharge facilities and drilled at depths representative of domestic wells in the locale can be sampled and added to the representative monitoring network in place of constructing new monitoring wells. The opportunity use of existing private wells is expected to be better understood during implementation of the Well Registration Program.

Funding: This management action will be funded by DEID.

Subsection 5.2.1.10.11 Drought Offset Measures *[Reg. § 354.44(b)(9)]*

> **23 Cal. Code Regs § 354.44 Projects and Management Actions. (b)** *Each Plan shall include a description of the projects and management actions that include the following:*

> **(9)** *A description of the management of groundwater extractions and recharge to ensure that chronic lowering of groundwater levels or depletion of supply during periods of drought is offset by increases in groundwater levels or storage during other periods.*

This management action is not expected to have a direct impact on drought offset.

Subsection 5.2.1.10.12 Corresponding Attachments *[Reg. § 354.44(c)]*

> **23 Cal. Code Regs § 354.44 Projects and Management Actions. (c)** *Projects and management actions shall be supported by best available information and best available science.*

There are no attachments associated with this action.

Subsection 5.2.1.11 Action 11 – Exceedance Policy and Investigation

Subsection 5.2.1.11.1 Description

DEID GSA recognizes that unsustainable pumping outside of the DEID GSA boundary will likely cause exceedance of strict minimum thresholds required to minimize subsidence today to protect the FKC and DEID's pipeline distribution system. DEID GSA intends to work collaboratively with the other GSAs to develop an Exceedance Policy to provide protocols and guidelines to investigate exceedance of minimum thresholds at Representative Monitoring Sites.

Subsection 5.2.1.11.2 Circumstantial Considerations *[Reg. § 354.44(b)(1)(A)]*

> **23 Cal. Code Regs § 354.44 Projects and Management Actions. (b)** *Each Plan shall include a description of the projects and management actions that include the following:*
>
> **(1)** *…The Plan shall include the following:*
>
> **(A)** *A description of the circumstances under which projects or management actions shall be implemented, the criteria that would trigger implementation and termination of projects or management, and the process by which the Agency shall determine that conditions requiring the implementation of particular projects or management actions have occurred.*

An Exceedance Policy is required to investigate exceedance of minimum thresholds. A policy needs to be developed now to have appropriate protocols and guidance in place to investigate exceedance of minimum thresholds.

Subsection 5.2.1.11.3 Public Notice Process *[Reg. § 354.44(b)(1)(B)]*

> **23 Cal. Code Regs § 354.44 Projects and Management Actions. (b)** *Each Plan shall include a description of the projects and management actions that include the following:*
>
> **(1)** *…The Plan shall include the following:*
>
> **(B)** *The process by which the Agency shall provide notice to the public and other agencies that the implementation of projects or management actions is being considered or has been implemented, including a description of the actions to be taken***.**

The public process for all GSA outreach activities is summarized in the C&E Plan (**Attachment 2E**).

Subsection 5.2.1.11.4 Quantification of Water Budget Impact *[Reg. § 354.44(b)(2)]*

> **23 Cal. Code Regs § 354.44 Projects and Management Actions. (b)** *Each Plan shall include a description of the projects and management actions that include the following:*
>
> **(2)** *If overdraft conditions are identified through the analysis required by Section 354.18, the Plan shall describe projects or management actions, including a quantification of demand reduction or other methods, for the mitigation of overdraft.*

This management action does not influence the groundwater budget directly.

Subsection 5.2.1.11.5 Permitting and Regulatory Process *[Reg. § 354.44(b)(3)]*

> **23 Cal. Code Regs § 354.44 Projects and Management Actions. (b)** *Each Plan shall include a description of the projects and management actions that include the following:*
>
> **(3)** *A summary of the permitting and regulatory process required for each project and management action.*

No permitting or regulatory process is necessary to implement this ongoing action.

Subsection 5.2.1.11.6 Timeline *[Reg. § 354.44(b)(4)]*

> **23 Cal. Code Regs § 354.44 Projects and Management Actions. (b)** *Each Plan shall include a description of the projects and management actions that include the following:*
>
> **(4)** *The status of each project and management action, including a time-table for expected initiation and completion, and the accrual of expected benefits.*

It is anticipated that it will take approximately three months to coordinate with all the GSAs in the Tule Subbasin to develop and adopt an Exceedance Policy. The Exceedance Policy would be initiated any time there was an identified exceedance of a minimum threshold.

Subsection 5.2.1.11.7 Anticipated Benefits & Evaluation *[Reg. § 354.44(b)(5)]*

> **23 Cal. Code Regs § 354.44 Projects and Management Actions. (b)** *Each Plan shall include a description of the projects and management actions that include the following:*
>
> **(5)** *An explanation of the benefits that are expected to be realized from the project or management action, and how those benefits will be evaluated.*

Benefits to beneficial uses and users may accrue as a result of the findings and actions/mitigation of the minimum thresholds investigation. Enforcement of pumping restrictions or other adequate mitigation may be necessary to remedy exceedance of minimum thresholds.

Subsection 5.2.1.11.8 Accomplishment *[Reg. § 354.44(b)(6)]*

> **23 Cal. Code Regs § 354.44 Projects and Management Actions. (b)** *Each Plan shall include a description of the projects and management actions that include the following:*
>
> **(6)** *An explanation of how the project or management action will be accomplished. If the project or management actions rely on water from outside the jurisdiction of the Agency, an explanation of the source and reliability of that water shall be included.*

Accomplishment and implementation of this action will be documented as noted in the above sections.

Subsection 5.2.1.11.9 Legal Authority *[Reg. § 354.44(b)(7)]*

> **23 Cal. Code Regs § 354.44 Projects and Management Actions. (b)** *Each Plan shall include a description of the projects and management actions that include the following:*
>
> **(7)** *A description of the legal authority required for each project and management action, and the basis for that authority within the Agency.*

California Water Code Section 10725.2 provides GSAs with the powers and authorities to "perform any act necessary or proper" to implement SGMA regulations and allows GSAs to adopt rules, regulations, ordinances, and resolutions necessary for SGMA implementation (23 CCR §355.4(b)(6)).

Subsection 5.2.1.11.10 Cost & Funding *[Reg. § 354.44(b)(8)]*

> **23 Cal. Code Regs § 354.44 Projects and Management Actions. (b)** *Each Plan shall include a description of the projects and management actions that include the following:*
>
> **(8)** *A description of the estimated cost for each project and management action and a description of how the Agency plans to meet those costs.*

Cost: The cost to develop this management action is included in the administrative and consultant ongoing costs. The cost to implement this action will be variable depending on the number exceedance of minimum thresholds and the nature of the impacts.

Funding: Development of this management action will be funded by DEID. Mitigation costs may be the responsibility of DEID GSA or other GSAs depending on the cause of the exceedance of minimum thresholds.

Subsection 5.2.1.11.11 Drought Offset Measures *[Reg. § 354.44(b)(9)]*

> **23 Cal. Code Regs § 354.44 Projects and Management Actions. (b)** *Each Plan shall include a description of the projects and management actions that include the following:*
>
> **(9)** *A description of the management of groundwater extractions and recharge to ensure that chronic lowering of groundwater levels or depletion of supply during periods of drought is offset by increases in groundwater levels or storage during other periods.*

This management action is not expected to have a direct impact on drought offset.

Subsection 5.2.1.11.12 Corresponding Attachments *[Reg. § 354.44(c)]*

> **23 Cal. Code Regs § 354.44 Projects and Management Actions. (c)** *Projects and management actions shall be supported by best available information and best available science.*

There are no attachments associated with this action.

Subsection 5.2.2 Richgrove Community Services District Management Area *[Reg. § 354.44(b)(1)]*

> **23 Cal. Code Regs § 354.44 Projects and Management Actions. (b)** *Each Plan shall include a description of the projects and management actions that include the following:*

(1) *A list of projects and management actions proposed in the Plan with a description of the measurable objective that is expected to benefit from the project or management action. The list shall include projects and management actions that may be utilized to meet interim milestones, the exceedance of minimum thresholds, or where undesirable results have occurred or are imminent.*

By actions of an executed memorandum of understanding, the RCSD and its service area, which covers the unincorporated community of Richgrove, is a participant in the DEID GSA (see **Appendix D**). The Richgrove community is served by a water system permitted, owned, and operated by the RCSD. The community water system relies exclusively on pumped groundwater as the source of supply, without any rights to surface water.

The purpose of the projects and management actions described in this section of the GSP for the Richgrove Community Services District Management Area (RCSD MA) is to outline the general process and procedures by which development within the RCSD can proceed in a manner consistent with the sustainability goal for the Tule Subbasin. While historical growth within the Richgrove community has been relatively modest, SGMA places a focus on ensuring the RCSD MA can address maintaining a reliable water supply for both current and future water users within its jurisdiction. This focus extends to parties and entities desiring to develop within the RCSD MA where demands projected exceed the sustainable yield. The following projects and management actions indicate the approach to meet sustainability recognizing that, in some cases, details associated with specific projects will be generated as future requests for water service and related services are received.

Projects and management actions for the RCSD MA are associated with the following general categories of actions:

- Current Groundwater Supply Optimization
- Development of Additional Groundwater Supplies
- Existing and Future Managed Aquifer Recharge

Successful implementation of the projects and management actions for the RCSD MA will provide for its sustainability.

The following project and management actions have been identified for the RCSD MA:

Action 1 Water conservation programs

Action 2 2020-2025 interim water supply supplement program

Action 3 2025-2040 groundwater recharge projects for future groundwater extraction needs

Action 4 Mitigation of identified adverse impacts

Subsection 5.2.2.1 Action 1 – Water Conservation Programs

Subsection 5.2.2.1.1 Description

Optimization of current groundwater supplies used within the RCSD MA will be maintained through current water conservation programs and future work to generate supplemental water conservation elements that will be incorporated into RCSD's adopted water conservation ordinances. These

provisions are/shall be constructed such that each dwelling unit, commercial development or industrial enterprise be required to use plumbing fixtures meeting defined levels of conservation potential. These levels are to be achieved by incorporation of conservation principals into the design and selection of plumbing fixtures. Current and future applicants for water service are required to satisfy the specific provisions of the adopted ordinances as a condition of initial and continued service. Demonstrating compliance with a mandated level of water conservation efficiency using fixtures and devices associated with any proposed development will be required.

Conservation provisions of any adopted water ordinances will be revisited on a defined frequency and maintained with respect to the incorporation of Best Available Technology. Conservation elements will be a permanent part of water supply procedures used in RCSD.

Included within Action 1 is the completion of a project to implement full metering of RCSD water service connections and an associated volumetric rate structure. This will allow for the conservation procedures associated with a water meter rate structure to be employed, along with specific conservation enforcement. Meters are installed on all service connections and are subject to technical review for accuracy, operation and replacement. Further, an appropriate volumetric rate structure is currently being evaluated. Rate structure implementation will be a function of successful passage of a Proposition 218 fee or assessment.

Subsection 5.2.2.1.2 Circumstantial Considerations *[Reg. § 354.44(b)(1)(A)]*

23 Cal. Code Regs § 354.44 Projects and Management Actions. (b) *Each Plan shall include a description of the projects and management actions that include the following:*

(1) *…The Plan shall include the following:*

(A) *A description of the circumstances under which projects or management actions shall be implemented, the criteria that would trigger implementation and termination of projects or management, and the process by which the Agency shall determine that conditions requiring the implementation of particular projects or management actions have occurred.*

Given the need for the RCSD MA to attain and maintain sustainability as required by SGMA, this management action will be implemented as an ongoing practice with additional conservation and project elements added in the future.

Subsection 5.2.2.1.3 Public Notice Process *[Reg. § 354.44(b)(1)(B)]*

23 Cal. Code Regs § 354.44 Projects and Management Actions. (b) *Each Plan shall include a description of the projects and management actions that include the following:*

(1) *…The Plan shall include the following:*

(B) *The process by which the Agency shall provide notice to the public and other agencies that the implementation of projects or management actions is being considered or has been implemented, including a description of the actions to be taken.*

Public notices will be provided as required by law, potential Proposition 218 notices, and standard communication practices of the RCSD.

Subsection 5.2.2.1.4 Quantification of Water Budget Impact *[Reg. § 354.44(b)(2)]*

> **23 Cal. Code Regs § 354.44 Projects and Management Actions. (b)** *Each Plan shall include a description of the projects and management actions that include the following:*
>
> **(2)** *If overdraft conditions are identified through the analysis required by Section 354.18, the Plan shall describe projects or management actions, including a quantification of demand reduction or other methods, for the mitigation of overdraft.*

Current water conservation actions are already in place within RCSD. The differential between groundwater pumped and treated wastewater returned to the Tule Subbasin has resulted in a maximum use of 351 acre-feet. When applying the sustainable yield and precipitation accruals on the 308 acres[3] within the RCSD MA, the net maximum current amount of over-pumping of 351 acre-feet is more than the calculated water availability of 243 acre-feet by 108 acre-feet. Each new conservation and project element added will be assessed for water budget impact when proposed by the RCSD.

Subsection 5.2.2.1.5 Permitting and Regulatory Process *[Reg. § 354.44(b)(3)]*

> **23 Cal. Code Regs § 354.44 Projects and Management Actions. (b)** *Each Plan shall include a description of the projects and management actions that include the following:*
>
> **(3)** *A summary of the permitting and regulatory process required for each project and management action.*

All requirements and standards of the SWRCB, Division of Drinking Water will be met.

Subsection 5.2.2.1.6 Timeline *[Reg. § 354.44(b)(4)]*

> **23 Cal. Code Regs § 354.44 Projects and Management Actions. (b)** *Each Plan shall include a description of the projects and management actions that include the following:*
>
> **(4)** *The status of each project and management action, including a time-table for expected initiation and completion, and the accrual of expected benefits.*

Implementation of the action is historical and ongoing throughout the GSP implementation period and beyond.

Subsection 5.2.2.1.7 Anticipated Benefits and Evaluation *[Reg. § 354.44(b)(5)]*

> **23 Cal. Code Regs § 354.44 Projects and Management Actions. (b)** *Each Plan shall include a description of the projects and management actions that include the following:*
>
> **(5)** *An explanation of the benefits that are expected to be realized from the project or management action, and how those benefits will be evaluated.*

Continued reduction of over-pumping of groundwater in the Tule Subbasin as a result of current and future water conservation measures implemented within RCSD.

[3] 308 acres x 0.79 acre-feet/acre = 243 acre-feet.

Evaluation of the benefits of this action will occur through continued evaluation of annual RCSD groundwater pumping and associated wastewater discharges by RCSD facilities that are returned to groundwater aquifers within the DEID GSA.

Benefits from this action will also be evaluated through groundwater level measurements.

Subsection 5.2.2.1.8 Accomplishment *[Reg. § 354.44(b)(6)]*

> **23 Cal. Code Regs § 354.44 Projects and Management Actions. (b)** *Each Plan shall include a description of the projects and management actions that include the following:*
>
> **(6)** *An explanation of how the project or management action will be accomplished. If the project or management actions rely on water from outside the jurisdiction of the Agency, an explanation of the source and reliability of that water shall be included.*

Accomplishments associated with this action will be documented as noted above.

5.2.3.2.9 Legal Authority *[Reg. § 354.44(b)(7)]*

> **23 Cal. Code Regs § 354.44 Projects and Management Actions. (b)** *Each Plan shall include a description of the projects and management actions that include the following:*
>
> **(7)** *A description of the legal authority required for each project and management action, and the basis for that authority within the Agency.*

RCSD has jurisdictional and enforcement rights under Section 61000 et seq of the California Community Services District Law.

5.2.3.2.10 Cost & Funding *[Reg. § 354.44(b)(8)]*

> **23 Cal. Code Regs § 354.44 Projects and Management Actions. (b)** *Each Plan shall include a description of the projects and management actions that include the following:*
>
> **(8)** *A description of the estimated cost for each project and management action and a description of how the Agency plans to meet those costs.*

Cost: Implementation of current water conservation elements are a part of the current operating budget of the RCSD MA. Future water conservation elements added to existing RCSD water conservation ordinances and policies will be assessed for projected costs and anticipated benefits before implemented.

The current costs associated with water conservation elements implemented within RCSD is unknown at this time.

Funding: The total current cost of Action 1 is budgeted and funded annually and will continue to be funded in this manner in the future. Any additional water conservation elements added in the future will require both initial and ongoing costs to be funded before implementation.

There are four primary categories of funding currently used and will continue to be used to fund this action. These are:

- Revenue from residential water and sewer fees – 2019 budget total = $258,888.

- Revenue from commercial water and sewer fees – 2019 budget total = $ 80,892
- Revenue from late fees charged to customers - 2019 budget total = $5,600.
- Revenue from property taxes and leases – 2019 budget total = $163,139.

5.2.3.2.11 Drought Offset Measures *[Reg. § 354.44(b)(9)]*

> **23 Cal. Code Regs § 354.44 Projects and Management Actions. (b)** *Each Plan shall include a description of the projects and management actions that include the following:*
>
> **(9)** *A description of the management of groundwater extractions and recharge to ensure that chronic lowering of groundwater levels or depletion of supply during periods of drought is offset by increases in groundwater levels or storage during other periods.*

RCSD adjusts expenses and revenues annually to reach a balanced budget. Drought years are managed accordingly, both with respect to maximizing water supplies and fiscal responsibility. This is anticipated to be continued in the future.

5.2.3.2.12 Corresponding Attachments *[Reg. § 354.44(c)]*

> **23 Cal. Code Regs § 354.44 Projects and Management Actions. (c)** *Projects and management actions shall be supported by best available information and best available science.*

There are no attachments associated with this action.

Subsection 5.2.2.2 Action 2 – 2020-2025 Interim Water Supply Supplement Program

Subsection 5.2.2.2.1 Description

The RCSD MA proposes to focus on an interim water supply supplement program for the period from 2020-2025 that will provide for a water balance budget where groundwater extractions beyond its historical maximum use are equal to the sum of available water supply inputs. This interim program provides for the purchase of imported water from DEID which will be managed by DEID and based on payment of market-based surface water acquisition prices. As an example, the historical water production and recycled water discharge history has been provided for the RCSD MA for the period from 2016-2018. The differential between groundwater extracted and returns of treated wastewater as groundwater recharge and/or irrigation return flows has resulted in a maximum differential of 351 acre-feet during this period.

A water supply purchase trigger would be based on an exceedance of historical maximum usage. For any prior year in which the annual usage exceeds 351 acre-feet, RCSD MA would be required to purchase supplemental imported supply from DEID. Exceedance above the historical maximum usage would be allowed to continue, up to a maximum of 41 acre-feet per year. The supplemental imported water purchases would be negotiated, arranged and managed by DEID. The price for the purchase of the supplemental supply shall be established by DEID based on the cost of water supply purchases made by DEID on behalf of RCSD MA.

It is envisioned that this program will be an interim program, having an anticipated 5-year life, with water supply payments from RCSD MA continuing into the future, but with future supply quantities generated through other projects (see Action 3).

The trigger for RCSD MA to purchase supplemental water will involve several response steps. Included will be a reporting procedure by the RCSD MA where it shall provide a monthly total of metered quantities of pumped groundwater, measured quantities of wastewater generated, and the disposition of said wastewater. Any exceedance, verified by investigation, will result in a mandatory response by the RCSD MA to participate in purchase of such supplemental quantities of imported water to maintain balance within the DEID GSA boundaries.

Subsection 5.2.2.2.2 Circumstantial Considerations *[Reg. § 354.44(b)(1)(A)]*

> **23 Cal. Code Regs § 354.44 Projects and Management Actions. (b)** *Each Plan shall include a description of the projects and management actions that include the following:*
>
> **(1)** *…The Plan shall include the following:*
>
> **(A)** *A description of the circumstances under which projects or management actions shall be implemented, the criteria that would trigger implementation and termination of projects or management, and the process by which the Agency shall determine that conditions requiring the implementation of particular projects or management actions have occurred.*

Given the need for the RCSD MA to attain and maintain sustainability as required by SGMA, this management action will be implemented immediately.

