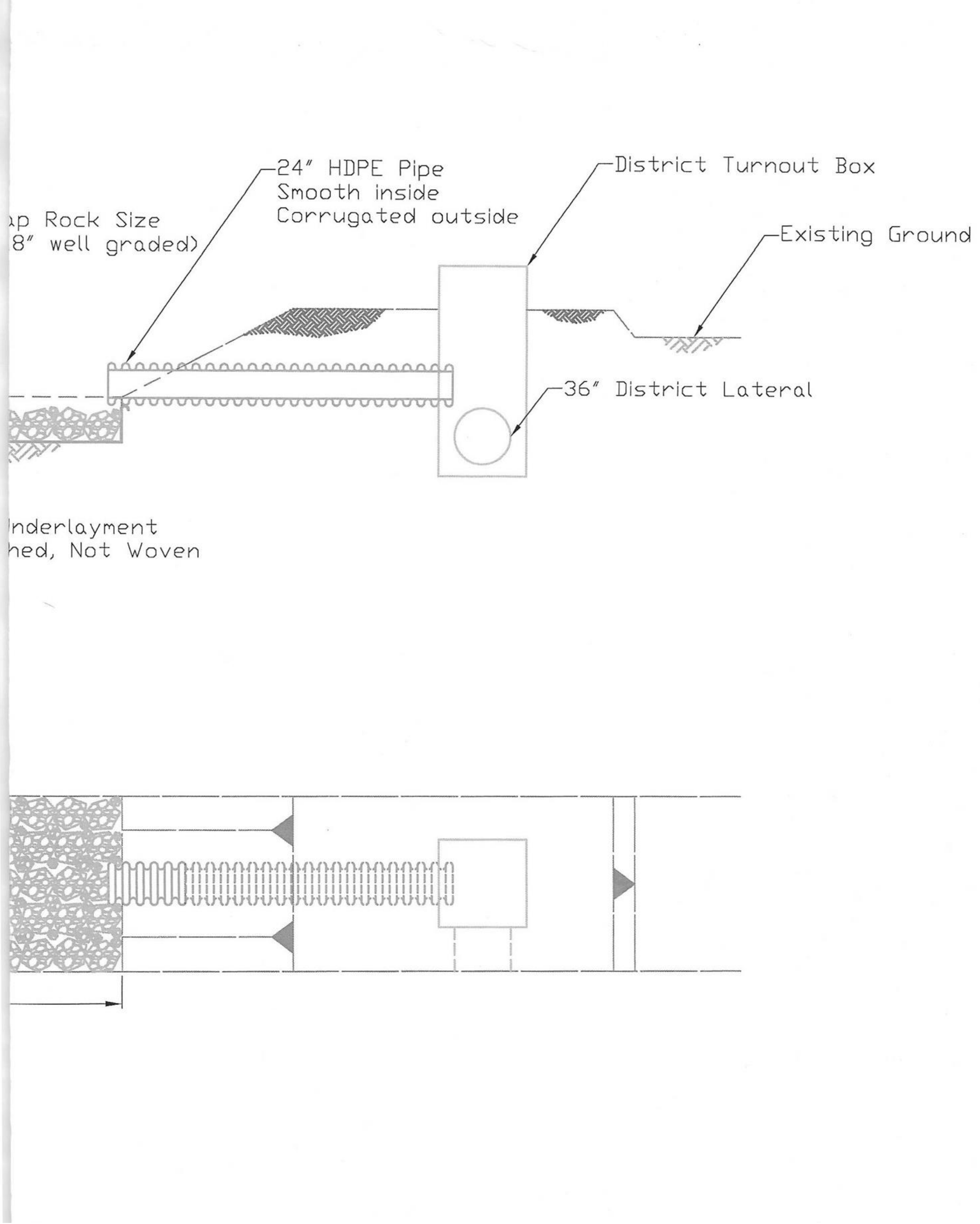
RECHARGE Basin

Markarian Family LP/NRCS/MID

Jennifer Peters 9/13/2024



USDA United States Department of Agriculture
Natural Resources Conservation Service

JOB CODE: 815, 587, 430, 580

SEDIMENT CHANNEL
Markarian Family LP
Madera County, CA

JOB CLASS: V

Designed *B Bain*
Drawn *A Curtis*
Checked ----
Approved ----

USDA

ENGINEERING DESIGN REPORT

Markarian Family LP

Supporting Practices for Groundwater Recharge Basin
Job Code: 815, 817, 468, 587, 430
Engineering Class: VI (None Specified – ICPS 815 & 817)

Prepared by: Blair Bain, San Joaquin Valley Team Engineer
Alysha Curtis, Engineering Pathways Student

Madera Service Center
Madera County

July 5, 2022

CALIFORNIA

NATURAL RESOURCES CONSERVATION SERVICE

The landowner requested technical and financial assistance through the Natural Resources Conservation Service (NRCS) Environmental Quality Incentives Program (EQIP). Technical and financial assistance will be provided by the NRCS Madera Field Office.