Subsection 5.2.2.2.3 Public Notice Process *[Reg. § 354.44(b)(1)(B)]*

> **23 Cal. Code Regs § 354.44 Projects and Management Actions. (b)** *Each Plan shall include a description of the projects and management actions that include the following:*
>
> **(1)** *…The Plan shall include the following:*
>
> **(B)** *The process by which the Agency shall provide notice to the public and other agencies that the implementation of projects or management actions is being considered or has been implemented, including a description of the actions to be taken.*

Public notices will be provided as required by law, potential Proposition 218 notices, and standard communication practices of the RCSD.

Subsection 5.2.2.2.4 Quantification of Water Budget Impact *[Reg. § 354.44(b)(2)]*

> **23 Cal. Code Regs § 354.44 Projects and Management Actions. (b)** *Each Plan shall include a description of the projects and management actions that include the following:*
>
> **(2)** *If overdraft conditions are identified through the analysis required by Section 354.18, the Plan shall describe projects or management actions, including a quantification of demand reduction or other methods, for the mitigation of overdraft.*

Supplemental water required by RCSD MA under Action 2 will provide for the correction of annual groundwater over-pumping that occurs within the RCSD MA through purchase of imported water from DEID. Imported water purchased by RCSD MA and made available by DEID will be added to the DEID GSA

water budget through either direct or in-lieu groundwater recharge programs currently in place within DEID.

Subsection 5.2.2.2.5 Permitting and Regulatory Process *[Reg. § 354.44(b)(3)]*

> **23 Cal. Code Regs § 354.44 Projects and Management Actions. (b)** *Each Plan shall include a description of the projects and management actions that include the following:*
>
> **(3)** *A summary of the permitting and regulatory process required for each project and management action.*

Potential Proposition 218 notices.

Subsection 5.2.2.2.6 Timeline *[Reg. § 354.44(b)(4)]*

> **23 Cal. Code Regs § 354.44 Projects and Management Actions. (b)** *Each Plan shall include a description of the projects and management actions that include the following:*
>
> **(4)** *The status of each project and management action, including a time-table for expected initiation and completion, and the accrual of expected benefits.*

This action is proposed as an interim measure that will be implemented between 2020-2025.

Subsection 5.2.2.2.7 Anticipated Benefits and Evaluation *[Reg. § 354.44(b)(5)]*

> **23 Cal. Code Regs § 354.44 Projects and Management Actions. (b)** *Each Plan shall include a description of the projects and management actions that include the following:*
>
> **(5)** *An explanation of the benefits that are expected to be realized from the project or management action, and how those benefits will be evaluated.*

Correction of annual groundwater over-pumping beyond the historical maximum that has occurred within the RCSD MA.

Evaluation of the benefits of this action will occur through continued evaluation of annual groundwater pumping and wastewater discharges that are returned to the Tule Subbasin's aquifers. Benefits from this action will also be evaluated through groundwater level measurements.

Subsection 5.2.2.2.8 Accomplishment *[Reg. § 354.44(b)(6)]*

> **23 Cal. Code Regs § 354.44 Projects and Management Actions. (b)** *Each Plan shall include a description of the projects and management actions that include the following:*
>
> **(6)** *An explanation of how the project or management action will be accomplished. If the project or management actions rely on water from outside the jurisdiction of the Agency, an explanation of the source and reliability of that water shall be included.*

Accomplishments associated with this action will be documented as noted above.

Subsection 5.2.2.2.9 Legal Authority *[Reg. § 354.44(b)(7)]*

> **23 Cal. Code Regs § 354.44 Projects and Management Actions. (b)** *Each Plan shall include a description of the projects and management actions that include the following:*

> **(7)** *A description of the legal authority required for each project and management action, and the basis for that authority within the Agency.*

RCSD has jurisdictional and enforcement rights under Section 61000 et seq of the California Community Services District Law.

Subsection 5.2.2.2.10 Cost & Funding *[Reg. § 354.44(b)(8)]*

> **23 Cal. Code Regs § 354.44 Projects and Management Actions. (b)** *Each Plan shall include a description of the projects and management actions that include the following:*
>
> **(8)** *A description of the estimated cost for each project and management action and a description of how the Agency plans to meet those costs.*

Cost: Implementation of this action will be included in the annual operating budget of the RCSD MA. The annual cost will be determined annually based on the cost of imported supply purchases made by DEID on behalf of RCSD MA.

Funding: Anticipated funding for Action 2 is expected to come from: (1) direct assessments from new water users requesting water service, which will be a condition of service being provided, and (2) revenue from water sales to existing RCSD customers, funded through annual water rates set by the RCSD Board of Directors.

Subsection 5.2.2.2.11 Drought Offset Measures *[Reg. § 354.44(b)(9)]*

> **23 Cal. Code Regs § 354.44 Projects and Management Actions. (b)** *Each Plan shall include a description of the projects and management actions that include the following:*
>
> **(9)** *A description of the management of groundwater extractions and recharge to ensure that chronic lowering of groundwater levels or depletion of supply during periods of drought is offset by increases in groundwater levels or storage during other periods.*

RCSD adjusts expenses and revenues annually to reach a balanced budget. Drought years are managed accordingly, both with respect to maximizing water supplies and fiscal responsibility. This is anticipated to be continued in the future.

Subsection 5.2.2.2.12 Corresponding Attachments *[Reg. § 354.44(c)]*

> **23 Cal. Code Regs § 354.44 Projects and Management Actions. (c)** *Projects and management actions shall be supported by best available information and best available science.*

There are no attachments associated with this action.

Subsection 5.2.2.3 Action 3 – Future Development and Implementation of Groundwater Recharge Projects

Subsection 5.2.2.3.1 Description

Action 3 is the future development and implementation of groundwater recharge projects that will bring the RCSD MA into a sustainable long-term balance condition. It is the long-term goal to develop

additional water supplies to meet water demands within the RCSD MA. The nature of these projects will be to provide groundwater recharge to offset RCSD MA groundwater extractions in excess of its sustainable yield and precipitation accruals.

There are three phases anticipated for Action 3: (1) project planning, (2) project construction, and (3) operation, maintenance, and repair of constructed facilities. All three phases will be accomplished in conjunction with DEID.

Planning efforts will begin shortly following approval of the GSP and will be focused on a determination of the proper location of recharge facilities to ensure that they have a direct impact on groundwater extractions within the RCSD MA and to address the capability to deliver purchased imported water supplies to the selected recharge locations. The planning phase will also include identifying potential funding sources to assist the RCSD MA in addressing planning and capital costs associated with project development and implementation. Potential funding sources include the Integrated Regional Water Management Planning, as well as specific funding programs of the State of California designed to address drinking water needs of economically disadvantaged communities. With respect to the latter, the RCSD service area is classified as a severely disadvantaged community relative to economic development criteria. In addition to those external funding efforts, an evaluation of the development of local impact fees will be necessary, both with respect to funding project capital expenses and expenses associated with ongoing project costs, specifically those related to surface water acquisition.

The need for future groundwater recharge projects for the RCSD MA is anticipated to be primarily for the benefit of parties requesting the capability to develop within the RCSD MA. RCSD will remain responsible for the determination of specific criteria that result in proposing the implementing Action 3 projects, including negotiations and other interactions with parties requesting service within RCSD MA. Anticipated potential requesting parties are school districts, which would involve increased demand related to changes in average daily attendance on existing school campuses.

On behalf of the RCSD MA, the DEID GSA will monitor the potential of meeting future RCSD MA community water needs through participation in a groundwater credits acquisition program within the Tule Subbasin. Should such a program become available within the Tule Subbasin and a determination is made by the DEID GSA that participation in the program will have of no negative impact to others within the DEID GSA, the RCSD Board of Directors will be given the option of participating in an inter-RCSD MA groundwater credits acquisition program.

Subsection 5.2.2.3.2 Circumstantial Considerations *[Reg. § 354.44(b)(1)(A)]*

> **23 Cal. Code Regs § 354.44 Projects and Management Actions. (b)** *Each Plan shall include a description of the projects and management actions that include the following:*
>
> **(1)** *…The Plan shall include the following:*
>
> **(A)** *A description of the circumstances under which projects or management actions shall be implemented, the criteria that would trigger implementation and termination of projects or management, and the process by which the Agency shall determine that conditions requiring the implementation of particular projects or management actions have occurred.*

Given the need for the RCSD MA to attain and maintain sustainability as required by SGMA, the planning phase of this action will be implemented immediately, with any identified projects found to be feasible anticipated to be constructed and operated during the period from 2025-2040 and beyond.

Subsection 5.2.2.3.3 Public Notice Process *[Reg. § 354.44(b)(1)(B)]*

> **23 Cal. Code Regs § 354.44 Projects and Management Actions. (b)** *Each Plan shall include a description of the projects and management actions that include the following:*
>
> **(1)** *…The Plan shall include the following:*
>
> **(B)** *The process by which the Agency shall provide notice to the public and other agencies that the implementation of projects or management actions is being considered or has been implemented, including a description of the actions to be taken***.**

Public notices will be provided as required by law, potential Proposition 218 notices, and standard communication practices of the RCSD.

Subsection 5.2.2.3.4 Quantification of Water Budget Impact *[Reg. § 354.44(b)(2)]*

> **23 Cal. Code Regs § 354.44 Projects and Management Actions. (b)** *Each Plan shall include a description of the projects and management actions that include the following:*
>
> **(2)** *If overdraft conditions are identified through the analysis required by Section 354.18, the Plan shall describe projects or management actions, including a quantification of demand reduction or other methods, for the mitigation of overdraft.*

The water supply impacts associated with future projects that are a result of Action 3 implementation will be identified as part of the feasibility analysis done for each project. As stated above, the intent of any Action 3 projects is to achieve a water balance within the RCSD that demonstrates its long-term sustainability.

With respect to potential participation in a Tule Subbasin groundwater credits acquisition program, said participation could result in an increase in groundwater extractions beyond what would otherwise be extracted without the program. This may require further analysis with respect to any potential undesirable results in any other management area in the DEID GSA and potential mitigation of impacts from increased groundwater extraction.

Subsection 5.2.2.3.5 Permitting and Regulatory Process *[Reg. § 354.44(b)(3)]*

> **23 Cal. Code Regs § 354.44 Projects and Management Actions. (b)** *Each Plan shall include a description of the projects and management actions that include the following:*
>
> **(3)** *A summary of the permitting and regulatory process required for each project and management action.*

All requirements associated with CEQA compliance will be met.

Subsection 5.2.2.3.6 Timeline *[Reg. § 354.44(b)(4)]*

> **23 Cal. Code Regs § 354.44 Projects and Management Actions. (b)** *Each Plan shall include a description of the projects and management actions that include the following:*

(4) *The status of each project and management action, including a time-table for expected initiation and completion, and the accrual of expected benefits.*

This action is proposed as a long-term measure with planning anticipated to commence immediately. Any projects ultimately chosen for construction are anticipated to be implemented from 2025-2040.

Subsection 5.2.2.3.7 Anticipated Benefits and Evaluation *[Reg. § 354.44(b)(5)]*

23 Cal. Code Regs § 354.44 Projects and Management Actions. (b) *Each Plan shall include a description of the projects and management actions that include the following:*

(5) *An explanation of the benefits that are expected to be realized from the project or management action, and how those benefits will be evaluated.*

Long-term correction of any annual groundwater over-pumping beyond the historical maximum that has occurred within the RCSD MA.

Evaluation of the benefits of this action will occur through continued evaluation of annual groundwater pumping and wastewater discharges that are returned to the Tule Subbasin's aquifers. Benefits from this action will also be evaluated through groundwater level measurements.

Subsection 5.2.2.3.8 Accomplishment *[Reg. § 354.44(b)(6)]*

23 Cal. Code Regs § 354.44 Projects and Management Actions. (b) *Each Plan shall include a description of the projects and management actions that include the following:*

(6) *An explanation of how the project or management action will be accomplished. If the project or management actions rely on water from outside the jurisdiction of the Agency, an explanation of the source and reliability of that water shall be included.*

Accomplishments associated with this action will be documented as noted above.

Subsection 5.2.2.3.9 Legal Authority *[Reg. § 354.44(b)(7)]*

23 Cal. Code Regs § 354.44 Projects and Management Actions. (b) *Each Plan shall include a description of the projects and management actions that include the following:*

(7) *A description of the legal authority required for each project and management action, and the basis for that authority within the Agency.*

RCSD has jurisdictional and enforcement rights under Section 61000 et seq of the California Community Services District Law.

Accomplishments associated with this action will be documented as noted above.

Subsection 5.2.2.3.10 Cost & Funding *[Reg. § 354.44(b)(8)]*

23 Cal. Code Regs § 354.44 Projects and Management Actions. (b) *Each Plan shall include a description of the projects and management actions that include the following:*

(8) *A description of the estimated cost for each project and management action and a description of how the Agency plans to meet those costs.*

Cost: Individual project cost of planning, construction, and ongoing operation, maintenance, and repair will be identified in the planning phase of this action.

Funding: Anticipated funding for Action 3 project planning and construction will likely come from funding sources associated with integrated regional water management planning programs or state funds associated with drinking water needs within economically disadvantaged communities' programs. Funding for ongoing operation, maintenance, and repair costs associated with any given project are likely to be funded through development agreements negotiated between interested parties proposing new developments within the RCSD MA and the RCSD.

Subsection 5.2.2.3.11 Drought Offset Measures *[Reg. § 354.44(b)(9)]*

> **23 Cal. Code Regs § 354.44 Projects and Management Actions. (b)** *Each Plan shall include a description of the projects and management actions that include the following:*
>
> **(9)** *A description of the management of groundwater extractions and recharge to ensure that chronic lowering of groundwater levels or depletion of supply during periods of drought is offset by increases in groundwater levels or storage during other periods.*

RCSD adjusts expenses and revenues annually to reach a balanced budget. Drought years are managed accordingly, both with respect to maximizing water supplies and fiscal responsibility. This is anticipated to be continued in the future.

Subsection 5.2.2.3.12 Corresponding Attachments *[Reg. § 354.44(c)]*

> **23 Cal. Code Regs § 354.44 Projects and Management Actions. (c)** *Projects and management actions shall be supported by best available information and best available science.*

There are no attachments associated with this action.

Subsection 5.2.2.4 Action 4 – Mitigation of Identified Adverse Impacts

Mitigation of identified adverse impacts is previously described in **Subsection 5.2.1.7.** As the RCSD MA is within the DEID GSA boundary, this Mitigation Plan will apply to RCSD for identified and confirmed adverse impacts to the community water system.

Subsection 5.2.3 Earlimart Public Utility District Management Area *[Reg. § 354.44(b)(1)]*

> **23 Cal. Code Regs § 354.44 Projects and Management Actions. (b)** *Each Plan shall include a description of the projects and management actions that include the following:*
>
> **(1)** *A list of projects and management actions proposed in the Plan with a description of the measurable objective that is expected to benefit from the project or management action. The list shall include projects and management actions that may be utilized to meet interim milestones, the exceedance of minimum thresholds, or where undesirable results have occurred or are imminent.*

By actions of an executed memorandum of understanding, the EPUD and its service area, which covers the unincorporated community of Earlimart, is a participant in the DEID GSA (see **Appendix C**). The Earlimart community is served by a water system permitted, owned, and operated by the EPUD. The

community water system relies exclusively on pumped groundwater as the source of supply, without any rights to surface water.

The purpose of the projects and management actions described in this section of the GSP for the Earlimart Public Utility District Management Area (EPUD MA) is to outline the general process and procedures by which development within the EPUD can proceed in a manner consistent with the sustainability goal for the Tule Subbasin. While historical growth within the Earlimart community has been relatively modest, the focus of SGMA is to allow the EPUD MA to ensure a reliable water supply for both current and future water users within its jurisdiction. This focus extends to parties and entities desiring to develop within the EPUD MA where demands projected exceed the sustainable yield. The following projects and management actions indicate the approach to meet sustainability recognizing that, in some cases, details associated with specific projects will be generated as future requests for water service and related services are received.

Projects and management actions for the EPUD MA are associated with the following general categories of actions:

- Current groundwater supply optimization
- Development of additional groundwater supplies
- Existing and future managed aquifer recharge

Successful implementation of the projects and management actions for the EPUD MA will provide for its sustainability.

The following project and management actions have been identified for the EPUD MA:

Action 1 Water conservation programs

Action 2 2020-2025 interim water supply supplement program

Action 3 2025-2040 groundwater recharge projects for future groundwater extraction needs

Action 4 Mitigation of identified adverse impacts

Subsection 5.2.3.1 Action 1 – Water Conservation Programs

Subsection 5.2.3.1.1 Description

Optimization of current groundwater supplies used within the EPUD MA will be maintained through current water conservation programs and future work to generate supplemental water conservation elements that will be incorporated into EPUD's adopted water ordinances. These provisions are/shall be constructed such that each dwelling unit, commercial development or industrial enterprise be required to use plumbing fixtures meeting defined levels of conservation potential. These levels are to be achieved by incorporation of conservation principals into the design and selection of plumbing fixtures. Current and future applicants for water service are required to satisfy the specific provisions of the adopted ordinances as a condition of initial and continued service. Demonstrating compliance with a mandated level of conservation efficiency using fixtures and devices associated with any proposed development will be required.

Conservation provisions of any adopted water ordinances will be revisited on a defined frequency and maintained with respect to the incorporation of Best Available Technology. Conservation elements will be a permanent part of water supply process used in EPUD.

Included within the Action 1 is the complete metering of EPUD water service connections. This will allow for the conservation procedures associated with a water meter rate structure to be employed, along with specific conservation enforcement. Timing of full implementation of systems metering will be functions of both funding of the capital cost element and successful passage of a Proposition 218 fee or assessment that will allow implementation of the meter-related rate structure.

Subsection 5.2.3.1.2 Circumstantial Considerations *[Reg. § 354.44(b)(1)(A)]*

> **23 Cal. Code Regs § 354.44 Projects and Management Actions. (b)** *Each Plan shall include a description of the projects and management actions that include the following:*
>
> **(1)** *…The Plan shall include the following:*
>
> **(A)** *A description of the circumstances under which projects or management actions shall be implemented, the criteria that would trigger implementation and termination of projects or management, and the process by which the Agency shall determine that conditions requiring the implementation of particular projects or management actions have occurred.*

Given the need for the EPUD MA to attain and maintain sustainability as required by SGMA, this management action will be implemented as an ongoing practice with additional elements added in the future.

Subsection 5.2.3.1.3 Public Notice Process *[Reg. § 354.44(b)(1)(B)]*

> **23 Cal. Code Regs § 354.44 Projects and Management Actions. (b)** *Each Plan shall include a description of the projects and management actions that include the following:*
>
> **(1)** *…The Plan shall include the following:*
>
> **(B)** *The process by which the Agency shall provide notice to the public and other agencies that the implementation of projects or management actions is being considered or has been implemented, including a description of the actions to be taken.*

Public notices will be provided as required by law, potential Proposition 218 notices, and standard communication practices of the EPUD.

Subsection 5.2.3.1.4 Quantification of Water Budget Impact *[Reg. § 354.44(b)(2)]*

> **23 Cal. Code Regs § 354.44 Projects and Management Actions. (b)** *Each Plan shall include a description of the projects and management actions that include the following:*
>
> **(2)** *If overdraft conditions are identified through the analysis required by Section 354.18, the Plan shall describe projects or management actions, including a quantification of demand reduction or other methods, for the mitigation of overdraft.*

Current water conservation actions are already in place within EPUD. The differential between groundwater pumped and treated wastewater returned to the Subbasin has resulted in a maximum use

of 845 acre-feet. When applying the sustainable yield and precipitation accruals on the 989 acres[4] within the EPUD MA, the net maximum current amount of over-pumping is more than the calculated water availability of 781 acre-feet by 208 acre-feet. Each new conservation and project element added will be assessed for water budget impact when proposed by the EPUD.

Subsection 5.2.3.1.5 Permitting and Regulatory Process *[Reg. §354.44(b)(3)]*

> **23 Cal. Code Regs § 354.44 Projects and Management Actions. (b)** *Each Plan shall include a description of the projects and management actions that include the following:*
>
> **(3)** *A summary of the permitting and regulatory process required for each project and management action.*

All requirements and standards of the SWRCB, Division of Drinking Water will be met.

Subsection 5.2.3.1.6 Timeline [Reg. § 354.44(b)(4)]

> **23 Cal. Code Regs § 354.44 Projects and Management Actions. (b)** *Each Plan shall include a description of the projects and management actions that include the following:*
>
> **(4)** *The status of each project and management action, including a time-table for expected initiation and completion, and the accrual of expected benefits.*

Implementation of the action is historical and ongoing throughout the SGMA implementation period and beyond.

Subsection 5.2.3.1.7 Anticipated Benefits and Evaluation *[Reg. § 354.44(b)(5)]*

> **23 Cal. Code Regs § 354.44 Projects and Management Actions. (b)** *Each Plan shall include a description of the projects and management actions that include the following:*
>
> **(5)** *An explanation of the benefits that are expected to be realized from the project or management action, and how those benefits will be evaluated.*

Anticipated benefits include continued reduction of over-pumping of groundwater in the Subbasin as a result of current and future water conservation measures implemented within EPUD.

Evaluation of the benefits of this action will occur through continued evaluation of annual EPUD groundwater pumping and associated wastewater discharges by EPUD facilities that are returned to groundwater aquifers within the DEID GSA.

Benefits from this action will also be evaluated through groundwater level measurements.

Subsection 5.2.3.1.8 Accomplishment *[Reg. § 354.44(b)(6)]*

> **23 Cal. Code Regs § 354.44 Projects and Management Actions. (b)** *Each Plan shall include a description of the projects and management actions that include the following:*

[4] 989 acres x 0.79 acre-feet/acres = acre-feet 781 acre-feet.

> **(6)** *An explanation of how the project or management action will be accomplished. If the project or management actions rely on water from outside the jurisdiction of the Agency, an explanation of the source and reliability of that water shall be included.*

Accomplishments associated with this action will be documented as noted above.

5.2.4.2.9 Legal Authority *[Reg. § 354.44(b)(7)]*

> **23 Cal. Code Regs § 354.44 Projects and Management Actions. (b)** *Each Plan shall include a description of the projects and management actions that include the following:*
>
> **(7)** *A description of the legal authority required for each project and management action, and the basis for that authority within the Agency.*

EPUD has jurisdictional and enforcement rights under Section 16461 of the California Public Utility District Act.

5.2.4.2.10 Cost & Funding *[Reg. § 354.44(b)(8)]*

> **23 Cal. Code Regs § 354.44 Projects and Management Actions. (b)** *Each Plan shall include a description of the projects and management actions that include the following:*
>
> **(8)** *A description of the estimated cost for each project and management action and a description of how the Agency plans to meet those costs.*

Cost: Implementation of current water conservation elements are a part of the current operating budget of the EPUD. Future water conservation elements added to existing EPUD water conservation ordinances and policies will be assessed for projected costs and anticipated benefits before implemented.

The current costs associated with water conservation elements implemented within EPUD is unknown at this time.

Funding: The total current cost of Action 1 is budgeted and funded annually and will continue to be funded in this manner in the future. Any additional water conservation elements added in the future will require both initial and ongoing costs to be funded before implementation.

There are four primary categories of funding currently used and will continue to be used to fund this action:

- Revenue from water and sewer fees – 2018 budget total = $749,045.
- Revenue from property taxes – 2018 budget total = $12,044.
- Revenue from other sales and services – 2018 budget total = $144,971.
- Unrestricted cash on hand – 2018 budget total = $893,992

5.2.4.2.11 Drought Offset Measures *[Reg. § 354.44(b)(9)]*

> **23 Cal. Code Regs § 354.44 Projects and Management Actions. (b)** *Each Plan shall include a description of the projects and management actions that include the following:*

(9) *A description of the management of groundwater extractions and recharge to ensure that chronic lowering of groundwater levels or depletion of supply during periods of drought is offset by increases in groundwater levels or storage during other periods.*

EPUD adjusts expenses and revenues annually to reach a balanced budget. Drought years are managed accordingly, both with respect to maximizing water supplies and fiscal responsibility. This is anticipated to be continued in the future.

5.2.4.2.12 Corresponding Attachments *[Reg. § 354.44(c)]*

23 Cal. Code Regs § 354.44 Projects and Management Actions. (c) *Projects and management actions shall be supported by best available information and best available science.*

There are no attachments associated with this action.

Subsection 5.2.3.2 Action 2 – 2020-2025 Interim Water Supply Supplement Program

Subsection 5.2.3.2.1 Description

The EPUD MA proposes to focus on an interim water supply supplement program for the period from 2020-2025 that will provide for a water balance where groundwater extractions beyond its historical maximum use are equal to the sum of available water supply inputs. This interim program provides for the purchase of imported water from DEID which will be managed by DEID and based on payment of market-based surface water acquisition prices. As an example, the historical water production and recycled water discharge history has been provided for the EPUD MA for the period from 2009-2017. The differential between groundwater extracted and returns of treated wastewater as groundwater recharge and/or in-lieu recharge has resulted in a maximum differential of 845 acre-feet during this period.

A water supply purchase trigger would be based on an exceedance of historical maximum usage. For any prior year in which the annual usage exceeds the maximum historical usage of 845 acre-feet, EPUD MA would be required to purchase supplemental imported supply from DEID. Exceedance above the historical maximum usage would be allowed to continue to exist, up to a maximum of 100 acre-feet per year. The supplemental imported water purchases would be negotiated, arranged and managed by DEID. The price for the purchase of the supplemental supply shall be established by DEID based on the cost of water supply purchases made by DEID on behalf of EPUD MA.

It is envisioned that this program will be an interim program, having an anticipated 5-year life, with water supply payments from EPUD MA continuing into the future, but with future supply quantities generated through other projects (see Action 3).

The trigger for EPUD MA to purchase supplemental water will involve several response steps. Included will be a reporting procedure by the EPUD MA where it shall provide a monthly total of metered quantities of pumped groundwater, measured quantities of wastewater generated, and the disposition of said wastewater. An exceedance, verified by investigation, will result in a mandatory response by the

EPUD MA to participate in purchase of supplemental quantities of imported water to maintain balance within the DEID GSA boundaries.

Subsection 5.2.3.2.2 Circumstantial Considerations *[Reg. § 354.44(b)(1)(A)]*

> **23 Cal. Code Regs § 354.44 Projects and Management Actions. (b)** *Each Plan shall include a description of the projects and management actions that include the following:*
>
> **(1)** *…The Plan shall include the following:*
>
> **(A)** *A description of the circumstances under which projects or management actions shall be implemented, the criteria that would trigger implementation and termination of projects or management, and the process by which the Agency shall determine that conditions requiring the implementation of particular projects or management actions have occurred.*

Given the need for the EPUD MA to attain and maintain sustainability as required by SGMA, this management action will be implemented immediately.

Subsection 5.2.3.2.3 Public Notice Process *[Reg. § 354.44(b)(1)(B)]*

> **23 Cal. Code Regs § 354.44 Projects and Management Actions. (b)** *Each Plan shall include a description of the projects and management actions that include the following:*
>
> **(1)** *…The Plan shall include the following:*
>
> **(B)** *The process by which the Agency shall provide notice to the public and other agencies that the implementation of projects or management actions is being considered or has been implemented, including a description of the actions to be taken***.**

Public notices will be provided as required by law, potential Proposition 218 notices, and standard communication practices of the EPUD.

Subsection 5.2.3.2.4 Quantification of Water Budget Impact *[Reg. § 354.44(b)(2)]*

> **23 Cal. Code Regs § 354.44 Projects and Management Actions. (b)** *Each Plan shall include a description of the projects and management actions that include the following:*
>
> **(2)** *If overdraft conditions are identified through the analysis required by Section 354.18, the Plan shall describe projects or management actions, including a quantification of demand reduction or other methods, for the mitigation of overdraft.*

Any supplemental water required by EPUD MA under Action 2 will provide for the correction of annual groundwater over-pumping that occurs within the EPUD MA through purchase of imported water from DEID. Imported water purchased by EPUD MA and made available by DEID will be added to the DEID GSA water budget through either direct or in-lieu groundwater recharge programs currently in place within DEID.

Subsection 5.2.3.2.5 Permitting and Regulatory Process *[Reg. § 354.44(b)(3)]*

> **23 Cal. Code Regs § 354.44 Projects and Management Actions. (b)** *Each Plan shall include a description of the projects and management actions that include the following:*
>
> **(3)** *A summary of the permitting and regulatory process required for each project and management action.*

Potential Proposition 218 notices.

Subsection 5.2.3.2.6 Timeline *[Reg. § 354.44(b)(4)]*

> **23 Cal. Code Regs § 354.44 Projects and Management Actions. (b)** *Each Plan shall include a description of the projects and management actions that include the following:*
>
> **(4)** *The status of each project and management action, including a time-table for expected initiation and completion, and the accrual of expected benefits.*

This action is proposed as an interim measure that will be implemented from 2020-2025.

Subsection 5.2.3.2.7 Anticipated Benefits and Evaluation *[Reg. § 354.44(b)(5)]*

> **23 Cal. Code Regs § 354.44 Projects and Management Actions. (b)** *Each Plan shall include a description of the projects and management actions that include the following:*
>
> **(5)** *An explanation of the benefits that are expected to be realized from the project or management action, and how those benefits will be evaluated.*

Correction of any annual groundwater over-pumping beyond the historical maximum that has occurred within the EPUD MA.

Evaluation of the benefits of this action will occur through continued evaluation of annual groundwater pumping and wastewater discharges that are returned to the Tule Subbasin's aquifers. Benefits from this action will also be evaluated through groundwater level measurements.

Subsection 5.2.3.2.8 Accomplishment *[Reg. § 354.44(b)(6)]*

> **23 Cal. Code Regs § 354.44 Projects and Management Actions. (b)** *Each Plan shall include a description of the projects and management actions that include the following:*
>
> **(6)** *An explanation of how the project or management action will be accomplished. If the project or management actions rely on water from outside the jurisdiction of the Agency, an explanation of the source and reliability of that water shall be included.*

Accomplishments associated with this action will be documented as noted above.

Subsection 5.2.3.2.9 Legal Authority *[Reg. § 354.44(b)(7)]*

> **23 Cal. Code Regs § 354.44 Projects and Management Actions. (b)** *Each Plan shall include a description of the projects and management actions that include the following:*
>
> **(7)** *A description of the legal authority required for each project and management action, and the basis for that authority within the Agency.*

EPUD has jurisdictional and enforcement rights under Section 16461 of the California Public Utility District Act.

Subsection 5.2.3.2.10 Cost & Funding *[Reg. § 354.44(b)(8)]*

> **23 Cal. Code Regs § 354.44 Projects and Management Actions. (b)** *Each Plan shall include a description of the projects and management actions that include the following:*

> **(8)** *A description of the estimated cost for each project and management action and a description of how the Agency plans to meet those costs.*

Cost: Implementation of this action will be included in the annual operating budget of the EPUD MA. The annual cost will be determined based on the cost of imported supply purchases made by DEID on behalf of EPUD MA.

Funding: Anticipated funding for Action 2 is expected to come from: (1) direct assessments from new water users requesting water service, which will be a condition of service being provided, and (2) revenue from water sales to existing EPUD customers, funded through annual water rates set by the EPUD Board of Directors.

Subsection 5.2.3.2.11 Drought Offset Measures *[Reg. § 354.44(b)(9)]*

> **23 Cal. Code Regs § 354.44 Projects and Management Actions. (b)** *Each Plan shall include a description of the projects and management actions that include the following:*
>
> **(9)** *A description of the management of groundwater extractions and recharge to ensure that chronic lowering of groundwater levels or depletion of supply during periods of drought is offset by increases in groundwater levels or storage during other periods.*

EPUD adjusts expenses and revenues annually to reach a balanced budget. Drought years are managed accordingly, both with respect to maximizing water supplies and fiscal responsibility. This is anticipated to be continued in the future.

Subsection 5.2.3.2.12 Corresponding Attachments *[Reg. § 354.44(c)]*

> **23 Cal. Code Regs § 354.44 Projects and Management Actions. (c)** *Projects and management actions shall be supported by best available information and best available science.*

There are no attachments associated with this action.

Subsection 5.2.3.3 Action 3 – 2025-2040 Groundwater Recharge Projects

Subsection 5.2.3.3.1 Description

Action 3 is the future development and implementation of groundwater recharge projects that will bring the EPUD MA into a sustainable long-term balance condition. It is the long-term goal to develop additional water supplies to meet the needs within the EPUD MA. The nature of these projects will be to provide groundwater recharge to offset EPUD MA groundwater extractions in excess of its sustainable yield and precipitation accruals.

There are three phases anticipated for Action 3: (1) project planning, (2) project construction, and (3) operation, maintenance and repair of constructed facilities. All three phases will be accomplished in conjunction with DEID.

Planning efforts will begin shortly following approval of the GSP and will be focused on a determination of the proper location of recharge facilities to ensure that they have a direct impact on groundwater extractions within the EPUD MA and to address the capability to deliver purchased imported water supplies to the selected recharge locations. The planning phase will also include identifying potential

funding sources to assist the EPUD MA in addressing planning and capital costs associated with project development and implementation. Potential funding sources are within the Integrated Regional Water Management Planning structure coordination, as well as specific funding programs of the State of California designed to address drinking water needs of economically disadvantaged communities. With respect to the latter, the EPUD service area is classified as a severely disadvantaged community relative to economic development criteria. In addition to those external funding efforts, an evaluation of the development of local impact fees will be a necessity, both with respect to funding project capital expenses and expenses associated with ongoing project costs, specifically those related to surface water acquisition.

The need for future groundwater recharge projects for the EPUD MA is anticipated to be primarily for the benefit of parties requesting the capability to develop within the EPUD MA. EPUD will remain responsible for the determination of specifics that result in proposing implementing Action 3 projects including negotiations and other interactions with parties requesting service within EPUD MA. Included within these potential requesting parties are school districts, as a number of projects are currently known to be in the planning phases which involve increased demand both related to changes in average daily attendance on existing school campuses, as well as a planned high school campus within the EPUD.

On behalf of the EPUD MA, the DEID GSA will monitor the potential of meeting future EPUD MA community water needs through participation in a groundwater credits acquisition program within the Tule Subbasin. Should such a program become available within the Tule Subbasin and a determination is made by the DEID GSA that participation in the program will have of no negative impact to others within the DEID GSA, the EPUD Board of Directors will be given the option of participating in an inter-EPUD MA groundwater credits acquisition program.

Subsection 5.2.3.3.2 Circumstantial Considerations *[Reg. § 354.44(b)(1)(A)]*

> **23 Cal. Code Regs § 354.44 Projects and Management Actions. (b)** *Each Plan shall include a description of the projects and management actions that include the following:*
>
> **(1)** *…The Plan shall include the following:*
>
> **(A)** *A description of the circumstances under which projects or management actions shall be implemented, the criteria that would trigger implementation and termination of projects or management, and the process by which the Agency shall determine that conditions requiring the implementation of particular projects or management actions have occurred.*

Given the need for the EPUD MA to attain and maintain sustainability as required by SGMA, the planning phase of this action will be implemented immediately, with any identified projects found to be feasible anticipated to be constructed and operated during the period from 2025-2040 and beyond.

Subsection 5.2.3.3.3 Public Notice Process *[Reg. § 354.44(b)(1)(B)]*

> **23 Cal. Code Regs § 354.44 Projects and Management Actions. (b)** *Each Plan shall include a description of the projects and management actions that include the following:*
>
> **(1)** *…The Plan shall include the following:*
>
> **(B)** *The process by which the Agency shall provide notice to the public and other agencies that the implementation of projects or management actions is being considered or has been implemented, including a description of the actions to be taken***.**

Public notices will be provided as required by law, potential Proposition 218 notices, and standard communication practices of the EPUD.

Subsection 5.2.3.3.4 Quantification of Water Budget Impact *[Reg. § 354.44(b)(2)]*

> **23 Cal. Code Regs § 354.44 Projects and Management Actions. (b)** *Each Plan shall include a description of the projects and management actions that include the following:*
>
> **(2)** *If overdraft conditions are identified through the analysis required by Section 354.18, the Plan shall describe projects or management actions, including a quantification of demand reduction or other methods, for the mitigation of overdraft.*

The water supply impacts associated with future projects that are a result of Action 3 implementation will be identified as part of the feasibility analysis done for each project proposed. As stated above, the intent of any Action 3 projects is to achieve a water balance within the EPUD that demonstrates its long-term sustainability.

With respect to potential participation in a Tule Subbasin groundwater credits acquisition program, said participation could result in an increase in groundwater extractions beyond what would otherwise be extracted without the program. This may require further analysis with respect to any potential undesirable results in any other management area in the DEID GSA and potential mitigation of impacts from increased groundwater extraction.

Subsection 5.2.3.3.5 Permitting and Regulatory Process *[Reg. § 354.44(b)(3)]*

> **23 Cal. Code Regs § 354.44 Projects and Management Actions. (b)** *Each Plan shall include a description of the projects and management actions that include the following:*
>
> **(3)** *A summary of the permitting and regulatory process required for each project and management action.*

All requirements associated with CEQA compliance will be met.

Subsection 5.2.3.3.6 Timeline *[Reg. § 354.44(b)(4)]*

> **23 Cal. Code Regs § 354.44 Projects and Management Actions. (b)** *Each Plan shall include a description of the projects and management actions that include the following:*
>
> **(4)** *The status of each project and management action, including a time-table for expected initiation and completion, and the accrual of expected benefits.*

This action is proposed as a long-term measure with planning anticipated to commence immediately. Any projects ultimately chosen for construction are anticipated to be implemented from 2025-2040.

Subsection 5.2.3.3.7 Anticipated Benefits and Evaluation *[Reg. § 354.44(b)(5)]*

> **23 Cal. Code Regs § 354.44 Projects and Management Actions. (b)** *Each Plan shall include a description of the projects and management actions that include the following:*
>
> **(5)** *An explanation of the benefits that are expected to be realized from the project or management action, and how those benefits will be evaluated.*

Long-term correction of any annual groundwater over-pumping beyond the historical maximum that has occurred within the EPUD MA.

Evaluation of the benefits of this action will occur through continued evaluation of annual groundwater pumping and wastewater discharges that are returned to the Tule Subbasin's aquifers. Benefits from this action will also be evaluated through groundwater level measurements.

Subsection 5.2.3.3.8 Accomplishment *[Reg. § 354.44(b)(6)]*

> **23 Cal. Code Regs § 354.44 Projects and Management Actions. (b)** *Each Plan shall include a description of the projects and management actions that include the following:*
>
> **(6)** *An explanation of how the project or management action will be accomplished. If the project or management actions rely on water from outside the jurisdiction of the Agency, an explanation of the source and reliability of that water shall be included.*

Accomplishments associated with this action will be documented as noted above.

Subsection 5.2.3.3.9 Legal Authority *[Reg. § 354.44(b)(7)]*

> **23 Cal. Code Regs § 354.44 Projects and Management Actions. (b)** *Each Plan shall include a description of the projects and management actions that include the following:*
>
> **(7)** *A description of the legal authority required for each project and management action, and the basis for that authority within the Agency.*

EPUD has jurisdictional and enforcement rights under Section 16461 of the California Public Utility District Act.