III. DESCRIPTION OF PROBLEM

The producer's land is not currently being utilized to its full potential. The landowner would like to capture winter flood releases from Madera Irrigation District to replenish groundwater sources. The proposed groundwater recharge basin and on-farm recharge systems will assist to replenish groundwater aquifers depleted due to pumping overdraft. The project will help address priorities outlined in Madera Groundwater Sustainability Agency's (GSA) Groundwater Sustainability Plan (GSP).

IV. SOLUTION AND ALTERNATIVES

A. ALTERNATIVES CONSIDERED
1. Do nothing.
2. Install an 18-acre recharge basin.
3. Install a 40-acre recharge basin.

Alternative 1 does not address the resource concern groundwater depletion. Alternative 2 allows the landowner to make use of winter flood releases for recharge purposes to mitigate against groundwater overdraft. The recharge basin is efficiently sized to accept the peak delivery flow expected by Madera Irrigation District (15CFS). Alternative 3 allows the landowner to utilize winter flood releases for groundwater recharge, but the basin facility is oversized for peak deliveries and the expected benefit to address groundwater overdraft. The larger basin would not be economically feasible due to excessive construction, operation, and maintenance costs. Therefore, Alternative 2 was chosen as the selected alternative due to least cost and ability to meet project objectives.

B. PRACTICE STANDARD(S) USED

Conservation Practice Standards:

1. 815 (July 2020): Groundwater Recharge Basin or Trench
   Includes a constructed basin with 30 ac-ft of water storage. The recharge basin will facilitate replenishment of the underlain unconfined aquifer to reduce groundwater overdraft.
2. 817 (July 2020): On Farm Recharge
   Includes a 20-ac cropland field with existing surface irrigation system. The on-farm recharge practice will facilitate replenishment of the underlain unconfined aquifer to reduce groundwater overdraft.
3. 468 (August 2021): Lined Waterway or Outlet
   Includes 400 ft² of large rip rap, 6"-18" well graded, to be placed within the sediment channel. The rip rap will help dissipate flow velocities and maintain basin flow capacity.
4. 587 (November 2018): Structure for Water Control
   Includes a 30 in. flow meter with mechanical index and a concrete control structure to measure and regulate inflow to the recharge basin. The structure assists to maintain an ideal inflow condition for optimum groundwater recharging.
5. 430 (August 2021): Irrigation Pipeline
   Includes 80 ft. of 30 in. HDPE pipeline to facilitate delivery of flood release water from the district turnout to the groundwater recharge basin. The pipe is sized to match the district's conveyance capacity to deliver peak flood releases.

V. DESIGN CONSIDERATIONS

Proposed practices will be designed according to the above NRCS standards. Soil data for the site indicates a saturated hydraulic conductivity (K_{sat}) of approximately 8 ft/day. A conservative value of 2 ft/day was assumed for design analysis. This is a reasonable assumption for prolonged use of the basin with minimum annual maintenance. The recharge basin was designed to minimize the basin footprint and earthwork as well as construction expenses. Consideration of existing irrigation distribution infrastructure and operation and maintenance of the basin were also critical in this design. Design calculations for this facility are documented in the Appendices.


512
OWNED/OPERATED BY:
BEST TOURS
FRESNO, CALIFORNIA


Bobcat

Water Basin Log Sheet 2023

Date	Time	Daily Acre Feet	Cumulative Acre Feet	Eto	Rainfall inches
3/21	8:46 a.m.	0	0	3.41 in/month	0
3/22	7:17 a.m.	11.71	11.71		0
3/23	7:29 a.m.	16.39	28.10		17/25
3/24	7:33 a.m.	17.47	45.57		
3/25	7:58 a.m.	16.23	61.80		
3/26	9:08 a.m.	14.67	76.47		
3/27	7:34 a.m.	7.09	83.56		
3/28	7:45 a.m.	7.62	91.18		
3/29	8:01 a.m.	7.57	98.75		47/100
3/30	7:54 a.m.	8.14	106.89		1/4
3/31	7:58 a.m.	10.14	117.03		
4/1	8:41 a.m.	9.68	126.71		
4/2	9:43 a.m.	9.34	136.05		
4/3	7:39 a.m.	7.71	143.76		
4/4	7:49 a.m.	6.41	150.17		
4/5	7:30 a.m.	5.79	155.96		
4/20	10:25 a.m.	6.69	162.65		
4/24	8:24 a.m.	35.87	198.52		
4/25	7:56 a.m.	9.51	208.03		
4/26	3:54 p.m.	27.42	235.45		
5/4					1/2