Subsection 5.2.3.3.10 Cost & Funding *[Reg. § 354.44(b)(8)]*

> **23 Cal. Code Regs § 354.44 Projects and Management Actions. (b)** *Each Plan shall include a description of the projects and management actions that include the following:*
>
> **(8)** *A description of the estimated cost for each project and management action and a description of how the Agency plans to meet those costs.*

Cost: Individual project cost of planning, construction, and ongoing operation, maintenance, and repair will be identified in the planning phase of this action.

Funding: Anticipated funding for Action 3 project planning and construction will likely come from funding sources associated with integrated regional water management planning programs or state funds associated with drinking water needs within economically disadvantaged communities' programs. Funding for ongoing operation, maintenance, and repair costs associated with any given project are likely to be funded through development agreements negotiated between interested parties proposing new developments within the EPUD MA and the EPUD.

Subsection 5.2.3.3.11 Drought Offset Measures *[Reg. § 354.44(b)(9)]*

> **23 Cal. Code Regs § 354.44 Projects and Management Actions. (b)** *Each Plan shall include a description of the projects and management actions that include the following:*

> **(9)** *A description of the management of groundwater extractions and recharge to ensure that chronic lowering of groundwater levels or depletion of supply during periods of drought is offset by increases in groundwater levels or storage during other periods.*

EPUD adjusts expenses and revenues annually to reach a balanced budget. Drought years are managed accordingly, both with respect to maximizing water supplies and fiscal responsibility. This is anticipated to be continued in the future.

Subsection 5.2.3.3.12 Corresponding Attachments *[Reg. § 354.44(c)]*

> **23 Cal. Code Regs § 354.44 Projects and Management Actions. (c)** *Projects and management actions shall be supported by best available information and best available science.*

There are no attachments associated with this action.

Subsection 5.2.3.4 Action 4 – Mitigation of Identified Adverse Impacts

Mitigation of identified adverse impacts is previously described in **Subsection 5.2.1.7.** As the EPUD MA is within the DEID GSA boundary, this Mitigation Plan will apply to EPUD for identified and confirmed adverse impacts to the water system.

Section 6 Plan Implementation

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List of Tables

Subsection 6.1 Estimated Cost and Schedule of Implementation *[23 CCR § 354.6]*

23 Cal. Code Regs. § 354.6 Agency information. *When submitting an adopted Plan to the Department, the Agency shall include a copy of the information provided pursuant to Water Code Section 10723.8, with any updates, if necessary, along with the following information:*

(e) *An estimate of the cost of implementing the Plan and a general description of how the Agency plans to meet those costs.*

GSP implementation is conducted under the authority of the DEID GSA and in accordance with the adopted GSP. The cost of implementing the Amended GSP varies by management area. A summary of the cost and activities for each project and management action was provided in **Section 5.** The cost of implementation, which includes GSA administration, GSP development, monitoring, and implementation of projects and management actions is summarized by activity and in alignment with activities' respective schedules in **Table 6-1**.

While **Table 6-1** evaluates the cost of sustainability starting from 2015 to reflect the investments since SGMA was enacted, it is important to clarify that DEID GSA truly began implementing and investing in sustainability in the 1950s in alignment with the start of water delivery under the District's CVP Contract. DEID has since built an extensive pipeline network covering the entirety of the District, built groundwater banking facilities, and invested in out-of-district banking.

Over its nearly 75-year history, DEID has invested heavily to continue to provide renewable surface water to its growers. The DEID distribution system includes 172 miles of pipeline, 18 pumping plants, and five regulating reservoirs. The DEID water system is a nearly $340M investment in 2023 dollars. Since SGMA was enacted, DEID has invested more than $44 million in projects that expand DEID's ability to honor the sustainability commitment described in **Figure 0-3**. This investment includes 944-acres of recharge and water banking facilities, referred to as the "Turnipseed Water Banking Facility" or "Turnipseed Recharge Basins" in this Plan. Phases 1-5 of the Turnipseed Water Banking Facility are complete and currently operating. Phase 6 of the Turnipseed Water Bank is currently under construction with completion scheduled for September 2024. Upon the completion of Phase 6, the 944-acre facility will be capable of percolating 12,928 acre-feet per month and, at an average recharge opportunity of 2.41 months per year[1], will allow the District to deposit an average of 31,157 acre-feet per year into the aquifer. Accounting for operational losses and a conservative leave-behind factor, the average net supply available for future recovery in dry years is 28,041 acre-feet per year (of the 31,157 acre-feet per year stored water). It is important to note that the surface water delivered to these recharge facilities and stored in the aquifer is of very good quality, being sourced directly from the Sierra Nevada snowmelt and diverted through the Friant Kern Canal.

DEID directly supports 450 growers, and its primary purpose is to deliver water from the FKC to farms in the region. Water records from DEID indicate that from 1987 to 2023 DEID imported nearly 4.0 million acre-feet or an average of approximately 110,000 acre-feet per year. **DEID is a net recharger to the**

[1] The average number of months per year during which recharge opportunities are available to the District is derived from historic DEID recharge operations data, starting in 1993. On average, from 1993 to present, DEID has been able to conduct recharge operations for 2.41 months per year.

Subbasin and has stored approximately 835,000 ac-ft of its imported surface water in the aquifer over this period. This significant volume of stored imported surface water is relied upon during periods of drought when the availability of surface water is insufficient to meet crop demands, with recovery of these stored volumes facilitated through grower-owned wells. The most notable withdrawals from this supply occurred during 2014 and 2015, when contractors in the Friant Division of the CVP received the first ever 0% allocation from the Bureau of Reclamation. Since then, DEID has continued to recharge surplus surface water supplies when they are available, and currently maintains a balance of approximately 700,000 ac-ft of stored imported surface water. Since 1950, DEID has imported 8.5M ac-ft of water to the Subbasin for irrigation (via direct delivery and recovery of previously banked imported surface water) and groundwater banking. No other GSA in the Tule Subbasin can substantiate such a positive and sustainable role.

DEID GSA's landowners are already operating sustainably; however, DEID continues to invest millions of dollars annually to secure this sustainability for the present and future. In many other San Joaquin Valley GSAs, funding for such activities is generated from volumetric penalty fees applied to those who contribute to overdraft. In DEID GSA, no landowner is overdrafting nor contributing to overdraft directly or indirectly due to their use of surface water. There is no need for penalty fees in DEID GSA. Moreover, sustainability and resiliency are considered priorities to secure economic opportunity, access to safe drinking water, public safety, and preservation of the cultural significance that agriculture has in the region.

As mentioned previously, DEID growers have invested approximately $44 million since SGMA was enacted (2015) on projects like Turnipseed Water Banking Facility. This amount exceeds the total funding generated by all other Tule Subbasin GSAs to mitigate impacts along the Friant-Kern Canal, including to implement the Tule Subbasin Mitigation Program. In the case of DEID GSA, these are sustainable landowners funding a sustainable future. In the other GSAs of the Tule Subbasin, the funding for these mitigation activities are generated primarily, if not exclusively, from overdrafting parties.

Subsection 6.2 Sources of Funding *[23 CCR § 354.6]*

23 Cal. Code Regs. § 354.6 Agency information. *When submitting an adopted Plan to the Department, the Agency shall include a copy of the information provided pursuant to Water Code Section 10723.8, with any updates, if necessary, along with the following information:*

(e) *An estimate of the cost of implementing the Plan and a general description of how the Agency plans to meet those costs.*

The DEID GSA has identified the following potential funding sources for GSP implementation:

Subsection 6.2.1 DEID General Fund

The DEID MA will be funded through the DEID general fund. DEID anticipates that this will remain the primary funding source for all GSP implementation expenses.

Subsection 6.2.2 DEID GSA Land-Based Assessment Fees

Administrative and other fixed expenses of the DEID MA are funded through per-acre, land-based assessments across all acreage in the DEID MA. The authority for the charges and collection of per-acre

land-based assessments comes from a successful 2016 Proposition 218 election that passed with a 93% approval rating in the DEID MA.

Subsection 6.2.3 Mitigation Funding from Neighboring GSAs

Fees associated with mitigation of impacts occurring with DEID and induced by the continued overdraft authorized by neighboring GSAs (via neighboring GSAs' transitional pumping programs) are expected to be funded by the responsible party or responsible GSA. The Subbasin groundwater flow model will be used in identifying areas of impact to the DEID GSA and its stakeholders along with actual groundwater levels and groundwater storage measurements. A Mitigation Plan has been developed by the other Tule Subbasin GSAs that may be used as the basis for resolving claims that result from the implementation of projects and management actions including transitional pumping. The DEID GSA continues to strongly urge the Tule Subbasin to construct a well-funded and responsive Tule Subbasin Mitigation Plan that mitigates all beneficial users and uses for the impacts of undesirable results that are caused by continued overdraft pumping.

Subsection 6.2.4 Federal, state or non-governmental agency funding

Opportunities to secure funding from grant programs to supplement GSP implementation and project construction funding will be sought. Funding for ongoing GSP implementation and specific projects are identified in **Section 5** of this GSP. Expertise in identifying grant opportunities and then completing applications will be a part of finding agency and Nongovernmental organization funding.

The importance and relative impact to the overall DEID GSA annual budget will vary as implementation occurs based on funding availability, necessary refinements to the GSP, and adjustments in project implementation.

Table 6-1: Cost of Sustainability in DEID GSA (in 5-year Increments)

	2015-2019		2020-2024		2025-2029		2030-2034		2035-2039		Total	
	Capital Cost	O&M Cost	Capital Cost	O&M Cost	Capital Cost	O&M Cost	Capital Cost	O&M Cost	Capital Cost	O&M Cost	Capital Cost	O&M Cost
1. Regular/Ongoing SGMA Compliance Activities												
GSA Administration	$0	$1,281,112	$0	$1,611,698	$0	$1,853,453	$0	$1,065,735	$0	$1,225,596	$0	$7,037,594
GSP Development	$0	$438,121	$0	$2,452,786	$0	$2,250,000	$0	$1,293,750	$0	$1,487,813	$0	$7,922,469
Subbasin Coordination	*Costs for this management action are included in the GSP Development and Administration costs above.*										$0	$0
Monitoring & Annual Reporting	*Costs for this management action are included in the GSP Development and Administration costs above.*										$0	$0
2. DEID MA Projects and Management Actions												
1. Continued Importation & Optimization of Surface Water	$0	$56,030,756	$0	$68,817,286	$0	$79,139,879	$0	$91,010,861	$0	$104,662,490	$0	$399,661,273
2. Actions to Increase Importation of Surface Water	$0	$9,717,695	$0	$8,844,111	$0	$10,170,728	$0	$11,696,337	$0	$13,450,787	$0	$53,879,658
3. Continued In-District Recharge and Banking	$0	$7,037,237	$0	$7,616,649	$0	$8,759,146	$0	$10,073,018	$0	$11,583,971	$0	$45,070,021
4. Actions to Increase In-District Recharge and Banking	$15,080,150	$0	$29,206,435	$0	$0	$0	$0	$0	$0	$0	$44,286,586	$0
5. Continued Out-of-District Banking	$0	$7,114,098	$0	$10,800,872	$0	$12,421,003	$0	$14,284,154	$0	$16,426,777	$0	$61,046,904
6. Actions to Increase Out-of-District Banking	$579,475	$0	$0	$0	$0	$0	$0	$0	$0	$0	$579,475	$0
7. DEID GSA Mitigation Plan	$0	$0	$0	$1,000,000	$0	$1,000,000	$0	$1,000,000	$0	$1,000,000	$0	$4,000,000
8. Well Permit Application Review	*Costs for this management action are included in the GSA Administrative costs in Item 1 above.*										$0	$0
9. Well Registration Program	$0	$0	$0	$0	$80,000	$50,000	$0	$20,000	$0	$10,000	$80,000	$80,000
10. Groundwater Quality Monitoring Program	$0	$0	$0	$0	$900,000	$30,000	$0	$30,000	$0	$30,000	$900,000	$90,000
11. Exceedance Policy and Investigation	*Costs for this management action are included in the GSA Administrative costs in Item 1 above.*										$0	$0
3. RCSD MA Projects and Management Actions												
1. Water Conservation Programs	*Included in RCSD's administrative budget*										$0	$0
2. Interim Water Supply Supplement Program	*Included in RCSD's annual budget*										$0	$0
3. Groundwater Recharge Projects for Future Groundwater Needs	*To be determined as opportunity to initiate new groundwater recharge projects become available.*										$0	$0
4. EPUD MA Projects and Management Actions												
1. Water Conservation Programs	*Included in RCSD's administrative budget*										$0	$0
2. Interim Water Supply Supplement Program	*Included in RCSD's administrative budget*										$0	$0
3. Groundwater Recharge Projects for Future Groundwater Needs	To be determined as opportunity to *initiate* new groundwater recharge projects become available.										$0	$0
TOTAL	**$15,659,625**	**$81,619,019**	**$29,206,435**	**$101,143,402**	**$980,000**	**$115,674,209**	**$0**	**$130,473,855**	**$0**	**$149,877,433**	**$45,846,061**	**$578,787,919**
	$97,278,644		**$130,349,838**		**$116,654,209**		**$130,473,855**		**$149,877,433**		**$624,633,979**	

Subsection 6.3 Monitoring and Reporting

The GSA will direct the monitoring programs outlined in **Section 4** to track Subbasin conditions related to the four applicable sustainability indicators. Data from the monitoring programs will be evaluated to ensure progress is being made towards sustainability and to identify whether undesirable results are occurring. Data will continue to be maintained in the DMS. Data from the monitoring program will be used by DEID GSA to guide decisions on projects and management actions and prepare annual reports to DWR.

SGMA regulations require that the reports comply with DWR submittal requirements with all transmittals signed by an authorized GSA representative. All reports and data submissions are available to the public.

The following sections describe the minimum reporting requirements required by SGMA:

Subsection 6.3.1 Annual Reports [23 CCR § 354.2]

23 Cal. Code Regs. § 356.2 Annual Reports. (e) *Each Agency shall submit an annual report to the Department by April 1 of each year following the adoption of the Plan.*

(a) *General information, including an executive summary and a location map depicting the basin covered by the report.*

(b) *A detailed description and graphical representation of the following conditions of the basin managed in the Plan:*

(1) *Groundwater elevation data from monitoring wells identified in the monitoring network shall be analyzed and displayed as follows:*

(A) *Groundwater elevation contour maps for each principal aquifer in the basin illustrating, at a minimum, the seasonal high and seasonal low groundwater conditions.*

(B) *Hydrographs of groundwater elevations and water year type using historical data to the greatest extent available, including from January 1, 2015, to current reporting year.*

(2) *Groundwater extraction for the preceding water year. Data shall be collected using the best available measurement methods and shall be presented in a table that summarizes groundwater extractions by water use sector, and identifies the method of measurement (direct or estimate) and accuracy of measurements, and a map that illustrates the general location and volume of groundwater extractions.*

(3) *Surface water supply used or available for use, for groundwater recharge or in-lieu use shall be reported based on quantitative data that describes the annual volume and sources for the preceding water year.*

(4) *Total water use shall be collected using the best available measurement methods and shall be reported in a table that summarizes total water use by water use sector, water source type, and identifies the method of measurement (direct or estimate) and accuracy of measurements. Existing water use data from the most recent Urban Water Management Plans or Agricultural Water Management Plans within the basin may be used, as long as the data are reported by water year.*

(5) *Change in groundwater in storage shall include the following:*

(A) *Change in groundwater in storage maps for each principal aquifer in the basin.*

(B) *A graph depicting water year type, groundwater use, the annual change in groundwater in storage, and the cumulative change in groundwater in storage for the basin based on historical data to the greatest extent available, including from January 1, 2015, to the current reporting year.*

(c) *A description of progress towards implementing the Plan, including achieving interim milestones, and implementation of projects or management actions since the previous annual report.*

Annual reports have been submitted to the DWR since April 1, 2020, and will continue to be submitted going forward. The purpose of annual reports is to provide monitoring and total groundwater use data to DWR, compare monitoring data to the sustainable management criteria, and to adaptively manage actions and projects implemented to achieve sustainability. Annual reports will be available to Subbasin stakeholders.

Subsection 6.3.2 Five-year GSP Assessment *[23 CCR § 354.4]*

23 Cal. Code Regs. § 356.4 Periodic Evaluation by Agency. *Each Agency shall evaluate its Plan at least every five years and whenever the Plan is amended, and provide a written assessment to the Department. The assessment shall describe whether the Plan implementation, including implementation of projects and management actions, are meeting the sustainability goal in the basin, and shall include the following:*

(a) *A description of current groundwater conditions for each applicable sustainability indicator relative to measurable objectives, interim milestones and minimum thresholds.*

(b) *A description of the implementation of any projects or management actions, and the effect on groundwater conditions resulting from those projects or management actions.*

(c) *Elements of the Plan, including the basin setting, management areas, or the identification of undesirable results and the setting of minimum thresholds and measurable objectives, shall be reconsidered and revisions proposed, if necessary.*

(d) *An evaluation of the basin setting in light of significant new information or changes in water use, and an explanation of any significant changes. If the Agency's evaluation shows that the basin is experiencing overdraft conditions, the Agency shall include an assessment of measures to mitigate that overdraft.*

(e) *A description of the monitoring network within the basin, including whether data gaps exist, or any areas within the basin are represented by data that does not satisfy the requirements of Sections 352.4 and 354.34(c). The description shall include the following:*

(1) *An assessment of monitoring network function with an analysis of data collected to date, identification of data gaps, and the actions necessary to improve the monitoring network, consistent with the requirements of Section 354.38.*

(2) *If the Agency identifies data gaps, the Plan shall describe a program for the acquisition of additional data sources, including an estimate of the timing of that acquisition, and for incorporation of newly obtained information into the Plan.*

(3) *The Plan shall prioritize the installation of new data collection facilities and analysis of new data based on the needs of the basin.*

(f) *A description of significant new information that has been made available since Plan adoption or amendment, or the last five-year assessment. The description shall also include whether new information warrants changes to any aspect of the Plan, including the evaluation of the basin setting, measurable objectives, minimum thresholds, or the criteria defining undesirable results.*

(g) *A description of relevant actions taken by the Agency, including a summary of regulations or ordinances related to the Plan.*

(h) *Information describing any enforcement or legal actions taken by the Agency in furtherance of the sustainability goal for the basin.*

(i) *A description of completed or proposed Plan amendments.*

(j) *Where appropriate, a summary of coordination that occurred between multiple Agencies in a single basin, Agencies in hydrologically connected basins, and land use agencies.*

(k) *Other information the Agency deems appropriate, along with any information required by the Department to conduct a periodic review as required by Water Code Section 10733.*

As required by SGMA, 5-year GSP assessment reports will be provided to DWR starting in 2025. Each 5-year assessment will report on the status of the GSA's GSP in achieving the sustainability goal in the Subbasin. The assessment will include a description of significant new information that has become available since the GSP adoption or amendment and whether the new information warrants any changes to the GSP.

The DEID GSA will provide both annual reports and 5-year assessments as required by SGMA.

Section 7 References and Technical Studies *[23 CCR § 354.4(b)]*

23 Cal. Code Regs. § 354.4 General Information. *Each Plan shall include the following general information:*

(b) *A list of references and technical studies relied upon by the Agency in developing the Plan. Each Agency shall provide to the Department electronic copies of reports and other documents and materials cited as references that are not generally available to the public.*

The following documents and resources are referenced throughout this GSP, or were otherwise relied upon by the Agency in the development of this GSP:

Bawden, G.W., Johnson, M.R., Kasmarek, M.C., Brandt, J., and Middleton, C.S., 2012, Investigation of land subsidence in the Houston-Galveston region of Texas by using the Global Positioning System and interferometric synthetic aperture radar, 1993–2000: U.S. Geological Survey Scientific Investigations Report 2012–5211, 88 p., available at https://doi.org/ 10.3133/ sir20125211.

Birdseye, C.H., 1925, Spirit Leveling in California 1893–1923: U.S Geological Survey Bulletin 766, 752 p., available at https://pubs.usgs.gov/bul/0766/report.pdf

California Association Local Agency Formation Commission. (2006). Community Service District Law.

California Department of Fish and Wildlife, 2018. Vegetation – Great Valley Ecoregion [ds2632]. https://map.dfg.ca.gov/metadata/ds2632.html

California Department of Fish and Wildlife, 2023. Vegetation – Southern Sierra Nevada Foothills [ds3073]. https://map.dfg.ca.gov/metadata/ds3073.html

California Department of Water Resources, 2024. Depletions of Interconnected Surface Water, An Introduction. Draft, dated February 2024.

California Department of Water Resources. (2014). DWR's Land Use Viewer. Retrieved from https://gis.water.ca.gov/app/CADWRLandUseViewer/

California Department of Water Resources. (2016). California's Groundwater Bulletin 118, Tulare Lake Region, San Joaquin Valley Groundwater, Tule Subbasin.

DEID, 2024. Personal Communication and exchange of technical information with DEID staff.

DWR. 2018. Summary of the "Natural Communities Commonly Associated with Groundwater Dataset and Online Web Viewer. April 2018.

California Department of Water Resources. (2019). NC Dataset Viewer. Retrieved from https://gis.water.ca.gov/app/NCDatasetViewer/

California Department of Water Resources. (2019). Water Data Library. Retrieved from http://wdl.water.ca.gov/waterdatalibrary/

California Department of Water Resources. (2019). Well Completion Report Map Application. Retrieved from https://dwr.maps.arcgis.com/apps/webappviewer/index.html?id=181078580a214c0986e2da28f8623b37

California Department of Water Resources. (n.d.). Sustainable Groundwater Management Act. 2016.

California Division of Drinking Water. (2018). California Code of Regulations, Tittle 22.

California Soil Resource Lab. (2015). Soil Agricultural Groundwater Banking Index. Retrieved from https://casoilresource.lawr.ucdavis.edu/sagbi/

California State Water Resources Control Board. (2019). GAMA Groundwater Information Center. Retrieved from https://gamagroundwater.waterboards.ca.gov/gama/gamamap/public/Default.asp

County of Tulare. (2012). 2030 General Plan Update.

County of Tulare. (2018). Draft EIR for Tulare County General Plan 2030.

County of Tulare. (2017a). Draft Richgrove Community Plan 2017 Update. Tulare County Resources Management Agency. Adopted: December 5, 2017

County of Tulare. (2017b). Draft Earlimart Community Plan 2017 Update. Tulare County Resources Management Agency.

County of Tulare, Environmental Health Services Division. (n.d.). Well Ordinance. 2019.

Deer Creek and Tule River Authority. (2018). Integrated Region Water Management Plan.

Delano-Earlimart Irrigation District. (2007). Groundwater Management Plan.

Department of Water Resources. (2019). Water Management Planning Tool. Retrieved from https://gis.water.ca.gov/app/boundaries/

Ellis, J.H., Knight, J.E., White, J.T., Sneed, M., Hughes, J.D., Ramage, J.K., Braun, C.L., Teeple, A., Foster, L., Rendon, S.H., and Brandt, J., 2023, Hydrogeology, land-surface subsidence, and documentation of the Gulf Coast Land Subsidence and Groundwater-Flow (GULF) model, southeast Texas, 1897–2018 (ver. 1.1, November 2023): U.S. Geological Survey Professional Paper 1877, 425 p., https://doi.org/ 10.3133/ pp1877.

Ernst, W.G. 2012. Overview of naturally occurring Earth materials and human health concerns. Journal of Asian Earth Sciences, 59, 108-126. http://linkinghub.elsevier.com/retrieve/pii/S1367912012002489

Fetter, C. W., (1994). *Applied Hydrogeology.* 3rd Edition. Macmillan College Publishing, New York.

Friant Water Authority. (2022). Jason Phillips Testimony for the Hearing Record Before the United States Senate Committee on Energy and Natural Resources Subcommittee on Water and Power, Legislative Hearing Support for S. 1179 – Canal Conveyance Capacity Restoration Act. May 25, 2022.

Friant Water Authority. (2018). Technical Memorandum Estimate of Future Friant Division Supplies for use in Groundwater Sustainability Plans, California. December 2018.

Jasechko, S., Seybold, H., Perrone, D. et al. Widespread potential loss of streamflow into underlying aquifers across the USA. Nature 591, 391–395 (2021).

Helsel, D. (2012). Statistics for Censored Environmental Data Using Minitab (2nd Edition). John Wiley & Sons, Inc.

Helsel, D. R., Hirsch, R. M., Ryberg, K. R., Archfield, S. A., & Gilroy, E. J. (2020). Statistical methods in water resources. U.S. Geological Survey Techniques and Methods, 2020(4-A3), 1–484. https://doi.org/10.3133/tm4a3

Howes, J.H., Whinery, M., Limas, E. and Vink, D. (2018). Using Net Groundwater Extractions for Farm Level Groundwater Sustainability Monitoring. ITRC Paper No. 18-002. http://www.itrc.org/papers/NTFGW_USCID_2018.htm

Howes, J.H., Burt, C.M. and Hoffman, L. (2014). Evaluating Net Groundwater Use from Remotely Sensed Evapotranspiration and Water Delivery Information. IA Irrigation Show, Nov. 17-21. 2014, Phoenix, AZ. ITRC Paper No. p 14-005.

Interstate Technology and Regulatory Council (ITRC). (2003). California Crop and Soil Evapotranspiration for Water Balances and Irrigation Scheduling/Design. ITRC No. 03-001, dated January 2003.

Ireland R.L., Poland, J.F., and Riley, F.S., 1984, Land subsidence in the San Joaquin Valley, California, as of 1980: U.S. Geological Survey Professional Paper 437–I, 93 p., available at https://pubs.er.usgs.gov/usgspubs/pp/pp437I.

Izbicki JA, Stamos CL, Metzger LF, Kulp TR (2008). Source, distribution, and management of arsenic in water from wells, eastern San Joaquin Ground-Water Subbasin, California. U.S. Geological Survey Open File 2008–1272. October 2008.

Kern County Department of Agriculture and Measurement Standards (1999 and 2007). Data available at: http://www.kernag.com/gis/gis-data.asp

Kern County. (2009). Kern County General Plan.

Land IQ (2014). Statewide Crop Mapping Global Information System Geodatabase. Data provided to the California Department of Water Resources. https://data.cnra.ca.gov/dataset/statewide-crop-mapping.

Lees, M., Knight, R., & Smith, R. (2022). Development and application of a 1D compaction model to understand 65 years of subsidence in the San Joaquin Valley. Water Resources Research, 58, e2021WR031390. https://doi.org/10.1029/2021WR031390 Valley

Leake, S.A., and Prudic, D.E., 1991, Documentation of a computer program to simulate aquifer-system compaction using the modular finite-difference ground-water flow model: U.S. Geological Survey Techniques of Water- Resources Investigations, book 6, chap. A2, 68 p., accessed October 17, 2019, at https://doi.org/ 10.3133/ twri06A2.

Lofgren, B.E., and Klausing, R.L., 1969, Land subsidence due to ground-water withdrawal, Tulare-Wasco area, California: U.S. Geological Survey Professional Paper 437–B, 103 p.

Lofgren, B.E., 1976, Hydrogeologic effects of subsidence, San Joaquin Valley, California: International Symposium on Land Subsidence, 2nd, Anaheim, California, December 13–17, program and abstracts, no. 12, unnumbered pages.

Meinzer, O.E., 1928, Compressibility and elasticity of artesian aquifers: Economic Geology, v. 23, no. 3, p. 263–291, accessed October 17, 2019, at https://doi.org/ 10.2113/ gsecongeo.23.3.263.

The Nature Conservancy, California. ICONS: Interconnected Surface Water in California's Central Valley, Version 1.0.2. https://icons.codefornature.org/. June 2023.

Oze, C., D.K. Bird, and S. Fendorf. 2007. "Genesis of Hexavalent Chromium for Natural Sources in Soil and Groundwater." Proceedings of the National Academy of Sciences (PNAS) 16(104): 6544-6549.

Page, R.W. (1986). Geology of the Fresh Ground-Water Basin of the Central Valley, California, with Texture Maps and Sections, Regional Aquifer System Analysis, United States Geological Survey Professional Paper 1401-C, United States Government Printing Office, Washington

Page, R.W. (1973). Base of fresh ground water (approximately 3,000 micromhos) in the San Joaquin Valley, California. Hydrologic Atlas 489.

Planert, M., & Williams, J. S. (1995). Ground Water Atlas of the United States: Segment 1, California, Nevada, Hydrologic Atlas (Vol. 730-B). Reston, VA: U.S. Geological Survey.

Poland, J.F., Lofgren, B.E., Ireland, R.L., and Pugh, A.G., 1975, Land subsidence in the San Joaquin Valley, California, as of 1972: U.S. Geological Survey Professional Paper 437–H, 78 p.

Poland, J.F., 1958, Land subsidence due to ground-water development: Journal of Irrigation and Drainage Division, v. 84(3), pages 1774-1–1774-11

Sneed, M., Brandt, J.T., and Solt, M., 2018, Land subsidence along the California Aqueduct in west-central San Joaquin Valley, California, 2003–10: U.S. Geological Survey Scientific Investigations Report 2018–5144, 67 p., accessed October 17, 2019, at https://doi.org/ 10.3133/ sir20185144.

SWRCB Geotracker (2020). Available at: https://geotracker.waterboards.ca.gov/

Terzaghi, K., 1925, Principles of soil mechanics, IV— Settlement and consolidation of clay: Engineering News- Record, v. 95, no. 22, p. 874–878.

Towill (2023) InSAR Data Accuracy for California Groundwater Basins CGPS Data Comparative Analysis January 2015 to October 2022, Contract 4600013876 TO#1

Thomas Harder & Co. (2019). Tule Subbasin Monitoring Plan (TSMP).

TH&Co (Thomas Harder & Company). 2024. Tule Subbasin Coordination Agreement. Draft Tule Subbasin Setting. Prepared for the Subbasin Technical Advisory Committee. June 2024.

Tule Basin Water Quality Coalition (TBWQC). (2017). Groundwater Quality Trend Monitoring Workplan Addendum.

Tule Basin Water Quality Coalition (TBWQC). (2014). Surface Water Monitoring Plan.

Tule Basin Water Quality Coalition (TBWQC). (2016). Comprehensive Groundwater Quality Monitoring Plan.

Tule Basin Water Quality Coalition (TBWQC). (2016). Groundwater Assessment Report (GAR) Addendum.

Tule Subbasin Technical Advisory Committee. (January 2020). Final Tule Subbasin Coordination Agreement. January 16, 2020.Welch, A.H., D.B. Westhohn, D.R. Helsel, and R.B. Wanty. 2000. "Arsenic in Groundwater of the United States—Occurrence and Geochemistry." Groundwater 38(4):589–604.

Williamson, A.K., Prudic, D.E., and Swain, L.A., (1989). Ground-Water Flow in the Central Valley, California. USGS Professional Paper 1401-D.

DELANO – EARLIMART IRRIGATION DISTRICT
GROUNDWATER SUSTAINABILITY AGENCY

APPENDIX A

Tule Subbasin Coordination Agreement

2024
2nd Amended Groundwater Sustainability Plan

EASTERN TULE GSA

TRI-COUNTY WATER AUTHORITY GSA

PIXLEY IRRIGATION DISTRICT GSA

LOWER TULE RIVER IRRIGATION DISTRICT GSA

DELANO-EARLIMART IRRIGATION DISTRICT GSA

ALPAUGH GSA

TULARE COUNTY GSA

TULE SUBBASIN COORDINATION AGREEMENT

7/13/2022

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Attachments:

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LIST OF ACRONYMS AND DEFINITIONS

"GSA" - Groundwater Sustainability Agency

"GSP" - Groundwater Sustainability Plan

"Coordination Agreement"

"DWR" - California Department of Water Resources

"Tule Subbasin" or "Tule Basin" - Bulletin 118 Groundwater Basin Number 5-22.13

"Tule Subbasin TAC" - Tule Subbasin Technical Advisory Committee

ACOE - United States Army Corps of Engineers

Alpaugh GSA – Alpaugh Irrigation District Groundwater Sustainability Agency

AWWA – American Water Works Association

BMP – Best Management Practices

CASGEM – California Statewide Groundwater Elevation Monitoring

DCTRA – Deer Creek Tule River Authority

DEID GSA – Delano-Earlimart Irrigation District Groundwater Sustainability Agency

ET - Evapotranspiration

ETGSA – Eastern Tule Groundwater Sustainability Agency

GIS – Geographic Information System

LTGSA – Lower Tule River Irrigation District Groundwater Sustainability Agency

LTRID – Lower Tule River Irrigation District

PIXID GSA – Pixley Irrigation District Groundwater Sustainability Agency

RWQCB – Regional Water Quality Control Board

QA/QC – Quality Assurance/Quality Control

SGMA – Sustainable Groundwater Management Act

TCWA GSA – Tri-County Water Authority Groundwater Sustainability Agency

TRA – Tule River Association

USBR – United State Bureau of Reclamation

USGS – United States Geological Survey

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I. INTRODUCTION

1.1 General (§357.4(a))

Pursuant to 23 Cal. Code Regs. §357.4(a), the GSAs hereby enter into this Coordination Agreement. The Tule Subbasin identified by DWR as No. 5-22-13 of the Tulare Lake Hydrologic Region, **Figure 1-1**, is currently composed of seven GSAs. Each GSA within the Tule Subbasin has previously submitted notice to the Department of its intent to implement and develop its own GSP pursuant to 23 CCR §353.6. As a result, a Coordination Agreement is necessary as multiple GSAs within the Tule Subbasin are developing and implementing independent GSPs. The purpose of this Coordination Agreement is to fulfill all statutory and regulatory requirements related to Intra-basin coordination agreements pursuant to the Sustainable Groundwater Management Act ("SGMA").

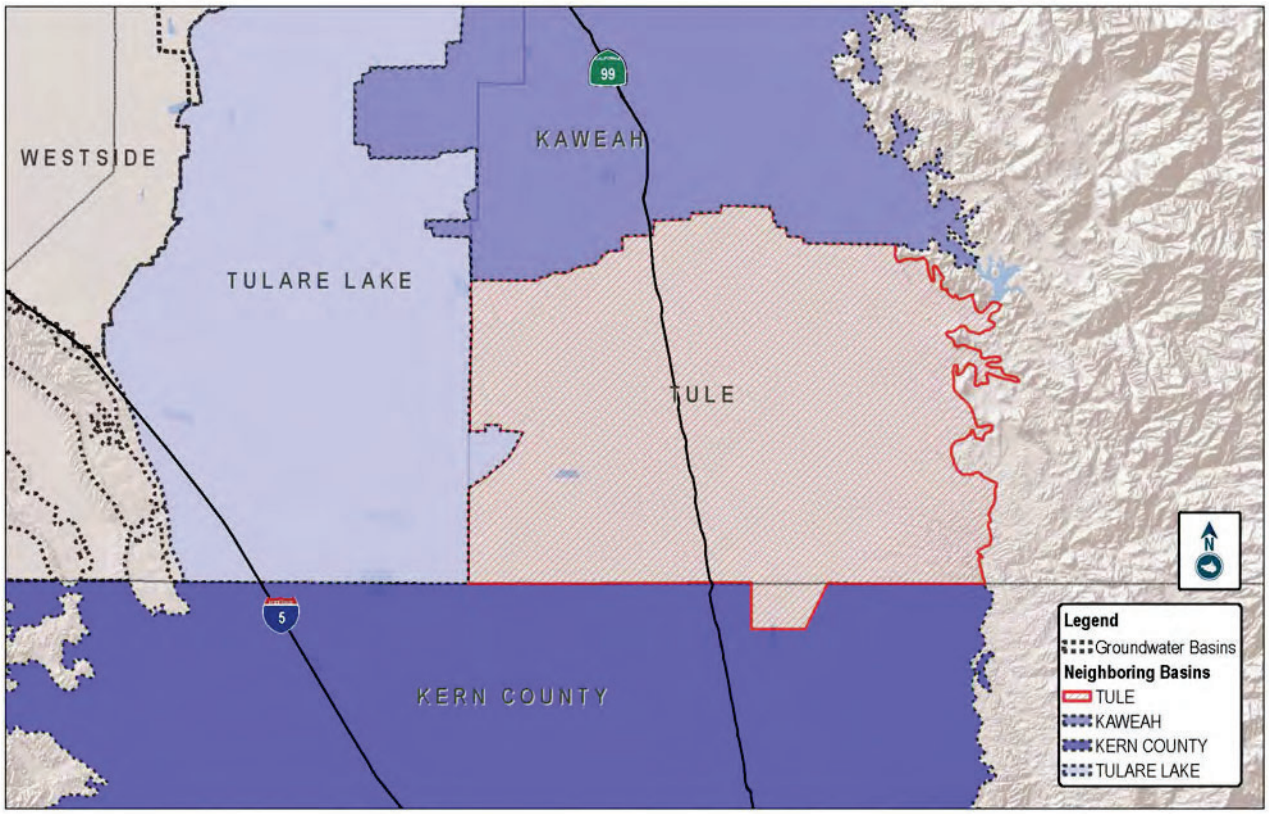

FIGURE 1-1: TULE SUBBASIN

1.2 Parties

The Parties to this Coordination Agreement are the seven (7) exclusive GSAs within the Tule Subbasin identified as follows:

1. Eastern Tule Groundwater Sustainability Agency ("ETGSA"),
2. Tri-County Water Authority Groundwater Sustainability Agency ("TCWA GSA"),
3. Pixley Irrigation District Groundwater Sustainability Agency ("PIXID GSA"),

4. Lower Tule River Irrigation District Groundwater Sustainability Agency ("LTGSA"),
5. Delano-Earlimart Irrigation District Groundwater Sustainability Agency ("DEID GSA"), and
6. Alpaugh Groundwater Sustainability Agency ("Alpaugh GSA")
7. Tulare County Groundwater Sustainability Agency ("Tulare County GSA")

It should be noted the Tulare County GSA has entered into MOUs concerning coverage of territories under adjacent GSPs and although there are seven GSAs there will be six GSPs covering the Tule Subbasin. Hereinafter the foregoing is collectively referred to as "Parties" or "Tule Subbasin GSAs" or individually as "Party", **Figure 1-2**. Collectively, the Parties' jurisdictional areas cover the Tulare Lake Hydrologic Region San Joaquin Valley Groundwater Basin, Tule Subbasin, a groundwater subbasin recognized by DWR as described in Groundwater Bulletin 118 and also identified as Groundwater Basin Number 5-22.13.

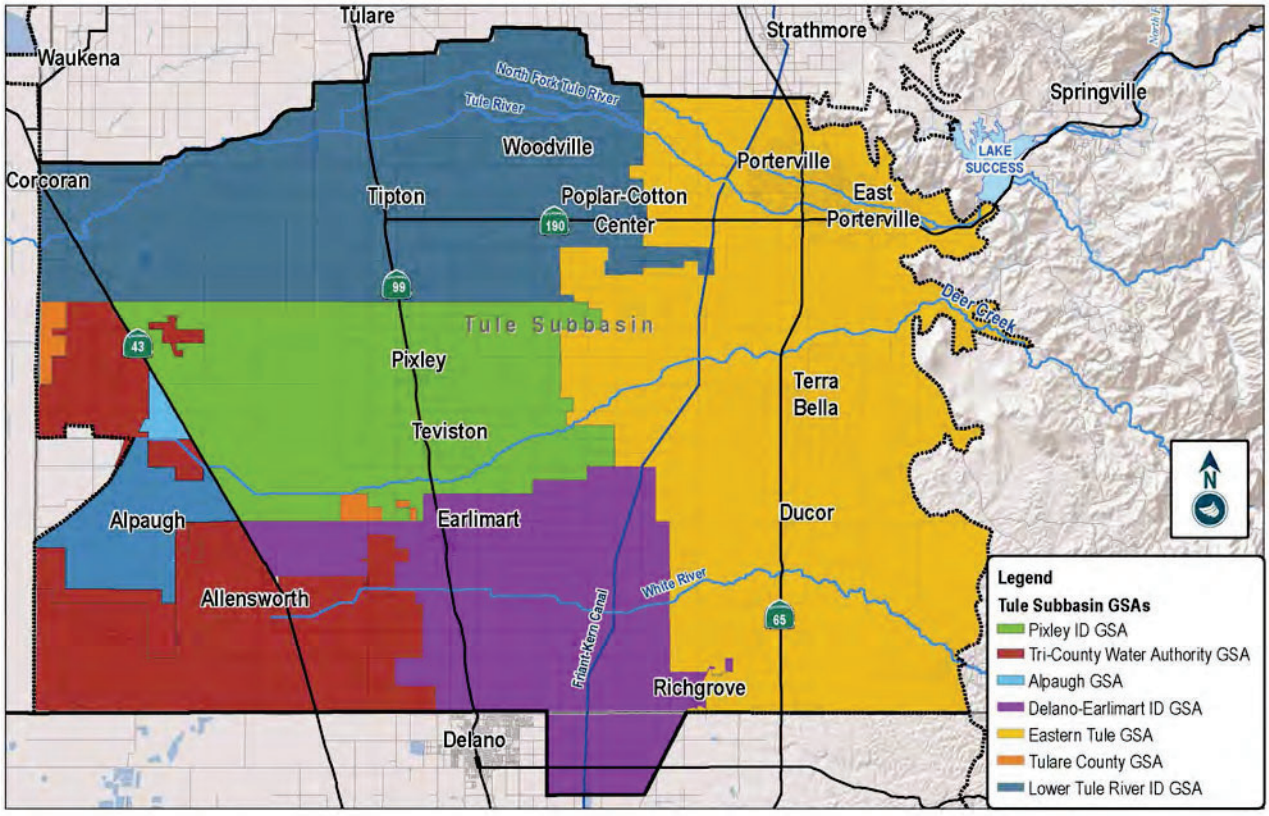

FIGURE 1-2: TULE SUBBASIN GROUNDWATER SUSTAINABILITY AGENCIES

1.3 Plan Manager (§§357.4(b)(1), 351(z))

Pursuant to 23 Cal. Code Regs. §357.4(b) and §351(z), the Plan Manager or point of contact with DWR, who is responsible for reviewing this Agreement and the GSPs prepared by each respective GSA and delegated the authority under this Agreement to submit information on behalf of the GSAs within the Tule Subbasin to DWR, shall be the selected chairperson of the Tule

Subbasin Technical Advisory Committee (TAC), which consists of representatives from each Party. Currently, the Chairperson of the Tule Subbasin TAC is:

David De Groot, Principal Engineer
324 S. Sante Fe, Suite A
Visalia, CA 93292
559-802-3052
davidd@4-creeks.com

The Parties agree that no GSP shall be submitted by the Plan Manager without the prior authority to do so being granted by the respective GSA that prepared that GSP.

1.4 Process for submitting all Plans, Plan amendments, supporting information, monitoring data, annual reports and periodic evaluations. (§357.4(d).)

Pursuant to 23 Cal. Code Regs. §357.4(d), this section describes the process for submitting GSPs, plan amendments, supporting information, monitoring data, and other pertinent information, along with annual reports and periodic evaluations to DWR. Each GSA shall provide to the Chairperson of the Tule Subbasin TAC the approved GSP, any subsequent GSP amendments and supporting information for submittal to the DWR. All GSAs within the Tule Subbasin shall endeavor to complete all GSP requirements in a timely manner.

The Plan Manager shall be responsible for submitting all required information to DWR in compliance with SGMA and 23 Cal. Code Regs. §353.4. No information shall be submitted by the Plan Manager without the prior written authorization of each responsible GSA.

1.4.1 Groundwater Sustainability Plans, Plan Amendments, and Supporting Information (§355.2, §355.10)

The Parties agree that each GSA shall prepare and submit its respective GSP and supporting information to the Tule Subbasin TAC so each GSP can be reviewed by the other GSAs in the Subbasin prior to the GSPs being submitted to the DWR. The Parties shall notify the other GSAs of future amendments and updates to their respective GSPs. The Parties agree that they endeavor to provide each other with as much notice of such amendments and updates as practically possible, but that the baseline, minimum noticing requirements will be what the SGMA Regulations require for public notice. Any plan amendments shall also be circulated to the other GSAs for review and submitted to the Plan Manager for submittal to DWR.

1.4.2 Monitoring Data (§354.40)

Basin-wide monitoring data will be collected in accordance with the Tule Subbasin Monitoring Plan, provided in this Coordination Agreement as **Attachment 1**, and reported to the Tule Subbasin TAC as part of the annual reports described below in compliance with 23 Cal. Code Regs. § 354.40.

If an individual GSA has identified monitoring features for use in collecting data specific to its GSA, and the features are not included in the Subbasin Monitoring Plan of this Coordination

Agreement, then the GSA can incorporate the features and data into its GSP upon confirmation that the monitoring features meet the minimum criteria specified in the Monitoring Plan.

1.4.3 Annual Reports (§356.2)

Pursuant to 23 Cal. Code Regs. § 356.2, annual reports are required to be submitted to DWR by April 1 of each year following the adoption by the GSA of the GSP. Each GSA shall submit annually to the Plan Manager a report to meet these requirements, who will in turn submit the reports to DWR on behalf of the Tule Subbasin. The Tule Subbasin TAC may develop a standardized template for these reports and use by each respective GSA. The annual report shall be separated between a subbasin-wide section and individual GSA specific sections that will be prepared by each respective GSA, but reviewed by the Tule Subbasin TAC prior to submission to DWR for review. The report shall contain the information described below.

- General information summarizing the contents of the report and a map depicting the subbasin.
- Groundwater elevation data from monitoring wells
    - Groundwater elevation contour maps
    - Hydrographs of groundwater elevations and water year type
- Groundwater extraction from preceding water year
- Surface water supply used or available for use for groundwater recharge or in-lieu use
- Total water use
- Changes in groundwater storage
    - Change in groundwater storage maps
    - Graph depicting water year type, groundwater use, annual change in groundwater storage, and cumulative change in groundwater in storage for the basin

In addition, each GSA shall provide a description of the progress towards implementing its respective GSP. The description shall include progress with respect to interim milestones, implementation of projects, and any management actions implemented since the prior annual report.

1.4.4 Periodic Evaluations (§356.4)

Pursuant to 23 Cal. Code Regs. §356.4, periodic evaluations by each GSA are required at least every five years and whenever a GSP is amended. These evaluations shall be provided to DWR.

Each individual GSA shall prepare the required periodic evaluation, in consultation with the Tule Subbasin TAC where subbasin-wide information is required. The evaluations shall be delivered to the Plan Manager for submission to DWR and subject to review by the other subbasin GSAs.

The periodic evaluations shall include all the requirements found in Section 356.4 of SGMA Regulations, including but not limited to the following:

- Groundwater conditions relative to measurable objectives, interim milestones, and minimum thresholds
- Description of project or management action implementations
- GSP elements that are being requested for reconsideration or proposed revision, if any
- Evaluation of the basin setting in light of new information or changes in water use
- Description of the monitoring network as described in **Attachment 1** including:
    - Assessment of monitoring network function
    - Identification of data gaps and program resolving such gaps
    - Plans to install new data collection facilities
    - Adjustments to Monitoring Network
- Description of significant information that has been made available since GSP adoption, amendment, or prior periodic evaluation and if changes to GSP elements are needed
- Description of actions taken by GSA related to GSP
- Enforcement activities, if any, by the GSA
- GSP amendments that have been completed or proposed
- Summary of coordination between GSAs
- Other relevant information

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II. BASIN SETTING (§§354.12-354.20)

Pursuant to 23 Cal. Code Regs. §354.12-354.20, the basin setting components are attached hereto and incorporated by reference as **Attachment 2** and summarized below.

2.1 Physical Setting

The Tule Subbasin is located in the southern portion of the San Joaquin Valley Groundwater Basin in the Central Valley of California. The lateral boundaries of the Tule Subbasin include both natural and political boundaries. The eastern boundary of the Tule Subbasin is defined by the surface contact between crystalline rocks of the Sierra Nevada and surficial alluvial sediments that make up the groundwater basin. The northern boundary is defined by the Lower Tule River Irrigation District (LTRID) and Porterville Irrigation District boundaries. The western boundary is defined by the Tulare County/Kings County boundary, except for a portion of the Tulare Lake Basin Water Storage District that extends east across the county boundary and is excluded from the subbasin. The southern boundary is defined by the Tulare County/Kern County boundary except for the portion of the Delano-Earlimart Irrigation District (DEID) that extends south of the county boundary and is included in the subbasin.

The area of the Tule Subbasin is defined by the latest version of DWR Bulletin 118 and is approximately 744 square miles (475,895 acres). The subbasin has been divided into seven individual GSAs: ETGSA, LTGSA, PIXID GSA, DEID GSA, Alpaugh GSA, TCWA GSA, and the Tulare County GSA. Communities within the subbasin include Allensworth, Alpaugh, Porterville, Tipton, Pixley, Earlimart, Richgrove, Ducor and Terra Bella. Neighboring DWR Bulletin 118 subbasins include the Kern County Subbasin to the south, the Tulare Lake Subbasin to the west, and the Kaweah Subbasin to the north.

2.2 Hydrogeologic Conceptual Model §354.14

The hydrogeologic conceptual model of the Tule Subbasin, as described in **Attachment 2**, has been developed in accordance with the requirements of California Code of Regulations, Title 23, Division 2, Chapter 1.5, Subchapter 2, Article 5, Subarticle 2 (§354.14) and in consideration of DWR Best Management Practices (BMPs) for the preparation of hydrogeologic conceptual models. The hydrogeologic conceptual model forms the basis for the numerical groundwater flow model of the subbasin.

2.3 Groundwater Conditions §354.16.

Two primary aquifers have been identified within the Tule Subbasin: an upper unconfined to semi-confined aquifer and a lower semi-confined to confined aquifer. The upper and lower aquifers are separated by the Corcoran Clay confining unit in the western portion of the subbasin. Groundwater within the southeastern portion of the subbasin is also produced from the Santa Margarita Formation, which is located stratigraphically below the lower aquifer.

In general, groundwater in the Tule Subbasin flows from areas of natural recharge along major streams at the base of the Sierra Nevada Mountains on the eastern boundary towards a groundwater pumping depression in the western-central portion of the subbasin. Groundwater

level changes observed in wells completed in the upper aquifer show a persistent downward trend between approximately 1987 and 2017, despite a relatively wet hydrologic period between 1991 and 1999 and other intervening wet years (2005 and 2011). Groundwater level trends in wells perforated exclusively in the lower aquifer vary depending on location in the subbasin. In the northwestern part of the subbasin, lower aquifer groundwater levels have shown a persistent downward trend from 1987 to 2017. In the southern part of the subbasin, groundwater levels were relatively stable between 1987 and 2007, but began declining after 2007.

Changes in groundwater storage within the Tule Subbasin have been estimated through analysis of the water budget. Comparison of the groundwater inflow elements of the water budget with the outflow elements shows a cumulative change in groundwater storage over the 31-year period between 1986/87 and 2016/17 of approximately -4,948,000 acre-ft. The average annual change in storage resulting from the groundwater budget is approximately -160,000 acre-ft/yr.

Seawater intrusion cannot occur in the Tule Subbasin due to its location with respect to the Pacific Ocean.

Groundwater quality in the Tule Subbasin is generally very good and does not prevent the beneficial use of the water in most places. The primary exception is perched and upper aquifer groundwater in the southwest portion of the subbasin, where the beneficial use designation has been removed by the State Water Resources Control Board. The primary groundwater quality issues that could affect the beneficial uses of groundwater in the future are nitrate and pesticides. Point sources of contamination have been identified in some parts of the subbasin, but they are highly localized problems.

Land surface subsidence resulting from lowering the groundwater level from groundwater production has been well documented in the Tule Subbasin. Since 1987, the highest rates of land subsidence have occurred in the northwestern portion of the subbasin and in the vicinity of the Friant-Kern Canal near Terra Bella.

Groundwater dependent ecosystems require shallow groundwater or groundwater that discharges at the land surface. Throughout the Tule Subbasin, the depth to groundwater is well below the level required to support riparian vegetation (vegetation that draws water directly from groundwater) or near surface ecosystems, except some areas along the Tule River, east of Porterville.

2.4 Water Budget §354.18.

A detailed surface water and groundwater budget has been developed for the Tule Subbasin for the 31-year period from 1986/87 to 2016/17. The surface water budget includes the following inflow and outflow terms:

Surface Water Inflow

- Precipitation
- Stream inflow
- Imported water

- Discharge to the land surface from wells

Surface Water Outflow

- Infiltration of precipitation
- Evapotranspiration of precipitation from native vegetation and crops
- Stream infiltration
- Canal losses
- Recharge in basins
- Deep percolation of applied water
- Crop consumptive use

The groundwater budget describes the sources and estimates the volumes of groundwater inflow and outflow within the Tule Subbasin. The groundwater budget includes the following inflow and outflow terms:

Groundwater Inflow

- Areal recharge from precipitation
- Recharge in stream/river channels
- Managed recharge in basins
- Canal losses
- Deep percolation of applied water
- Release of water from compression of aquitards
- Subsurface inflow

Groundwater Outflow

- Groundwater pumping
- Evapotranspiration
- Subsurface outflow

A fundamental premise of the groundwater budget is the following relationship:

Inflow – Outflow = +/- ΔS

The difference between the sum of groundwater inflow terms and the sum of groundwater outflow terms is the change in groundwater storage (ΔS). The cumulative change in groundwater storage over the 31-year period between 1986/87 and 2016/17 in the Tule Subbasin was approximately -4,948,000 acre-ft. The average annual change in storage resulting from the groundwater budget is approximately -160,000 acre-ft/yr.

In the Tule Subbasin, sources of groundwater recharge (i.e. inflow) that are associated with pre-existing surface water rights and imported water deliveries are not used to estimate the Sustainable Yield of the subbasin.

III. COORDINATED DATA AND METHODOLOGIES (§357.4(b)(3).)

3.1 General

This section of the Coordination Agreement describes the types of data to be collected and the data collection and analysis methodologies to be utilized to satisfy requirements for the preparation of GSPs and annual reports.

Pursuant to Water Code Section 10727.6, GSAs intending to develop and implement multiple GSPs are required to coordinate with other agencies preparing a GSP within the basin to ensure that the various GSPs utilize the same data and methodologies for the following assumptions in developing the GSP:

a) Groundwater elevation data;
b) Groundwater extraction data;
c) Surface water supply;
d) Total water use;
e) Change in groundwater storage;
f) Water budget; and
g) Sustainable yield.

3.2 Groundwater Elevation (§357.4(b)(3)(A))

Pursuant to 23 Cal. Code Regs. §357.4(b)(3)(A), the following describes how the GSAs have used the same data and methodologies for groundwater elevation, which is supported by the quality, frequency and spatial data in the monitoring network and monitoring objectives. Groundwater elevation data to be relied on for the purpose of determining minimum thresholds, estimating change in groundwater storage as required for annual reports, and measuring progress towards achieving sustainability will be collected from the minimum monitoring well network identified in the Tule Subbasin Monitoring Plan (see **Attachment 1**).

The Tule Subbasin shall use the following data and methods to measure or estimate groundwater elevations:

3.2.1 Data and Monitoring Protocols

Groundwater elevation data to be relied on for the purpose of determining minimum thresholds, estimating change in groundwater storage as required for annual reports, and measuring progress towards achieving sustainability will be collected from the minimum monitoring well network. Groundwater elevation monitoring protocols and measurement frequencies are described in detail in the Tule Subbasin Monitoring Plan (**Attachment 1**).

The monitoring well network for collection of groundwater elevation data may consist of a combination of existing wells and new dedicated monitoring wells. In order to be included in the well network for collecting groundwater elevation data, each monitoring well must meet the following minimum criteria:

3.2.1.1 *Existing Wells*

Preference will be given where feasible to existing wells that are not actively pumped as they provide the most representative static groundwater level data. Monitoring of groundwater levels in existing wells that are actively pumped must be conducted in accordance with the monitoring procedures specified in the Tule Subbasin Monitoring Plan (**Attachment 1**).

The location (i.e. X-Y Coordinates) of existing wells to be included in the monitoring well network must be surveyed to the nearest 1 foot (NAD83) by a California licensed land surveyor. The elevation of the reference point (i.e. the Z Coordinate) shall be surveyed to an accuracy of 0.1 foot relative to mean sea level (NAVD88) by a California licensed land surveyor.

The construction of each existing well must be documented and confirmed to the satisfaction of the Tule Subbasin TAC's technical consultant. Construction information shall include:

- The total well depth,
- The perforation interval(s),
- The casing diameter,
- Depth intervals of all seals,
- Pump setting (if applicable).

If these data are not known or cannot be confirmed, the well must be investigated in the field to be considered for inclusion in the monitoring well network. Any field investigation must be conducted with the consent of the landowner and/or well owner. All field verification of the wells will be collected utilizing professional staff that are trained and experienced in the use of the equipment used to measure well depth and inspect wells, and who meet the minimum qualifications and training requirements required by the Tule Subbasin TAC technical consultant. Field verification of the wells identified in the Tule Subbasin Monitoring Plan will be conducted by a technical consultant of the Tule Subbasin TAC. A GSA may hire and use its own technical consultant, who meets minimum qualifications and training requirements required by the Tule Subbasin TAC consultant, to collect data from wells within its GSA's boundaries, that a GSA may choose to monitor in addition to the wells identified in the Tule Subbasin Monitoring Plan. Each GSA shall be provided notice of when the Tule Subbasin TAC consultant will be conducting field verification or measurements and a GSA may have its consultant quality control check the Tule Subbasin TAC's consultant's work. Furthermore, nothing in this Agreement prevents multiple GSAs from using the same consultant to conduct field verification.

Field verification will consist of obtaining a downhole video log of the full length of blank and perforated well casing. If the well is equipped with a pump, the pump shall be removed prior to obtaining the downhole video log. The video camera equipment shall be equipped with side-scan capability in order to view the condition and depth of well perforations. Existing wells for which adequate documentation is not available, as determined by the Tule Subbasin TAC's technical consultant, will not be included in the groundwater level monitoring network. Further, wells for which the owner does not provide access, does not voluntarily remove the pump for investigating the well, or does not otherwise provide consent to investigate the well will not be included in the groundwater level monitoring network.

An established and acceptable sounding access tube or port shall be available for the purpose of measuring groundwater levels. Sounding tubes that are separate and outside the main well casing (i.e. enter the well casing from the outside at depth) will be preferred. Sounding tubes located within the main well casing are acceptable if they extend past the pump intake depth. The sounding tube shall be free and clear and allow for collection of representative groundwater level measurements without the risk of damaging the sounder.

Only wells perforated exclusively in either the upper aquifer (as defined in **Attachment 1**) or lower aquifer (as defined in **Attachment 1**) will be included in the monitoring well network. Wells constructed with perforations across multiple aquifers in a single casing string (i.e. "composite wells") will not be included in the monitoring network for measuring groundwater elevations unless authorized by the Tule Subbasin TAC.

Groundwater elevation data has historically been obtained via monitoring programs conducted under other local State and Federal programs such as the Regional Water Quality Control Board (RWQCB) General Order for Dairies, California Statewide Groundwater Elevation Monitoring (CASGEM) program, Bureau of Reclamation, and others. Existing wells that have been monitored as part of these programs will be considered for the Tule Subbasin monitoring network as long as they meet the criteria specified in this section.

3.2.1.2 *New Wells*

New monitoring wells will either be constructed in the upper aquifer, lower aquifer, or Santa Margarita Formation aquifer (as defined in **Attachment 1**). New wells shall not be constructed as composite wells. The exact depth and perforation intervals of these wells will be determined from site-specific data collected during the drilling of the boreholes for the wells.

New monitoring wells will be constructed with minimum 4-inch diameter casing in order to allow for collection of groundwater samples.

Each new monitoring well will be constructed with a steel above-ground riser equipped with a protective locking cap for keeping the wellhead secure. The above-ground riser will be surrounded by cement-filled steel bollards for further protection.

A dedicated reference point shall be established and marked on the top of the monitoring well casing. All groundwater level measurements shall be obtained relative to the reference point. The elevation of the reference point shall be surveyed to an accuracy of 0.1 foot relative to mean sea level (NAVD88) by a California licensed land surveyor.

3.2.2 Quality Assurance/Quality Control

All groundwater elevation data will be collected utilizing professional staff that are trained and experienced in the use of the monitoring equipment and who meet the minimum qualifications and training requirements required by the Tule Subbasin TAC technical consultant. All data collection required for the Tule Subbasin Monitoring Plan ("Baseline Monitoring") will be performed either by the Tule Subbasin TAC technical consultant or a consultant hired direct by

the GSA. If the GSA utilizes the Tule Subbasin TAC technical consultant, each GSA shall be notified in advance of when such data collection will occur within that respective GSA's boundaries and each GSA may hire its own consultant for quality control and peer review the work of the Tule Subbasin TAC technical consultant. If the GSA hires and uses its own consultant, who meets the same minimum qualifications and training requirements required by the Tule Subbasin TAC consultant, to collect data for monitoring features within its GSA's boundaries, all data shall be submitted per the data management requirements and schedule. Furthermore, nothing in this Agreement prevents multiple GSAs from using the same consultant to collect such data. General and basin-wide data will be collected by and/or provided to the Tule Subbasin TAC's consultant in accordance with the protocols specified in the Tule Subbasin Monitoring Plan (**Attachment 1**). The goal of the GSAs is to maintain the integrity of the data by following the above described procedures for collection of Baseline Monitoring data and additional data within each GSA that will provide additional information for the benefit of the Subbasin.

By December 1 following a water year, all groundwater elevation data produced by the GSAs shall be submitted to the Tule Subbasin TAC's technical consultant for input into the Tule Subbasin Water Management Database (**Attachment 1**). All groundwater elevation data shall be subject to Quality Assurance/Quality Control (QA/QC) checks by the Tule Subbasin TAC's technical consultant. QA/QC may include (but not necessarily be limited to):

- Verification of reference point survey data
- Verification of groundwater level measurement methodology
- Review of calculations to convert groundwater depth to groundwater elevation
- Comparison of data with previous measurements to identify outliers

Data from wells that have not been included in the Tule Subbasin Monitoring Plan or do not follow the above-described procedures, shall not be relied on for making basin management decisions and shall not be used in the analyses necessary for completion of GSPs or annual reports. No wells will be added or removed from the groundwater elevation network without the prior approval of the Tule Subbasin TAC. All monitoring wells to be added to the monitoring network shall meet the criteria specified in this section. Upon such time as wells are added or removed from the monitoring network, the Tule Subbasin Monitoring Plan (**Attachment 1**) will be revised to reflect the changes.

Individual GSAs may include additional monitoring features, not specifically identified in the Tule Subbasin Monitoring Plan, for collecting data to include in their respective GSPs and annual reports. Tule Subbasin GSAs may collect more GSA-specific data utilizing the same methodologies and may supply applicable information to the Tule Subbasin TAC's technical consultant for the benefit of basin-wide information. The technical consultant will compile the groundwater elevation data into a relational database to be maintained by the consultant in accordance with **Attachment 1**.

3.3 Groundwater Extraction (§357.4(b)(3)(B))

Pursuant to 23 Cal. Code Regs. §357.4(b)(3)(B), this section outlines the approved methodologies for measuring or estimating groundwater extraction in the Tule Subbasin. The

GSAs shall use either satellite remote sensing technology or metered wells to estimate groundwater extraction as described below:

3.3.1 Data and Monitoring Protocols

3.3.1.1 *Groundwater Extraction Estimated from Satellite Data*

In this method, groundwater extraction is estimated as a function of the total agricultural water demand, surface water deliveries, and precipitation. This method is specific to agricultural groundwater extraction (as opposed to municipal groundwater extraction). The total agricultural water demand (i.e. applied water demand) is estimated as follows:

$$W_d = \frac{A_i \, x \, ET}{I_{eff}}$$

Where:

W_d = Total Agricultural Water Demand (acre-ft)
A_i = Irrigated Area (acres)
ET = Evapotranspiration (acre-ft/acre)
I_{eff} = Irrigation Efficiency (unitless)

Crop evapotranspiration (ET) is estimated using remote sensing data from LandSAT satellites. The satellite data is entered into a model, which is used to estimate the ET rate and ET spatial distribution of an area in any given time period. When appropriately calibrated to land-based ET and/or climate stations and validated with crop surveys, the satellite-based model provides an estimate of crop ET (i.e. consumptive use). The satellite-based model is representative, verifiable, and can be accomplished uniformly across the Tule Subbasin by an independent third party. The Tule Subbasin TAC will provide this data for all GSAs.

Irrigation efficiency (I_{eff}) is estimated for any given area based on the irrigation method for that area (e.g. drip irrigation, flood irrigation, micro sprinkler, etc.). Irrigation methods are tied to crop types based on either DWR land use maps or field surveys. The following irrigation efficiencies will be applied to the different irrigation methods based on California Energy Commission (2006):

- Border Strip Irrigation – 77.5 percent
- Micro Sprinkler – 87.5 percent
- Surface Drip Irrigation – 87.5 percent
- Furrow Irrigation – 67.5 percent

Agricultural groundwater extraction is estimated as the total applied water demand (W_d) minus surface water deliveries and effective precipitation. Effective precipitation is the portion of precipitation that becomes evapotranspiration.

3.3.1.2 Groundwater Extraction Measured Using Flow Meters

For this method, groundwater extraction is measured using a totalizing flowmeter. The GSAs agree that for metering to be effective, any well in a GSA that chooses this method and pumps over 70 gallons per minute, or an annual total of two (2) acre-ft per year, shall be metered. The GSAs also agree that as a Subbasin-wide standard, meters installed shall be calibrated, certified, and periodically tested following the guidance of American Water Works Association (AWWA) Standard M6 – Water Meters, Selection, Installation, Testing and Maintenance (AWWA, 2012) and the AWWA standards referenced therein for the types of inline meters employed (AWWA C700 series standards). Copies of all meter calibration and testing reports shall be submitted to the Tule Subbasin TAC's technical consultant for review and documentation.

3.3.2 Quality Assurance/Quality Control

By January 1 following a water year, all groundwater extraction data produced by the GSAs shall be submitted to the Tule Subbasin TAC's technical consultant for input into Tule Subbasin Water Management Database (see Section 4.3).

All groundwater extraction data will be subject to QA/QC checks and verification by the Tule Subbasin TAC's technical consultant. QA/QC could include (but not necessarily be limited to):

- Field inspection and verification of inline flow meters.
- Review of flow meter calibration and testing reports.
- Review of groundwater extraction estimates using satellite data.

3.4 Surface Water Supply (§357.4(3)(b)(B))

Pursuant to 23 Cal. Code Regs. §357.4(b)(3)(B), the GSAs agree the total surface water supply to the Tule Subbasin will be the sum of supplies from stream inflow, imported water, and delivered recycled water. Surface water supplies will be compiled annually by the Tule Subbasin TAC consultant from the following sources:

- Tule River inflow to the Subbasin – Tule River Association (TRA) Annual Reports
- Tule River flow from ETGSA to LTGSA – TRA Annual Reports
- Deer Creek inflow to the Subbasin – United States Geological Survey (USGS) Stream Gage at Fountain Springs
- Deer Creek flow from ETGSA to PID GSA – Trenton Weir as provided by Pixley Irrigation District
- Deer Creek flow to downstream license holders in the Tule Subbasin – measured by TCWA GSA
- White River inflow to the Subbasin – Estimated by the Tule Subbasin TAC consultant based on flows measured in Deer Creek
- White River flow from ETGSA to DEID GSA – Estimated by the Tule Subbasin TAC consultant based on an analysis of infiltration or data from White River at Road 208 (from DEID or California Data Exchange Center), as available.

The Tule Subbasin shall use the following data and methods to measure or estimate surface water supply:

3.4.1 Data and Monitoring Protocols

3.4.1.1 *Stream Inflow*

3.4.1.1.1 *Tule River*

Streamflow in the Tule River is recorded as releases from the Lake Success Reservoir and reported in the TRA annual reports. Diversions from the Tule River between Lake Success and Oettle Bridge are documented in TRA annual reports and described in Section 2.6.1.1 of the Monitoring Plan.

Native Tule River water flow in the Tule River channel from the ETGSA to the LTGSA will be recorded as the flow at Rockford Station minus assumed channel losses between the Rockford Station stream gage and Oettle Bridge, as reported in TRA annual reports.

Tule River gaged flow into the LTGSA is assumed to be the sum of gaged surface water measured Below Oettle Bridge, Woods Central Ditch Diversion, Poplar Irrigation Company flow reaching LTGSA, and Porter Slough at 192, as reported in TRA annual reports. Diversions of native Tule River water in the LTGSA will be recorded using the following ratio:

$$\frac{TR_{Gaged}}{TR_{Gaged} + FK_{LTRID}} \; x \; LTRID \; deliveries = TR_{delivered}$$

Where:

TR_{Gaged}	=	Sum of gaged flow at Below Oettle Bridge, Woods Central Diversion, Poplar Irrigation Company flow reaching LTRID, and Porter Slough at 192 (acre-ft).
FK_{LTRID}	=	Imported water delivered to the LTRID from the Friant Kern Canal (acre-ft).
LTRID deliveries	=	Total water deliveries to farmers in the LTRID (acre-ft).
$TR_{delivered}$	=	Assumed portion of LTRID delivered water that is native Tule River water (acre-ft).

Any residual stream flows left in the Tule River after diversions and channel loss are measured at the Turnbull Weir, located at the west end of the LTGSA and the Tule Subbasin. This stream outflow from the Subbasin will be the same as reported in TRA annual reports. Exports of Tule River water to the Friant-Kern Canal will be the same as reported in TRA annual reports.

3.4.1.1.2 *Deer Creek*

Streamflow in Deer Creek is measured by the USGS at their gaging station at Fountain Springs. Stream inflow from Deer Creek into the Tule Subbasin is recorded as the flow at the USGS Fountain Springs stream gage. It is noted that although the Fountain Springs gage is located

approximately five miles upstream of the Tule Subbasin boundary, the creek flows over granitic bedrock between the gage and the alluvial basin boundary and losses along this reach are assumed to be limited to evapotranspiration. Evapotranspiration losses between the Fountain Springs gage and the Trenton Weir are assumed to be 30 acre-ft/month when the gaged flow at Fountain Springs is greater than 30 acre-ft/month. When the gaged flow at Fountain Springs is less than 30 acre-ft/month the evapotranspiration is assumed to be equal to the gaged flow.

Deer Creek stream flow from the ETGSA to the PID GSA will be recorded as the flow at Trenton Weir as reported in the Pixley Irrigation District annual water use summaries. J.G. Boswell Company and Angiola Water District hold licenses on Deer Creek and those flows will be reported by TCWA GSA.

3.4.1.1.3 *White River*

Stream inflow into the Tule Subbasin (and ETGSA) from the White River has historically been measured at the USGS stream gage near Ducor. The measured data from this station is only available from 1971 to 2005. For years with no stream flow data, it is assumed that the magnitude of flow in the White River is proportional to the magnitude of flow in Deer Creek. A linear regression analysis of monthly White River streamflow plotted against monthly Deer Creek streamflow for the period 1971 to 2005 results in a correlation coefficient of 0.91. Accordingly, monthly stream flow in the White River will be reported using the following equation from the linear regression:

$$SF_{WR} = 0.3523(SF_{DC}) - 1.1215$$

Where:

SF_{WR} = Stream flow in the White River (Acre-ft).
SF_{DC} = Stream flow in Deer Creek (Acre-ft).

This method will be used to record stream inflow from the White River until a stream gage is established in the river near the eastern subbasin boundary.

White River stream flow from the ETGSA to the DEID GSA will be estimated as the White River inflow into the Subbasin minus evapotranspiration loss and minus an assumed infiltration rate between the eastern subbasin boundary and the DEID GSA boundary. Evapotranspiration losses between the Subbasin boundary and the DEID GSA are estimated to be 14 acre-ft/month when the flow at the boundary is greater than 14 acre-ft/month and equal to the flow in the river when the flow is less than 14 acre-ft/month. Channel loss within the ETGSA is estimated as the total flow minus ET up to 1,190 acre-ft/month. If flows exceed 1,190 acre-ft/month, the balance, up to 9,000 acre-ft/month, is assumed to infiltrate within the DEID GSA. If measured flow at the USGS stream gage near Ducor or interpolated flows, based on the linear regression described above, exceed 9,000 acre-ft in any given month, the volume over 9,000 acre-ft is assumed to infiltrate within the TCWA GSA.

3.4.1.2 Imported Water

Imported water delivered to the various agencies within the seven GSAs of the Tule Subbasin will be reported on an annual basis by the agencies receiving deliveries.

3.4.1.3 Recycled Water

Recycled water consists of treated wastewater generated at the City of Porterville's Wastewater Treatment Facility and other treatment facilities within the Subbasin. Most of the water from subbasin facilities is delivered to crops in the area. In the case of the City of Porterville, the balance is allowed to infiltrate into the subsurface in recharge ponds located in the old Deer Creek channel. The volume of recycled water delivered to crops shall be measured using an in-line calibrated flow meter. Monthly water deliveries will be provided on an annual basis by the City of Porterville, community services districts, and public utility districts within the Subbasin.

3.4.2 Quality Assurance/Quality Control

The Tule Subbasin GSAs assume that the QA/QC procedures in place by the various entities acting as sources of data, including the TRA, USGS, United States Bureau of Reclamation (USBR), United States Army Corps of Engineers (ACOE), Angiola Water District, City of Porterville, and any other entity upon which the GSAs rely for monitoring surface water flowing in and out of the Subbasin, are satisfactory and will not cause any undue compromise of the data relied upon to calculate total surface water supply.

Surface water supply data will be obtained from the various sources of data by the Tule Subbasin TAC's technical consultant and entered into the Tule Subbasin Water Management Database (see Section 4.3). Surface water supply data will be made available to each GSA by February 1 following the end of a water year.

3.5 Total Water Use (§357.4(b)(3)(B))

Pursuant to 23 Cal. Code Regs. §357.4(b)(3)(B), the GSAs agree the total water use, as defined herein, is based on 23 Cal. Code Regs. §356.2(b)(4), which provides: "Total water use shall be collected using the best available measurement methods and shall be reported in a table that summarizes total water use by water use sector, water source type, and identifies the method of measurement (direct or estimate) and accuracy of measurements." Total water use is the total water demand, including consumptive use.

The Tule Subbasin shall use the following data and methods outlined in **Attachment 1** to measure or estimate total water use, briefly described below:

3.5.1 Data and Monitoring Protocols

3.5.1.1 *Agricultural Water Use*

3.5.1.1.1 *Agricultural Water Demand*

Agricultural water demand will be the sum of groundwater extractions (see Section 3.3) and surface water deliveries from stream sources, imported water, and recycled water (Sections 3.4.1.1, 3.4.1.2 and 3.4.1.3).

3.5.1.1.2 *Agricultural Consumptive Use*

Crop consumptive use will be estimated using the method described in Section 3.3.1.1.

3.5.1.2 *Municipal and Industrial Water Use*

3.5.1.2.1 *M&I Water Demand*

Municipal water demand will be the sum of metered groundwater production from the following communities:

ETGSA

1. City of Porterville
2. Community of East Porterville
3. Terra Bella Irrigation District
4. Ducor Community Services District

LTGSA

1. Tipton Public Utility District
2. Woodville Community Services District
3. Poplar Community Services District

PIXID GSA

1. Pixley Public Utility District
2. Teviston Community Services District

DEID GSA

1. Earlimart Public Utility District
2. Richgrove Community Services District

Alpaugh GSA

1. Alpaugh Community Services District

TCWA GSA

1. Allensworth Community Services District

Tulare County GSA
(None)

3.5.1.2.2 *M&I Consumptive Use*

Consumptive use of landscaping associated with applied municipal groundwater pumping will be estimated based on an assumed percentage of delivered water that is applied to landscaping and an assumed deep percolation factor. It is assumed 47 percent of municipal water use is applied to landscaping. It is assumed that 75 percent of applied water to landscaping is consumptively used by the plants.

The total municipal consumptive use for any one of the communities in the Subbasin is the sum of landscape consumptive use and evaporation of surface water in that community's wastewater treatment facility discharge basins.

3.5.2 Quality Assurance/ Quality Control

By January 1 following a water year, the total water use from each GSA shall be submitted to the Tule Subbasin TAC's technical consultant for review and input into the Tule Subbasin Water Management Database (see Section 4.3).

Total water use will be calculated by individuals from each GSA who meet the minimum qualifications and training requirements. Total water use will be checked by the Tule Subbasin TAC's technical consultant to ensure consistency with the methods described in this Coordination Agreement and to verify that the consumptive use estimates are consistent with satellite data.

3.6 Change in Groundwater Storage (§357.4(b)(3)(B))

The Tule Subbasin shall use the following data and methods to measure or estimate change in annual groundwater storage:

3.6.1 Data and Monitoring Protocols

3.6.1.1 *GIS-Based Method for Estimating Storage Change*

For any given GSA, the change in groundwater storage can be estimated using the following equation:

$V_w = S_y A \, \Delta h$

Where:

V_w	=	the volume of groundwater storage change (acre-ft).
S_y	=	specific yield of aquifer sediments (unitless).
A	=	the surface area of the aquifer within the Tule Subbasin/GSA (acres).
Δh	=	the change in hydraulic head (i.e. groundwater level) (feet).

The change in storage estimate is specific to the shallow aquifer as the groundwater level in the deep aquifer will not likely drop below the top of the aquifer. The calculations will be made using a Geographic Information System (GIS) map of the Tule Subbasin/GSA that will be discretized into 300-foot by 300-foot grids to allow for spatial representation of aquifer specific yield and groundwater level change.

The areal and vertical distribution of specific yield for the shallow aquifer will be based on the values obtained from the calibrated groundwater flow model of the Tule Subbasin.

For the areal distribution of change in hydraulic head within the Tule Subbasin/GSA, groundwater contours for the spring of the previous year will be digitized and overlain on the grid map of the Tule Subbasin/GSA in GIS. Groundwater levels will then be assigned to each grid. A contour map with groundwater elevation contours from spring of the next year will also be digitized and overlain on the grid map. Change in hydraulic head (groundwater level) at each grid will be calculated as the difference in groundwater level between the two years.

The complete GIS files of specific yield and groundwater levels will be exported into a spreadsheet program for the final analysis of groundwater storage change. The change in groundwater storage will be calculated for each grid cell by multiplying the change in groundwater level by the specific yield and then by the area of the cell.

The data from the analysis can be used to develop change in storage maps for incorporation into the annual reports.

3.6.1.2 *Groundwater Flow Model Method for Estimating Storage Change*

The calibrated groundwater flow model of the Tule Subbasin, which was originally prepared for the Tule Subbasin TAC in 2018, can be used to estimate the change in groundwater storage across the subbasin and within each GSA boundary. The calibrated groundwater surface from one year can be exported and subtracted from the exported calibrated groundwater surface from a subsequent year. The difference in groundwater levels is multiplied by the specific yield distribution of the shallow aquifer in the model to obtain an estimate of the change in groundwater storage across the subbasin.

In order to develop updated change in storage values for the annual reports, the model will be updated on a regular basis. The update will include incorporation of the previous year's groundwater extractions, recharge values, and groundwater levels. The model calibration will be validated with the measured data and adjusted as needed. Once the updated model is validated, it can be used to estimate changes in groundwater storage both across the Subbasin and within each GSA. The GSAs acknowledge that the more measured data that is available for incorporation into the model, the better the model results will be. The GSAs further acknowledge that they have used the best available information up to this point, but that they will continue to evaluate and gather additional information through the Monitoring Plan.

The model output will be used to develop maps showing the changes in groundwater storage, for incorporation into annual reports.

3.6.2 Quality Control and Assurance

All change in groundwater storage estimates will be conducted by professionals trained and experienced in the use of the groundwater flow model and hydrological calculations. All work shall be conducted under the direct supervision of a California registered Professional Civil Engineer, Professional Geologist, or Certified Hydrogeologist.

3.7 Water Budget (§357.4(b)(3)(B))

Pursuant to 23 Cal. Code Regs. §357.4(b)(3)(B), the GSAs agree to use the following data and methods to measure or estimate a water budget, for both the Subbasin and individual GSAs:

3.7.1 Data and Monitoring Protocols

The water budget methodologies described herein have been developed based on the best available data and procedures at the time of publication. The methodologies shall be reviewed and updated periodically as new monitoring features, data, and technical advances are available.

3.7.2 Surface Water Budget

Surface water budgets describe all of the sources and volumes of surface water inflow and outflow to/from the subbasin. Inflow terms for the surface water budget of the Tule Subbasin will include:

1. Precipitation.
2. Stream inflow.
3. Imported water.
4. Discharge to the land surface from wells.

Surface water outflow terms will include:

1. Infiltration of precipitation.
2. Evapotranspiration of precipitation from native vegetation and crops.
3. Stream infiltration.
4. Infiltration in canals.
5. Recharge in basins.
6. Deep percolation.
7. Consumptive use.
8. Stream outflow.

3.7.2.1 Surface Water Inflow

3.7.2.1.1 *Precipitation*

The annual volume of water entering the Tule Subbasin as precipitation will be estimated based on the long-term average annual isohyetal map as included in **Attachment 2** and annual precipitation data reported for the Porterville precipitation station. As annual precipitation values are not available throughout the entire Tule Subbasin, it will be assumed that the relative

precipitation distribution for each year is the same as that shown on the isohyetal map. The magnitude of annual precipitation within each isohyetal zone will be varied from year to year based on the ratio of annual precipitation at the Porterville Station to annual average precipitation at the Porterville isohyetal zone multiplied by the isohyetal zone average annual precipitation.

$$\frac{Precip_{Porterville}}{Precip_{Ave\ Porterville}}\ x\ Isohyet_{Ave\ Precip} = Precip_{Isohyet}$$

Where:

$Precip_{Porterville}$	=	Precipitation at the Porterville Station in any given year (ft/yr).
$Precip_{Ave\ Porterville}$	=	Long-Term Average Precipitation at the Porterville Station (ft/yr).
$Isohyet_{Ave\ Precip}$	=	Average precipitation within the Isohyet zone overlying the Subbasin/GSA (ft/yr).
$Precip_{Isohyet}$	=	Adjusted annual precipitation within the isohyet zone overlying the Subbasin/GSA (ft/yr).

The adjusted annual precipitation for the year of interest will be multiplied by the area of the isohyet zone to estimate the precipitation falling on the area (in acre-ft).

3.7.2.1.2 *Stream Inflow*

Surface water inflow to the Tule Subbasin occurs primarily via three native streams: the Tule River, Deer Creek, and the White River. As the ETGSA borders the eastern Tule Subbasin boundary, stream inflow into the Tule Subbasin is equal to the stream inflow into the ETGSA.

Tule River

Streamflow in the Tule River is documented in TRA annual reports. Stream inflow to the Tule Subbasin (and ETGSA) is recorded as releases from the Richard L. Schafer Dam (formerly Lake Success Dam) and will be the same as reported in the TRA annual reports. Accounting of diversions from the Tule River is described in Section 3.4.1.1.1 of this Coordination Agreement.

Deer Creek

Accounting of streamflow in Deer Creek is described in Section 3.4.1.1.2 of this Coordination Agreement.

White River

Accounting of streamflow in the White River is described in Section 3.4.1.1.3 of this Coordination Agreement.

3.7.2.1.3 *Imported Water*

Imported water delivered to the various agencies within the six GSAs of the Tule Subbasin will be provided on an annual basis by the agencies receiving deliveries.

3.7.2.1.4 *Discharge to Crops from Wells*

Water applied to crops from wells is assumed to be the total applied water minus surface water deliveries from imported water and diverted stream flow. Total crop demand will be estimated based on the methodologies identified in Section 3.3.1. Diverted streamflow and imported water deliveries are described in Sections 3.4.1.1 and 3.4.1.2, respectively.

3.7.2.1.5 *Municipal Deliveries from Wells*

Accounting of groundwater pumping for municipal supply will be provided on a monthly basis by the various cities/communities in the Tule Subbasin. These cities/communities include:

1. City of Porterville
2. Tipton Public Utility District
3. Pixley Public Utility District
4. Teviston Community Services District
5. Earlimart Community Services District
6. Terra Bella Irrigation District
7. Richgrove Community Services District
8. Poplar Community Services District
9. Woodville Community Services District
10. Allensworth Community Services District
11. Alpaugh Community Services District
12. Ducor Community Services District

It is assumed that municipal pumping will be metered. In the event that metered pumping data is not available, municipal supply will be estimated based on the population of the community served and an assumption of per capita water demand from the most recent Urban Water Master Plan applicable to the area.

It is noted that there are some households in the rural portions of the Tule Subbasin that rely on private wells to meet their domestic water supply needs. However, given the low population density of these areas, the volume of pumping from private domestic wells is considered negligible compared to the other pumping sources.

3.7.2.2 Surface Water Outflow

3.7.2.2.1 *Areal Recharge from Precipitation*

Historical estimates of areal recharge from precipitation falling on the valley floor in the Tule Subbasin, as used in TH&Co (2017a)[1] were based on Williamson et al., (1989).[2] The equation for estimating areal recharge, using the Williamson Method, is:

$$PPT_{rech} = (0.64)PPT - 6.2$$

Where:

PPT_{rech}	=	Groundwater Recharge from Precipitation (ft/yr)
PPT	=	Annual Precipitation (ft/yr)

Total precipitation in any given GSA (i.e. PPT) will be estimated on an annual basis using the portion of the isohyetal map overlapping the GSA (see **Attachment 2**; Figure 2-27) and adjusted based on the recorded annual precipitation at the Porterville station, as described in Section 3.7.1.1.1.1. Precipitation recharge for each GSA will then be recorded on an annual basis using the above equation.

3.7.2.2.2 *Streambed Infiltration (Channel Loss)*

Tule River

Total channel loss (i.e. streambed infiltration plus evapotranspiration) in the Tule River between Lake Success and Oettle Bridge will be the same as reported in TRA annual reports and shall be allocated pursuant to the allocation method in the TRA Water Rights Schedule. Tule River infiltration for the water budget will be estimated as follows:

$TR_{CL} – ET = TR_{NatInf}$

Where:

TR_{CL}	=	Tule River channel losses between Lake Success and Oettle Bridge as reported in TRA annual reports (acre-ft).
ET	=	Evapotranspiration (acre-ft).
TR_{NatInf}	=	Infiltration losses between Lake Success and Oettle Bridge attributed to native Tule River water (acre-ft).

[1] TH&Co, 2017a; Hydrogeological Conceptual Model and Water Budget of the Tule Subbasin. Dated August 1, 2017.

[2] Williamson, A.K., Prudic, D.E., and Swain, L.A., 1989. Ground-Water Flow in the Central Valley, California. USGS Professional Paper 1401-D.

Evapotranspiration between Lake Success and Oettle Bridge will be equal to 35 acre-ft/month when the flow in the channel is greater than 35 acre-ft/month and equal to the flow when less than 35 acre-ft/month.

Reporting of total streambed infiltration of surface water flow in the Tule River channel between Oettle Bridge and Turnbull Weir will be obtained from LTRID annual water use summaries and adjusted to account for ET in the stream channel. Evapotranspiration in the Tule River channel between Oettle Bridge and Turnbull Weir is assumed to be equal to 55 acre-ft/month if the flow in the channel is greater than 55 acre-ft/month and equal to the flow when less than 55 acre-ft/month.

Given the fact that LTRID periodically releases imported water from the Friant-Kern Canal to the Tule River upstream of Oettle Bridge, it will be necessary to account for the portion of channel infiltration attributed to native Tule River flow versus the channel infiltration attributed to imported water as the native river flow infiltration is part of the Sustainable Yield of the subbasin but the imported water recharge is not. Imported water deliveries to the Tule River channel are reported in the TRA annual reports. The estimated native Tule River water infiltration in the channel between Oettle Bridge and Turnbull Weir will be computed as follows:

$$\frac{FK}{TR_{BOB} + FK} \; x \; TR_{Tot\ Inf} - ET = TR_{Native\ Inf\ Loss}$$

Where:

FK	=	Imported water delivered to the LTRID from the Friant Kern Canal (acre-ft).
TR_{BOB}	=	Gaged flow Below Oettle Bridge from TRA annual reports (acre-ft).
$TR_{Tot\ Inf}$	=	Infiltration losses from both native Tule River water and imported water (acre-ft).
ET	=	Evapotranspiration (acre-ft).
$TR_{Native\ Inf\ Loss}$	=	Infiltration losses between Oettle Bridge and Turnbull Weir attributed to native Tule River water (acre-ft).

Deer Creek

Deer Creek is a losing stream such that infiltration of surface water within the stream channel recharges the groundwater system beneath it. Streambed infiltration (channel loss) is estimated for the stream reaches between the Fountain Springs gaging station and Trenton Weir and between Trenton Weir and Homeland Canal. The difference in streamflow between Fountain Springs station and Trenton Weir is assumed to be total channel loss along this section. Combined streambed infiltration in the Deer Creek channel between Trenton Weir and Homeland Canal and canal losses within the rest of the Pixley Irrigation District were estimated based on Pixley Irrigation District monthly water use summaries. Measured channel loss includes infiltration as well as evapotranspiration. Therefore, infiltration is equal to channel loss minus evapotranspiration.

It is noted that there are two sources of water in the Deer Creek channel: 1) native flow and 2) imported water from the Friant-Kern Canal. It is further noted that imported water is introduced into the Deer Creek channel upstream of Trenton Weir. Thus, until a stream gage is established upstream of the Friant-Kern Canal/Deer Creek intersection, the separate accounting of losses associated with imported water and native Deer Creek surface flow will be approximated. Imported water discharged to the Deer Creek channel from the Friant-Kern Canal is monitored by the USBR and reported in the Pixley Irrigation District monthly water use summaries.

Deer Creek channel loss (i.e. streambed infiltration and evapotranspiration) from Fountain Springs to Trenton Weir was estimated based on the difference in measured flows between the two stations. The surface flow between these two stations is assumed to be, for this water budget, native Deer Creek water. Deer Creek channel infiltration will be estimated as follows:

$$DC_{FS} - DC_{TW} - ET = DC_{Inf\ Loss}$$

Where:

$\underline{DK_{FS}}$	=	Gaged flow at Fountain Springs (acre-ft).
$\underline{DK_{TW}}$	=	Gaged flow at Trenton Weir (acre-ft).
ET	=	Evapotranspiration (acre-ft).
$DC_{Inf\ Loss}$	=	Infiltration losses attributed to native Deer Creek water (acre-ft).

Flow in the Deer Creek channel from Trenton Weir to Homeland Canal is a combination of native Tule River water and imported water purchased by the Pixley Irrigation District for distribution in their service area. For this water balance, it is assumed that all of the water that flows through Trenton Weir is either delivered to farmers or becomes channel or canal loss (i.e. there are no data available to document surface flow from the Deer Creek channel to Homeland Canal although it is known that this occurs during periods of above normal precipitation). The infiltration of native Deer Creek water in the Deer Creek channel downstream of Trenton Weir is estimated for each month based on Pixley Irrigation District annual water use summaries in the following way:

1. Subtract the imported water deliveries to Deer Creek from the total flow measured at Trenton Weir to estimate the volume entering Pixley Irrigation District that is attributed to native Deer Creek flow.
2. Pixley Irrigation District sales and deliveries to basins are subtracted from the total flow through Trenton Weir to determine the volume of water presumably lost as infiltration in the Deer Creek channel and canals.
3. The total loss in No. 2 is multiplied by the ratio of Deer Creek channel length to the total channel/canal length within the Pixley irrigation District (0.21) to estimate losses in the channel and multiplied by the ratio of canal length to the total channel/canal length to estimate losses in the canals (0.79).
4. The total loss attributed to the Deer Creek channel, as estimated from No. 3, is multiplied by the ratio of native Deer Creek flow at Trenton Weir to the total water available to estimate the volume of native Deer Creek water infiltration estimated to occur in the Deer Creek channel.

5. The total loss attributed to canals, as estimated from No. 3, is multiplied by the ratio of native Deer Creek flow at Trenton Weir to the total water available to estimate the volume of native Deer Creek water loss estimated to occur in the canals.

Infiltration losses in the Deer Creek channel are included in the Sustainable Yield of the overall Tule Subbasin.

White River

All of the surface water flow measured or interpolated at the White River stream gage, after accounting for ET losses, is assumed to become streambed infiltration, as described in Section 3.4.1.1.3.

3.7.2.2.3 *Canal Losses*

Canal Losses from Tule River Diversions

Canal losses from Tule River diversions occur within the numerous unlined canals connected to the Tule River within the City of Porterville, Vandalia Water District, Porterville Irrigation District and LTRID. With the exception of LTRID, canal losses are accounted for in the portion of the water budget that addresses deep percolation of applied water (see Section 3.7.1.1.2.5).

Canal losses associated with deliveries of native Tule River water in the LTRID GSA are estimated based on LTRID annual water use summaries. Canal losses will be reported as total LTRID GSA losses minus channel losses attributed to native Tule River water ($TR_{\text{Native Inf Loss}}$). The equation is as follows:

$$\frac{TR_{Gaged}}{TR_{Gaged} + FK} \; x \; LTRID_{Total\ Losses} \; - \; TR_{Native\ Inf\ Loss} \; = TR_{Native\ Can\ Loss}$$

Where:

TR_{Gaged}	=	Sum of gaged flow at Below Oettle Bridge, Woods Central Diversion, Poplar Irrigation Company flow reaching LTRID, and Porter Slough at 192 (acre-ft).
FK	=	Imported water delivered to the LTRID from the Friant Kern Canal.
$LTRID_{\text{Total Losses}}$	=	Total losses reported in LTRID annual water use summaries.
$TR_{\text{Native Inf Loss}}$	=	Native Tule River channel infiltration losses.
$TR_{\text{Native Can Loss}}$	=	Canal losses attributed to native Tule River water.

Canal losses from diverted native Tule River water are not included in the Sustainable Yield of the overall Tule Subbasin.

Canal Losses from Deer Creek Diversions

It is assumed that canal losses from delivery of native Deer Creek water to riparian landowners and farmers occur only within the PID GSA. The methodology to estimate canal losses within the PID GSA is described above.

Canal losses from diverted Deer Creek water are not included in the Sustainable Yield of the overall Tule Subbasin.

Canal Losses from Imported Water Deliveries

With the exception of canal losses within the Angiola Water District and Porterville Irrigation District, it is assumed that imported water that infiltrates into the subsurface in the Tule River channel, Deer Creek channel and unlined canals is grouped together. Within the Angiola Water District and Porterville Irrigation District, canal losses are accounted for in the portion of the water budget that addresses deep percolation of applied water (see Section 3.7.1.1.2.5). For the Tule River, canal losses are estimated as follows:

$$LTRID_{Total\ Losses} - TR_{Native\ Inf\ Loss} = LTRID_{Imp\ Can\ Loss}$$

Where:

$LTRID_{Total\ Losses}$	=	Total losses reported in LTRID annual water use summaries (acre-ft).
$TR_{Native\ Inf\ Loss}$	=	Native Tule River channel infiltration losses (acre-ft).
$LTRID_{Imp\ Can\ Loss}$	=	Canal losses attributed to imported water in the LTRID (acre-ft).

For Deer Creek, canal losses are estimated as follows:

$$Pixley_{Total\ Losses} - DC_{Native\ Inf\ Loss} = Pixley_{Imp\ Can\ Loss}$$

Where:

$Pixley_{Total\ Losses}$	=	Total losses reported in Pixley Irrigation District annual water use summaries (acre-ft).
$DC_{Native\ Inf\ Loss}$	=	Native Deer Creek channel infiltration losses (acre-ft).
$Pixley_{Imp\ Can\ Loss}$	=	Canal losses attributed to imported water in the Pixley Irrigation District (acre-ft).

Canal losses resulting from delivery of imported water are not included in the Sustainable Yield of the overall Tule Subbasin.

3.7.2.2.4 *Managed Recharge in Basins*

Managed Recharge of Tule River Diversions

Native Tule River water is diverted to basins for recharge by Pioneer Water Company, Campbell and Moreland Ditch Company, Vandalia Water District, Porterville Irrigation District, and LTRID.

All of the water diverted by Campbell and Moreland Ditch Company and Vandalia Water District (ETGSA) is native Tule River flow and is assumed to be delivered to basins. The native Tule River water diverted by these agencies is reported in TRA annual reports. Native Tule River water diverted to basins by Pioneer Water Company and Porterville Irrigation District will be provided by those agencies.

Monthly total water deliveries to basins in the LTGSA are reported in LTRID annual water use summary reports. The total deliveries include both native Tule River water and imported water from the Friant-Kern Canal. The basin recharge attributable to native Tule River water downstream of Oettle Bridge will be reported as follows:

$$\frac{TR_{Gaged}}{TR_{Gaged} + FK} \; x \; LTRID_{Total\ Basin\ Rech} = TR_{Basin\ Rech}$$

Where:

TR_{Gaged}	=	Sum of gaged flow at Below Oettle Bridge, Woods Central Diversion, Poplar Irrigation Company flow reaching LTRID, and Porter Slough at 192 (acre-ft).
FK	=	Imported water delivered to the LTRID from the Friant Kern Canal (acre-ft).
$LTRID_{Total\ Basin\ Rech}$	=	Total LTRID basin recharge from annual water use summaries (acre-ft).
$TR_{Basin\ Rech}$	=	Basin recharge in LTRID attributed to native Tule River water (acre-ft).

Managed recharge of diverted native Tule River water is not included in the Sustainable Yield of the overall Tule Subbasin.

Managed Recharge of Deer Creek Diversions

Artificial recharge (i.e. recharge in basins) of diverted Deer Creek streamflow is accomplished via multiple recharge facilities. Native Deer Creek water is diverted to basins for recharge by Pixley Irrigation District and DCTRA. It is acknowledged that the Pixley Irrigation District diversions are limited to the rights of the riparians within the District. The amount of the water right is subject to discussion. Basin recharge attributed to native Deer Creek water is estimated using the following equation: