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<b>DOCKET</b>	
01-AFC-18C	
DATE	FEB 13 2009
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**Subject: Data Responses Set 3 (Responses to Data Requests 23 through 31  
GWF Henrietta Combined Cycle Power Plant Project (01-AFC-18C))**

On behalf of the GWF Energy LLC., please find attached six hardcopies and six CD copies of the Data Responses, Set 3, in response to Staff's Data Requests dated January 20, 2009.

Please call me if you have any questions.

Sincerely,

CH2M HILL

Jennifer Scholl  
Senior Project Manager

*Petition for License Amendment*

# **GWF Henrietta Combined-Cycle Power Plant**

Data Responses Set 3  
(Responses to Data Requests 23 through 31)  
GWF Henrietta Peaker Plant (01-AFC-18C)

Submitted by



With Technical Assistance by

**CH2MHILL**

February 2009

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# **GWF Henrietta Combined Cycle Power Plant**

(01-AFC-18C)

## **Data Responses Set 3** (Responses to Data Requests 23 through 31)

Submitted to  
**California Energy Commission**

Submitted by  
**GWF Energy, LLC**

February 2009

With Assistance from

**CH2MHILL**  
2485 Natomas Park Drive  
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Sacramento, CA 95833

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# Introduction

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Attached are GWF Energy LLC's responses to the California Energy Commission (CEC) staff's Data Requests numbered 23 through 31 – Soil and Water Resources for GWF Henrietta Combined Cycle Power Plant Project (GWF Henrietta). The CEC staff served these data requests on January 20, 2009, as part of the discovery process for GWF Henrietta's Petition for License Amendment (01-AFC-18C). The responses are presented in the same order as the CEC staff presented them and numbered (23 through 31). New or revised graphics or tables are numbered in reference to the Data Request number. For example, the first table used in response to Data Request 23 would be numbered Table DR23-1. The first figure used in response to Data Request 23 would be Figure DR23-1, and so on.

Additional documents submitted in response to a data request (i.e., stand-alone documents) are found at the end of this Data Response submittal and are not sequentially page-numbered with the remainder of the document, though they may have their own internal page numbering system.

The Applicant continues to appreciate the cooperative working relationship with CEC staff as GWF Henrietta proceeds through the License Amendment process. We trust that these responses address the staff's questions and remain available to have any additional dialogue the staff may require.

# Soil and Water Resources (23–28)

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## **Project Background**

GWF Energy LLC (GWF) proposes to modify the existing Henrietta Peaker Plant (HPP) by converting the facility from a nominal 95-megawatt (MW) simple-cycle power plant into a combined-cycle power plant with a nominal generating capacity of 120 MW net (GWF Henrietta). HPP was constructed and placed in service on July 1, 2002 in Kings County, south of the City of Lemoore, and has been operating as a peaker plant to provide critical peak energy.

The primary modifications related to Soil and Water Resources that were identified in the proposed amendment include the following:

1. Increase in water consumption of approximately 8 AFY for once-through steam generator (OTSG) feed water makeup and the lube oil cooler makeup;
2. Modification of the wastewater treatment system to optimize water supply requirements and minimize off-site wastewater disposal;
3. Modifications to the storm water drainage collection systems;
4. Replacement of the existing storm water retention basin for storm water management. The new basin will be larger than the existing basin by approximately 2,200 cubic yards. Excavated material from the new retention basin will be retained onsite and incorporated into filling the existing basin and final facility grading;
5. Temporary disturbance for construction laydown and parking;
6. Permanent disturbance associated with the expansion of the site from 7 to 9.86 acres;
7. Addition of an Air Cooled Condenser (ACC) for system heat rejection; and,
8. Use of a Wet Surface Air Cooler (WSAC) when temperatures exceed 88 °F.

## **Background: Water Supply**

The current HPP water usage is approximately 150 AFY. GWF Henrietta, with the two OTSGs and the STG lube oil cooler, will require approximately 158 AFY. During construction, the applicant estimates that water use will average about 1,000 gallons per day and a maximum of up to 6,000 gallons per day will be required. During the 5-month construction period, total construction water use is estimated to be less than 0.5 acre-feet for dust control, and flushing and testing of the water treatment and OTSGs.

The current HPP water supply is made up of two sources:

200 ac-ft of State Water Project (SWP) surface water delivered from the California Aqueduct from Kings County by Westlands Water District (WWD); and,

52 ac-ft of Central Valley Project (CVP) surface water delivered from the California Aqueduct by the WWD from the existing service pipeline.

Additionally, GWF has legal control of approximately 2,000 acre-feet of SWP entitlements associated with the Land Purchase Option Agreement held for 750 acres adjacent to GWF Henrietta. The Land Purchase Option Agreement is being revised to cover 950 acres of agricultural lands and 2,600 acre-feet of SWP entitlements. The proposed amendment states that no change to the existing water supply or service connection from the Westland Water District (WWD) and Kings County is expected.

GWF indicates that existing water supplies may be subject to reduction. Given current drought conditions and court ordered reductions for resources in the Sacramento – San Joaquin Delta, it appears possible the proposed primary supply may not be adequate for project operation. GWF is relying on a verbal agreement from WWD for delivery of 51.8 acre feet of CVP water. GWF also briefly describes another potential project water supply related to the Land Purchase Options. This supply has not been evaluated by Energy Commission staff and the commitment of additional fresh water supplies may not be consistent with energy commission policy. The 2002 Commission Decision indicates that while the original simple cycle project's use of SWP water was not considered a significant impact, water supply for future amendments including conversion to a combined cycle plant should be re-evaluated against the requirements of State Water Resource Control Board Policy 75-58 including examining the use of recycled water as the plant's primary water supply.

### **Data Request**

23. Please provide a monthly summary of water use for the existing HPP. Please include hours of operation, power delivered, and water use for each year of operation. Please breakdown water use data for steam cycle makeup, gas turbine SPRINT, evaporative inlet cooling, emission controls, turbine wash water, and service water.

**Response:** In an effort to provide a more timely response, the requested data for the last three years have been compiled and are provided in Attachment DR23-1.

### **Data Request**

24. Please provide a detailed discussion regarding the availability and feasibility of utilizing an alternative source of water such as agricultural wastewater or recycled water (e.g., possibly from Lemoore NAS) to provide the additional 8 AFY of water required for the modifications to the licensed plant.

**Response:** GWF Energy LLC had discussions with the United States Navy regarding the availability of recycled water from wastewater ponds from the Lemoore Naval Air Station for use to satisfy the increase in water supply requirements for the combined-cycle modifications, described more fully the Petition for License Amendment. The Navy indicated that recycled water could be made available in sufficient quantities for GWF Henrietta. The Navy currently treats wastewater from the Lemoore Naval Air Station in a sewage treatment plant with a primary treatment unit. The wastewater is then discharged into ponds on the south side of Highway 198 east of the HPP facility for secondary treatment. The Navy does not currently have plans to construct a tertiary unit at the plant. Besides the Lemoore Naval Air Station wastewater, there are no other potential recycled water sources (e.g., other wastewater facilities or agricultural wastewater) that could be feasibly obtained. Water quality characteristics of recycled water from the Lemoore Naval Air Station are presented in Attachment DR24-1.

GWF Henrietta requires water that meets tertiary standards because of the increased water quality requirements necessary to operate the wet surface air condenser (WESAC). In addition, the recycled water would also require additional treatment to satisfy the water quality requirements for use as makeup to the OTSG. The use of this recycled water would also require the construction of an approximately 1.5-mile pipeline from the Navy ponds to GWF Henrietta. The rejected wastes from the water treatment units would require further treatment and disposal off site at an approved waste disposal facility. The capital cost of the treatment facilities and pipelines are summarized in Table DR24-1.

TABLE DR24-1

Estimated Capital Cost of Treatment Facilities and Pipelines for Recycled Water Use at GWF Henrietta

<b>Facilities/Processes</b>	<b>Capital Cost</b>
Recycled Water Transfer Pump Station and Pipeline	\$460,000
Tertiary Treatment (installed)	\$500,000
Boiler Feedwater Treatment	\$80,000
Waste Treatment	\$150,000
Total Capital Cost	\$1,190,000
Offsite Disposal Annual Cost	\$18,000

It would be economically infeasible for a project that only requires 8 acre-feet of water per year to complete the intensive capital investments summarized in Table DR24-1. As a result, it is not feasible for GWF Henrietta to utilize wastewater from the Lemoore Naval Air Station for its water supply needs.

### **Data Request**

25. Please provide a detailed discussion and back up for construction water supply estimates.

**Response:** The estimated maximum construction water requirement of 6,000 gallons is based on an OTSG volume provided by the manufacturer plus the average daily water usage of 1,000 gallons. The modifications will require phased soil disturbance with the majority of disturbance occurring during the installation of the new stormwater retention pond and the backfilling of the existing pond. The amount of soil disturbance following these two major tasks is expected to be minimal. During the period of increased soil disturbance (first month of construction) 6 gallons per minute of water flow was assumed for dust mitigation for 8 hours during the day. For the remaining 13 months of construction that were estimated to have some soil disturbance, 2 gallons per minute of water flow was assumed for dust mitigation for 7 hours during the day. The total water usage over the 14 months was rounded up to 14,000 gallons and an average of 1,000 gallons per month was estimated.

### Data Request

26. Please provide copies of agreements for the WWD supply of 51.8 acre feet per year and the SWP entitlement of 2,600 acre feet per year.

**Response:** Please refer to Attachments DR26-1 through DR26-6 for copies of agreements for the existing 200-acre-ft of SWP and 51.8 acre-feet of CVP water entitlements.

### Data Request

27. Please provide information describing the potential impacts of this freshwater use.

**Response:** From the standpoint of allocated water supply, GWF Henrietta's proposed water demand is fully accounted for within existing CVP and SWP entitlements and does not represent a new, unaccounted for water demand. The project will require the incremental use of approximately 8 acre-feet per year (AFY) based on 8,000 hours per year of operation. This is a very small increase in incremental water demand when compared with the State's water supply.<sup>1</sup>

From a CEQA perspective, the GWF Henrietta would not result in a demand on groundwater or a depletion of groundwater resources. Nor would the project result in a change in water demand that would exceed water supply available from existing water entitlements. Relatively few agencies have adopted numerical thresholds of significance for water use. However, the SJVAPCD has established a CEQA significance threshold of 5,000,000 gal/day of water use in its draft CEQA Implementation Policy. This threshold is relevant to apply to this analysis given that GWF Henrietta is located within the SJVAPCD's jurisdiction. The proposed incremental use from GWF Henrietta of 8 AFY is equivalent to approximately 7800 gal/day or less than 0.2% of the 5,000,000 gal/day of this CEQA significance threshold. As a result, the very small incremental increase associated with the project represents a less than significant impact on freshwater use.

<sup>1</sup> According to the California Legislative Analyst's Office, the State water supply ranges from 65 million AFY in a dry year to 95 million AFY in a wet year (California's Water: An LAO Primer, October 2008, [http://www.lao.ca.gov/2008/rsrc/water\\_primer/water\\_primer\\_102208.aspx](http://www.lao.ca.gov/2008/rsrc/water_primer/water_primer_102208.aspx)). GWF Henrietta's incremental demand of 8 AFY is an insignificant and imperceptible quantity when compared to this water supply base, approximately 0.000008% - 0.00001% of the statewide water supply.

In addition, the proposed combined cycle conversion will result in a more efficient use of water per megawatt of electricity produced. At the current facility permitted water use rate of 150 AFY and a nominal output of 95 MW, the water use efficiency is 1.58 AFY/MW. With the conversion to combined cycle, the facility would require 158 AFY and have a nominal output of 120 MW, reducing water use to 1.31 AFY/MW, a water conservation gain of approximately 17%.

Based on the above, the potential freshwater use impact would result in a less than significant impact to freshwater sources.

### Data Request

28. Please discuss whether use of this supply would be consistent with Energy Commission water policy.

**Response:** Under the State Water Resources Control Board (SWRCB) Water Quality control Policy on the Use and Disposal of Inland Waters Used for Powerplant Cooling (adopted on June 19, 1975, as Resolution 75-58), the use of fresh inland waters should only be used for power plant cooling if other sources or other methods of cooling would be environmentally undesirable or economically unsound. In the 2003 Integrated Energy Policy Report, the CEC adopted a similar policy stating they will approve the use of fresh water for cooling purposes by power plants only where alternative water supply sources and alternative cooling technologies are shown to be “environmentally undesirable” or “economically unsound.”

GWF Henrietta is consistent with SWRCB Resolution 75-58 and the CEC’s freshwater policy. Only a very small increase in water consumption will be associated with the project because it will utilize dry cooling technology. GWF Henrietta’s use of an additional 8 AFY represents a minor project modification of the HPP because the total water use required by GWF Henrietta would still be less than the entitlements previously secured for the HPP, thereby eliminating the need to procure additional water supplies or construct new water supply infrastructure, such as pipelines. For the reasons discussed below, if new infrastructure were required, construction costs would reduce the economic feasibility of the project while construction activities could significantly increase environmental impacts related to water quality, air quality, soils, traffic, and biological resources.

The Applicant has held discussions with the United States Navy about the availability of recycled water from waste water ponds at the Lemoore Naval Air Station to satisfy GWF Henrietta’s water supply requirements. The Navy currently treats the waste water in a sewage treatment plant with a primary treatment unit. The waste water is then discharged into ponds located on the south side of Highway 198 (east of the HPP facility) for secondary treatment. The Navy, however, does not plan to construct a unit to achieve tertiary treatment. Because the increased water requirements for GWF Henrietta include a Wet Surface Air Condenser (WESAC) to cool the lube-oil from the Steam Turbine Generator, the make-up water for this equipment must meet tertiary treatment standards. In addition, the recycled water would require further treatment to satisfy the requirements for use as make-up to the OTSG.

As a result, the Navy recycled water would not be available unless extensive infrastructure additions and construction actions were taken to achieve the necessary tertiary treatment. The use of the recycled water would also require the construction of an approximately 1.5-mile pipeline from the Navy ponds to GWF Henrietta. The rejected wastes from the water treatment units would then require treatment and disposal offsite at an approved waste disposal facility. These significant construction requirements have the potential to cause environmental impacts related to water quality, air quality, soils, traffic, and biological resources. It would be environmentally undesirable to cause these impacts for the small amount of water (8 acre-feet) needed for GWF Henrietta. In addition, the intensive capital investments needed to use the Navy recycled water would be so extensive as to make it economically infeasible for a project that only requires a very small increase of water per year.

Besides the Navy recycled water, there are no other sources of recycled water or agricultural waste water that could be feasibly obtained. The following alternatives water supplies were considered and rejected as part of the original HPP:

- *Wastewater from industrial facilities in the area.* There are no facilities in the area that generate a wastewater stream of sufficient quality. The closest industrial facility with sufficient quantity is over eight miles from the site. However, the quality of the water from this facility does not meet the water quality requirements of the HPP or GWF Henrietta.
- *Drilling an onsite water supply well.* Concerns over the local and regional drawdown of the aquifer underlying the HPP site, the difficulty of providing for groundwater recharge to mitigate the project impacts, and the relatively poor quality of water sampled from existing water supply wells near the HPP site led to the rejection of the onsite supply well option.

In addition to only requiring a small amount of new water, GWF Henrietta will result in a more efficient use of water per MW of electricity produced. At the current facility permitted water use rate of 150 AFY and a nominal output of 95 MW, the water use efficiency is 1.58 AFY/MW. With the conversion to combined cycle, the facility would require 158 AFY and have a nominal output of 120 MW, reducing water use to 1.31 AFY/MW, a water conservation gain of approximately 17%.

For the reasons described above, GWF Henrietta's use of the HPP's existing water supplies eliminates the need to construct new alternative water supply infrastructure that would be both environmentally undesirable and economically unsound.

### **Background: Stormwater**

The existing HPP stormwater retention basin will be re-located and re-sized to accommodate GWF Henrietta. The new basin will be expanded by approximately 2,200 cubic yards. With the exception of the relocated retention basin, stormwater management practices remain unchanged from those included in the original HPP license. The stormwater retention basin is sized to capture and detain the runoff resulting from a 100-year 10-day rainfall event. All runoff will be either infiltrated to

the subsurface or evaporated, hence no stormwater discharges will be released to surface waters or to the surrounding ground surface.

While infiltration of stormwater generated at the project site is an ideal BMP to control runoff and protect downstream properties from flooding and water quality impacts, infiltration BMPs can lead to significant groundwater quality impacts. This is particularly important at GWF Henrietta where the groundwater is relatively close to the ground surface.

### Data Request

29. Please provide a draft Drainage Erosion and Sediment Control Plan (DESCP) containing elements A through I below outlining site management activities and erosion/sediment control BMPs to be implemented during site mobilization, excavation/demolition, construction, and post-construction activities. The level of detail in the draft DESCP should be commensurate with the current level of planning for site grading and drainage. Please provide all conceptual erosion control information for those phases of construction and post-construction that have been developed or provide a statement when such information will be available. The DESCP may be combined with the Stormwater Pollution Prevention Plan required by the Regional Water Quality Control Board to limit the need for the project to develop separate stormwater management plans.
- A. Vicinity Map – A map(s) at a minimum scale 1"=100' shall be provided indicating the location of all project elements (construction site, laydown area, pipelines, etc.) with depictions of all significant geographic features including swales, storm drains, and sensitive areas.
  - B. Site Delineation – All areas subject to soil disturbance for the CGS (project site, laydown area, all linear facilities, landscaping areas, and any other project elements) shall be delineated showing boundary lines of all construction/demolition areas and the location of all existing and proposed structures, pipelines, roads, and drainage facilities.
  - C. Watercourses and Critical Areas – The DESCP shall show the location of all nearby watercourses including swales, storm drains, and drainage ditches. Indicate the proximity of those features to the CGS construction, laydown, and landscape areas and all transmission and pipeline construction corridors.
  - D. Drainage Map – The DESCP shall provide a topographic site map(s) at a minimum scale 1"=100' showing all existing, interim and proposed drainage systems and drainage area boundaries. On the map, spot elevations are required where relatively flat conditions exist. The spot elevations and contours shall be extended off-site for a minimum distance of 100 feet in flat terrain.

- E. Drainage of Project Site Narrative – The DESCPC shall include a narrative of the drainage measures to be taken to protect the site and downstream facilities. The narrative should include the summary pages from the hydraulic analysis prepared by a professional engineer/erosion control specialist. The narrative shall state the watershed size(s) in acres that was used in the calculation of drainage measures. The hydraulic analysis should be used to support the selection of BMPs and structural controls to divert off-site and on-site drainage around or through the CGS construction and laydown areas.
- F. Clearing and Grading Plans – The DESCPC shall provide a delineation of all areas to be cleared of vegetation and areas to be preserved. The plan shall provide elevations, slopes, locations, and extent of all proposed grading as shown by contours, cross sections or other means. The locations of any disposal areas, fills, or other special features will also be shown. Illustrate existing and proposed topography tying in proposed contours with existing topography.
- G. Clearing and Grading Narrative – The DESCPC shall include a table with the quantities of material excavated or filled for the site and all project elements of the CGS project (project site, lay down area, transmission corridors, and pipeline corridors) whether such excavations or fill is temporary or permanent, and the amount of such material to be imported or exported.
- H. Best Management Practices Plan – The DESCPC shall identify on the topographic site map(s) the location of the site specific BMPs to be employed during each phase of construction (initial grading/demolition, project element excavation and construction, and final grading/stabilization). BMPs shall include measures designed to prevent wind and water erosion.
- I. Best Management Practices Narrative – The DESCPC shall show the location (as identified in H above), timing, and maintenance schedule of all erosion and sediment control BMPs to be used prior to initial grading, during all project element (site, pipelines, etc.) excavations and construction, final grading/stabilization, and post-construction. Separate BMP implementation schedules shall be provided for each project element for each phase of construction. The maintenance schedule should include post-construction maintenance of structural control BMPs or a statement provided when such information will be available.

**Response:** Attachment DR29-1 includes a Preliminary Draft DESCPC for GWF Henrietta.

### Data Request

30. Please provide hydrologic design calculations for the proposed stormwater retention basin, including estimates of the 100-year 10-day runoff volume, retention basin stage-volume relationship, infiltration rates, and estimated residence time of water in the pond for average conditions (CASQA Water Quality Volume), as well as during the 10-day, 100-year storm event. Please include details on soil characteristics such as infiltration capacity in the analysis of basin drawdown.

**Response:** Please refer to Attachment DR30-1.

### Data Request

31. Please provide a summary of stormwater quality sample results measurements, collected during the history of HPP. Please include specifics of the on-site sampling events and concentration of storm water contaminants.

**Response:** Table DR31-1, provides a summary of stormwater quality sample results for the HPP.

TABLE DR31-1  
HPP Stormwater Quality Sampling Results

Sample Date	Cond. (µmhos/cm)		Oil & Grease (mg/L)	pH (S.U.)		TSS (mg/L)	Fe (total) (mg/L)	Fe (diss.) (mg/L)
1/1/2006	168	<	3	8.2		10	—	—
3/25/2006	240	<	3	8.2	<	10	—	—
1/28/2007	1150		7	7.2		120	5.67	0.26
11/26/2008	1540		8	6.9		32	0.84	0.16

ATTACHMENT 23-1

# Summary of Water Use at the Existing HPP

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GWF Henrietta Combined Cycle Power Plant Project (01-AFC-18C)  
 Data Response Set 3  
 Data Response #23 - February 2009

### Henrietta Peaker Plant Historical Water Use Summary

2008	Operating hours			Estimated water usage rate <sup>1</sup>				
	Water Supply (gallons)	Unit A	Unit B	Total NMWH	SMEC (gpm)	SPRINT (gpm)	Nox control (gpm)	Total GPM
JAN	366,976	43.1	48.0	3,362	0	17.8	39.3	57.1
FEB	133,697	18.6	19.9	782	0	18.7	22.7	41.4
MAR	192,253	49.4	37.1	1,922	4.5	18.7	24.6	47.8
APR	93,031	18.5	20.9	1,595	4.5	19	42.9	66.4
MAY	89,153	3.5	8.0	235	9.1	19.5	22.9	51.5
JUN	757,771	55.0	58.3	4,528	13.6	19.6	42.4	75.6
JUL	301,903	48.7	46.0	3,376	13.6	19.6	38.1	71.3
AUG	556,361	50.8	51.9	3,879	13.6	19.6	40.1	73.3
SEP	805,834	76.8	74.7	6,200	13.6	19.6	43.3	76.5
OCT	1,013,794	108.3	109.4	9,075	9.1	19.4	44.1	72.6
NOV	668,455	73.0	75.2	6,373	4.5	18.4	45.4	68.3
DEC	555,775	75.4	80.3	6,739	0	17.9	45.7	63.6

**Total**      5,535,003      621      630      48,065  
**Combined Op hrs**      1,251

Notes

- 1) Estimated water usage per hour of operation is based on average ambient conditions using methods from GE. The individual flows are not metered. Actual water use for SMEC (cooling), SPRINT, and emissions control will depend on ambient conditions during the actual operation. For this reason the product of the total gpm and the operating hours may not equal the water supply used.
- 2) Estimated water use for turbine water wash is 4,000 gallons per year

GWF Henrietta Combined Cycle Power Plant Project (01-AFC-18C)  
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2007	Operating hours			Estimated water usage rate <sup>1</sup>				
	Water Supply (gallons)	Unit A	Unit B	Total NMWH	SMEC (gpm)	SPRINT (gpm)	Nox control (gpm)	Total GPM
JAN	285,610	18.1	16.5	1,230	-	17.8	37.9	55.7
FEB	17,107	5.0	5.1	309	-	18.7	33.1	51.8
MAR	168,466	19.4	21.8	1,390	5	18.7	36.2	59.4
APR	169,802	14.6	14.5	1,125	5	19.0	41.0	64.5
MAY	51,876	5.7	0.6	139	9	19.5	24.4	53.0
JUN	262,246	21.6	21.6	1,836	14	19.6	45.0	78.2
JUL	188,441	26.9	23.5	2,013	14	19.6	42.4	75.6
AUG	986,683	115.1	116.6	8,185	14	19.6	37.7	70.9
SEP	70,091	6.5	5.4	340	14	19.6	31.1	64.3
OCT	84,103	7.3	7.5	300	9	19.4	22.8	51.3
NOV	187,105	34.3	32.2	2,069	5	18.4	33.5	56.4
DEC	261,953	29.4	32.1	2,074	-	17.9	36.1	54.0
<b>Total</b>	2,733,483	304	297	21,011				
<b>Combined Op hrs</b>		601						

Notes

- 1) Estimated water usage per hour of operation is based on average ambient conditions using methods from GE. The individual flows are not metered. Actual water use for SMEC (cooling), SPRINT, and emissions control will depend on ambient conditions during the actual operation. For this reason the product of the total gpm and the operating hours may not equal the water supply used.
- 2) Estimated water use for turbine water wash is 4,000 gallons per year

GWF Henrietta Combined Cycle Power Plant Project (01-AFC-18C)  
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2006	Operating hours			Estimated water usage rate <sup>1</sup>				
	Water Supply (gallons)	Unit A	Unit B	Total NMWH	SMEC (gpm)	SPRINT (gpm)	Nox control (gpm)	Total GPM
JAN	52,267	4.7	4.8	338	0	17.8	38.0	55.8
FEB	1,499	0.0	0.0	-	0	0		0.0
MAR	0	0.0	0.0	-	0	0		0.0
APR	2,085	1.6	1.8	197	4.5	19	61.3	84.8
MAY	134,968	6.7	7.6	408	9.1	19.5	31.0	59.6
JUN	535,344	51.7	51.1	4,261	13.6	19.6	43.9	77.1
JUL	1,056,187	112.6	112.5	9,162	13.6	19.6	43.1	76.3
AUG	245,237	13.9	13.7	1,127	13.6	19.6	43.3	76.5
SEP	11,926	3.2	3.2	252	13.6	19.6	42.1	75.3
OCT	181,468	16.1	19.5	1,240	9.1	19.4	37.2	65.7
NOV	204,831	30.0	22.0	2,044	4.5	18.4	41.7	64.6
DEC	38,972	3.2	2.1	195	0	17.9	39.4	57.3
<b>Total</b>	2,464,784	243	238	19,223				
<b>Combined Op hrs</b>		482						

Notes

- 1) Estimated water usage per hour of operation is based on average ambient conditions using methods from GE. The individual flows are not metered. Actual water use for SMEC (cooling), SPRINT, and emissions control will depend on ambient conditions during the actual operation. For this reason the product of the total gpm and the operating hours may not equal the water supply used.
- 2) Estimated water use for turbine water wash is 4,000 gallons per year

ATTACHMENT DR24-1

# Water Quality Characteristics of the Recycled Water from the Lemoore Naval Air Station

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**Table 6-1  
Treatment Ponds Water Quality Sampling Results**

	Detection Limit	Units	Pump House					Pond A & B Effluent	Pond B Effluent	Typical Wastewater Characteristics <sup>(1)</sup>	
			5/5/98	6/26/98	6/26/98	8/4/98	8/5/98	8/5/98	11/16/02	Weak	Medium
<b>Field Measurements</b>											
Volume		gal				12	12	14			
pH		none				6.4	6.4	6.5			
Conductivity, @25oC		mS/cm				3.5	3.6	1.1	11.8		
Temperature		°C				26	28	29	14.7		
Color						Gray	Gray	Green			
Turbidity		NTU				5	1	15			
Dissolved Oxygen		ppm				1.4	8.2	2			
Odor						Yes	Yes	Slight	Slight		
Salinity		%				0.2	0.2	0.6			
<b>General Chemistry</b>											
Alkalinity as CaCO <sub>3</sub>	1.00	mg/L		124	124	142	130	288		50	100
Ammonia-N		mg/L	6.4	12.6	12.2		7.0	2.3	7.2	12	25
Biochemical Oxygen Demand (BOD <sub>5</sub> )		mg/L	25	101	45			<17	18	110	220
Chemical Oxygen Demand (COD)		mg/L	50	153	144		172	151		250	500
Chloride	1.80	mg/L		145	148		214	796	870		
MBAS		mg/L	0.6	4.77	4.4		1.64	<0.10			
Nitrate as N	0.02	mg/L		0.05 U	0.05 U		<0.05	<0.5		0	0
Nitrate as N	0.50	mg/L							ND		
Nitrite as N	0.02	mg/L		0.1 U	0.1 U		<0.1	<0.02		0	0
Oil and Grease		mg/L	ND	27	29		<10	<10		50	100
Orthophosphate, as P		mg/L	1.4	1.4	1.32		0.68	<50	0.48	3	5
Phosphate, PO <sub>4</sub>	0.30	mg/L							1.56	1	3
Sample Volume		ML		900	900	1,000	1,000				
Saline Content		mg/L	1450								
Settleable Solids		ML/L/H	ND	0.1 U	1.2	0.1	<0.1	<0.1		5	10
Sulfate		mg/L							4900		
Sulfide	0.30	mg/L		5.6	2 U		<2	<2			
Total Dissolved Solids		mg/L	1,600	1,400	1,370	2,340	2,480	7,550	8,300		
Specific Conductance (laboratory)	100.00	mS/cm							10,000		
Total Kjeldahl Nitrogen		mg/L		15.7	16.2		10.9	7.7	13	20	40
Total Organic Carbon (TOC)	0.10	mg/L	15	28.8	29.2	28.0	36.8	27.1	36	80	160
Total Solids		mg/L	0.17 (%)	1,470	1,570	2,510	2,640	8,700			
Total Suspended Solids		mg/L	110	99	70	41.0	40	59		100	220
Turbidity		NTU	4.1	24.6	25.9	19.0	21.4	52			
Total Coliform			1,600	>1,600	>1,600		>16,000	13,000		10 <sup>6</sup> - 10 <sup>7</sup>	10 <sup>7</sup> - 10 <sup>8</sup>
Fecal Coliform			900	>1,600	>1,600		>16,000	1,000			

ATTACHMENT DR26-1

**Westlands Water District 2009-2010  
Agricultural Water Allocation Agreement,  
Dated December 17, 2008**

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**WESTLANDS WATER DISTRICT**

**2009-2010 AGRICULTURAL WATER ALLOCATION APPLICATION AND PURCHASE AGREEMENT**

**This Agricultural Water Allocation Application and Purchase Agreement must be received by January 15, 2009, in the District's Fresno or Five Points Offices. Postmarks will not be accepted.**

GWP Energy LLC, herein referred to as "Water User," hereby applies for agricultural water for the March 2009 – February 2010 Water Year and agrees, as a condition of the allocation and furnishing of any agricultural water during that water year and in accordance with the District's Regulations, policies, and applicable agreements, as follows:

1. To accept, if and when provided by the District, the total amount of a) CVP contract water requested on the application form(s), b) the allocation of Long-Term Water acquired by the District, and c) the allocation of District Water Supply pursuant to the Agreement for Distribution of Water, Allocation of Costs, and Settlement of Claims dated April 29, 2002; and d) Water User's unused water rescheduled from a prior water year, unless Water User provides written notice to the District before the last day of the water year that Water User will not reschedule such water. Notwithstanding the foregoing, the District will not allocate or reschedule water to land for which water charges or assessments have been delinquent for 30 days or more at March 1.
2. To make all payments by the due dates specified in the District's Terms and Conditions for Agricultural Water Service.
3. Except as otherwise provided by the District, to remain liable to the District for any unused portion of the water unless the District is able to sell the water to another water user or the water has been transferred to another water user.
4. To comply with the Terms and Conditions for Agricultural Water Service and the Regulations for the Allocation of Agricultural Water, copies of which will be furnished upon request, both of which are incorporated herein as though set forth at length.
5. Allocation calculations will be based on irrigable acres as determined by U. S. Consolidated Farm Service Agency measurements.
6. The District will notify Water User as to the amounts of water allocated to him and maintain a record of the revisions, if any, of his allocated water supply.
7. Water User recognizes that, upon his application for agricultural water and the District's allocation of water to him, he is liable for all such water allocated to him except as otherwise provided by the District.
8. The District may use any funds held for the benefit of or on behalf of Water User to pay or offset any monetary obligation Water User has to the District.
9. Water User hereby further agrees that there are no intended third party beneficiaries to this Agreement and nothing contained herein, expressed or implied, is intended to give to any person, partnership, corporation, joint venture, limited liability company or other form of organization or association any right, remedy or claim under or pursuant hereto, and any agreement or covenant required herein to be performed by or on behalf of Water User or the District shall be for the sole and exclusive benefit of Water User or the District.

Dec 17, 2008  
Date

[Signature]  
Print Name

Vice-President  
Signature

\_\_\_\_\_  
Title

Westlands Water District

WWD511

2009-10 AGRICULTURAL WATER ALLOCATION  
APPLICATION AND PURCHASE AGREEMENT  
PRIORITY AREA 1

G W F ENERGY LLC  
ATTN TINA SANTOS  
4300 RAILROAD AVE  
PITTSBURG CA 94565-6006

PREPARED BY: D. W. Wheeler  
(Please Print)  
[Signature]  
(Signature)

ACCOUNT NO: 103768

TELEPHONE (925) 431-1443  
FAX (925) 431-0518

<u>LAND DESCRIPTION</u>	<u>FIELD #</u>	<u>CFSA ACRES</u>	<u>ACRE-FEET REQUESTED*</u>	<u>DISTRICT USE ONLY</u>
20 NW4 NW4 34 19 19	34 22	20	<u>52</u>	

TOTAL ACRES 20

TOTAL AMOUNT OF CENTRAL VALLEY  
PROJECT CONTRACT WATER REQUESTED 52 ACRE-FEET

\* PLEASE ENTER ACRE-FEET REQUESTED FOR EACH FIELD

ATTACHMENT DR26-2

**Westlands Water District 2007-2008  
Agricultural Water Allocation Agreement,  
Dated January 5, 2007**

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**WESTLANDS WATER DISTRICT**

**2007-2008 AGRICULTURAL WATER ALLOCATION APPLICATION AND PURCHASE AGREEMENT**

**This Agricultural Water Allocation Application and Purchase Agreement must be received by January 15, 2007, in the District's Fresno or Five Points Offices. Postmarks will not be accepted.**

SWF Energy, LLC herein referred to as "Water User," hereby applies for agricultural water for the March 2007 – February 2008 Water Year and agrees, as a condition of the allocation and furnishing of any agricultural water during that water year and in accordance with the District's Regulations, policies, and applicable agreements, as follows:

1. To accept, if and when provided by the District, the total amount of a) CVP contract water requested on the application form(s), b) the allocation of Long-Term Water acquired by the District, and c) the allocation of District Water Supply pursuant to the Agreement for Distribution of Water, Allocation of Costs, and Settlement of Claims dated April 29, 2002; and d) Water User's unused water rescheduled from a prior water year, unless Water User provides written notice to the District before the last day of the water year that Water User will not reschedule such water. Notwithstanding the foregoing, the District will not allocate or reschedule water to land for which water charges or assessments have been delinquent for 30 days or more at March 1.
2. To make all payments by the due dates specified in the District's Terms and Conditions for Agricultural Water Service.
3. Except as otherwise provided by the District, to remain liable to the District for any unused portion of the water unless the District is able to sell the water to another water user or the water has been transferred to another water user.
4. To comply with the Terms and Conditions for Agricultural Water Service and the Regulations for the Allocation of Agricultural Water, copies of which will be furnished upon request, both of which are incorporated herein as though set forth at length.
5. Allocation calculations will be based on irrigable acres as determined by U. S. Consolidated Farm Service Agency measurements.
6. The District will notify Water User as to the amounts of water allocated to him and maintain a record of the revisions, if any, of his allocated water supply.
7. Water User recognizes that, upon his application for agricultural water and the District's allocation of water to him, he is liable for all such water allocated to him except as otherwise provided by the District.
8. The District may use any funds held for the benefit of or on behalf of Water User to pay or offset any monetary obligation Water User has to the District.
9. Water User hereby further agrees that there are no intended third party beneficiaries to this Agreement and nothing contained herein, expressed or implied, is intended to give to any person, partnership, corporation, joint venture, limited liability company or other form of organization or association any right, remedy or claim under or pursuant hereto, and any agreement or covenant required herein to be performed by or on behalf of Water User or the District shall be for the sole and exclusive benefit of Water User or the District.

January 5, 2007  
Date

[Signature]  
Print Name

Signature

Vice-President  
Title



ATTACHMENT DR26-3

**Westlands Water District 2006-2007  
Agricultural Water Allocation Agreement,  
Dated January 10, 2006**

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**WESTLANDS WATER DISTRICT**

**2006-2007 AGRICULTURAL WATER ALLOCATION APPLICATION AND PURCHASE AGREEMENT**

This Agricultural Water Allocation Application and Purchase Agreement must be received by January 15, 2006, in the District's Fresno or Five Points Offices. Postmarks will not be accepted.

GloF Energy LLC, herein referred to as "Water User," hereby applies for agricultural water for the March 2006 – February 2007 Water Year and agrees, as a condition of the allocation and furnishing of any agricultural water during that water year and in accordance with the District's Regulations, policies, and applicable agreements, as follows:

1. To accept, if and when provided by the District, the total amount of a) CVP contract water requested on the application form(s), b) the allocation of Long-Term Water acquired by the District, and c) the allocation of District Water Supply pursuant to the Agreement for Distribution of Water, Allocation of Costs, and Settlement of Claims dated April 29, 2002; and d) Water User's unused water rescheduled from a prior water year, unless Water User provides written notice to the District before the last day of the water year that Water User will not reschedule such water. Notwithstanding the foregoing, the District will not allocate or reschedule water to land for which water charges or assessments have been delinquent for 30 days or more at March 1.
2. To make all payments by the due dates specified in the District's Terms and Conditions for Agricultural Water Service.
3. Except as otherwise provided by the District, to remain liable to the District for any unused portion of the water unless the District is able to sell the water to another water user or the water has been transferred to another water user.
4. To comply with the Terms and Conditions for Agricultural Water Service and the Regulations for the Allocation of Agricultural Water, copies of which will be furnished upon request, both of which are incorporated herein as though set forth at length.
5. Allocation calculations will be based on irrigable acres as determined by U. S. Consolidated Farm Service Agency measurements.
6. The District will notify Water User as to the amounts of water allocated to him and maintain a record of the revisions, if any, of his allocated water supply.
7. Water User recognizes that, upon his application for agricultural water and the District's allocation of water to him, he is liable for all such water allocated to him except as otherwise provided by the District.
8. The District may use any funds held for the benefit of or on behalf of Water User to pay or offset any monetary obligation Water User has to the District.
9. Water User hereby further agrees that there are no intended third party beneficiaries to this Agreement and nothing contained herein, expressed or implied, is intended to give to any person, partnership, corporation, joint venture, limited liability company or other form of organization or association any right, remedy or claim under or pursuant hereto, and any agreement or covenant required herein to be performed by or on behalf of Water User or the District shall be for the sole and exclusive benefit of Water User or the District.

January 10, 2006  
Date

[Signature]  
Print Name

Signature

Vice-President  
Title

2006 - 2007 AGRICULTURAL WATER ALLOCATION  
APPLICATION AND PURCHASE AGREEMENT  
PRIORITY AREA 1

G W F ENERGY LLC  
ATTN DOUG WHEELER  
4300 RAILROAD AVE  
PITTSBURG CA 94565-6006

PREPARED BY:

Dou. Wheeler  
(Please Print)  
[Signature]  
(Signature)

ACCOUNT NO: 103768

TELEPHONE ( 925 ) 431 - 1443  
FAX ( 925 ) 431 - 0518

<u>LAND DESCRIPTION</u>	<u>FIELD #</u>	<u>CFSA ACRES</u>	<u>ACRE-FEET REQUESTED *</u>	<u>DISTRICT USE ONLY</u>
20 NW4 NW4 34 19 19	34 22	20	<u>52</u>	

**TOTAL ACRES 20**

TOTAL AMOUNT OF CENTRAL VALLEY  
PROJECT CONTRACT WATER REQUESTED 52 ACRE-FEET

**\* PLEASE ENTER ACRE-FEET REQUESTED FOR EACH FIELD**

ATTACHMENT DR26-4

**Westlands Water District 2005-2006  
Agricultural Water Allocation Agreement,  
Dated January 25, 2005**

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WESTLANDS WATER DISTRICT

2005-2006 AGRICULTURAL WATER ALLOCATION APPLICATION AND PURCHASE AGREEMENT

This Agricultural Water Allocation Application and Purchase Agreement must be received by January 15, 2005, in the District's Fresno or Five Points Offices. Postmarks will not be accepted.

GWP Energy, LLC, herein referred to as "Water User," hereby applies for agricultural water for the March 2005 -- February 2006 Water Year and agrees, as a condition of the allocation and furnishing of any agricultural water during that water year and in accordance with the District's Regulations, policies, and applicable agreements, as follows:

1. To accept, if and when provided by the District, the total amount of a) CVP contract water requested on the application form(s), b) the allocation of Long-Term Water acquired by the District, and c) the allocation of District Water Supply pursuant to the Agreement for Distribution of Water, Allocation of Costs, and Settlement of Claims dated April 29, 2002; and d) Water User's unused water rescheduled from a prior water year, unless Water User provides written notice to the District before the last day of the water year that Water User will not reschedule such water. Notwithstanding the foregoing, the District will not allocate or reschedule water to land for which water charges or assessments have been delinquent for 30 days or more at March 1.
2. To make all payments by the due dates specified in the District's Terms and Conditions for Agricultural Water Service.
3. Except as otherwise provided by the District, to remain liable to the District for any unused portion of the water unless the District is able to sell the water to another water user or the water has been transferred to another water user.
4. To comply with the Terms and Conditions for Agricultural Water Service and the Regulations for the Allocation of Agricultural Water, copies of which will be furnished upon request, both of which are incorporated herein as though set forth at length.
5. Allocation calculations will be based on irrigable acres as determined by U. S. Consolidated Farm Service Agency measurements.
6. The District will notify Water User as to the amounts of water allocated to him and maintain a record of the revisions, if any, of his allocated water supply.
7. Water User recognizes that, upon his application for agricultural water and the District's allocation of water to him, he is liable for all such water allocated to him except as otherwise provided by the District.
8. The District may use any funds held for the benefit of or on behalf of Water User to pay or offset any monetary obligation Water User has to the District.
9. Water User hereby further agrees that there are no intended third party beneficiaries to this Agreement and nothing contained herein, expressed or implied, is intended to give to any person, partnership, corporation, joint venture, limited liability company or other form of organization or association any right, remedy or claim under or pursuant hereto, and any agreement or covenant required herein to be performed by or on behalf of Water User or the District shall be for the sole and exclusive benefit of Water User or the District.

January 26, 2005  
Date

D.W. Wheeler  
Print Name



Signature

Vice-President

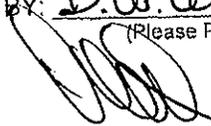
Title

2005-2006 AGRICULTURAL WATER ALLOCATION

APPLICATION AND PURCHASE AGREEMENT

Priority Area 1

WATER USER: GWF Energy LLC  
ADDRESS: 4300 Railroad Ave.  
Pittsburg, CA 94565

PREPARED BY: D.W. Wheeler  
(Please Print)  
  
(Signature)

TELEPHONE: (925) 431-1443

ACCOUNT NO: 103768

FAX: 925 431-0518

LAND DESCRIPTION	FIELD NO.	CFSA ACRES	ACRE-FEET REQUESTED*	DISTRICT USE ONLY
<u>NW43A 1919</u>		<u>20</u>	<u>52</u>	

TOTAL ACRES: 20

TOTAL AMOUNT OF CENTRAL VALLEY PROJECT CONTRACT WATER REQUESTED 52 ACRE-FEET

\*PLEASE ENTER ACRE-FEET REQUESTED FOR EACH FIELD

PLEASE SIGN AGREEMENT ON THE REVERSE

ATTACHMENT DR26-5

# Westlands Water District Terms and Conditions for Agricultural Water Service

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## WESTLANDS WATER DISTRICT

OFFICE--3130 N. FRESNO STREET/MAILING-P. O. BOX 6056, FRESNO, CA 93703  
TELEPHONE: WATER ORDERS (559) 241-6250/OTHER (559) 224-1523/FAX (559) 241-6276

### TERMS AND CONDITIONS FOR AGRICULTURAL WATER SERVICE

1. The allocation and furnishing of water shall be subject to all regulations of the Board of Directors of the District as the same may exist now or hereafter be amended or adopted. In the event of a conflict between these terms and conditions and the regulations, the latter shall be controlling.
2. All water shall be delivered pursuant to a request by the water user for the delivery of a specific flow rate to a specific parcel of land. The request shall be made within the time and in the manner prescribed by the General Manager.
3. Water will be furnished by the District subject to the terms and conditions under which it is made available to the District including, but not limited to, the requirements of federal Reclamation law. The District will use its best efforts, to the extent that it has water and capacity available and taking into account the requirements of other water users to receive water from District facilities, to provide such water in the manner and at the times requested. The District may temporarily discontinue water service or reduce the amount of water to be furnished for investigation, inspection, maintenance, repair, or replacement of any of the District's facilities. The District will give the water user notice in advance of such temporary discontinuance or reduction, except in case of emergency, in which event no notice need be given. In the event the District issues a notice to discontinue or curtail water use, and District facilities are required to be re-filled because the water user fails to discontinue or curtail such use within the prescribed time, the water user shall pay an administrative charge established by the Board of Directors for each point of delivery in violation. No liability shall accrue against the District or any of its officers, directors, or employees for damage, direct or indirect, because of the failure to provide water as a result of system malfunctions, interruptions in service necessary to properly operate and maintain the water distribution system, or other similar causes which are beyond the District's reasonable control.
4. By taking delivery of water from the District, the water user assumes responsibility for, and agrees to hold the District harmless from, all damage or claims for damage which may arise from his use of the water after it leaves the District's facilities. The water user further agrees that there are no intended third party beneficiaries established and nothing contained herein, expressed or implied, is intended to give to any person, partnership, corporation, joint venture, limited liability company or other form of organization or association any right, remedy or claim under or pursuant hereto, and any agreement or covenant required herein to be performed by or on behalf of the water user or the District shall be for the sole and exclusive benefit of the water user or the District.
5. The water furnished by the District is not in a potable state and the District does not warrant the quality or potability of water so furnished. By taking delivery of water from the District, the water user assumes responsibility for, and agrees to hold the District harmless from, damage or claims for damage arising out of the non-potability of water furnished by the District.
6. All water will be measured by the District with meters installed, maintained, and calibrated by it and such measurements shall be final and conclusive.
7. Charges for agricultural water, hereinafter referred to as "water charges," shall be established by the Board of Directors. The water charges shall include District operation and maintenance costs and any other costs determined by the Board to be payable as part of the water charges. The water charges

shall also include the applicable water rates required pursuant to the Reclamation Reform Act of 1982, the Central Valley Project Improvement Act of 1992, and the Judgment in Barcellos and Wolfsen, Inc., et al. v. Westlands Water District, et al., and Westlands Water District, et al. v. United States, et al., U.S. District Court, Eastern District of California, Nos. CV-79-106-EDP and CV-F-81-245-EDP, respectively. Water charges shall be adjusted retroactively to the extent required and authorized by federal or state law or regulations or District regulations. The General Manager may adjust the water charges as necessary and legally authorized to account for increases or decreases in the estimates used to establish the water charges.

8. Payments for water service shall be due on the 25<sup>th</sup> of each month or 15 calendar days after the date on which the monthly bill for such service is mailed, whichever is later. Payment for the "Water Allocation" component of the District's annual repayment obligation to the United States shall be due on July 25. Notwithstanding the foregoing, for those water users who are subject to advance payment, payment for water service shall be due on the 25<sup>th</sup> day of the month preceding the use of water; provided, that for water allocated prior to July 31, the due date shall be deferred to the earlier of the first day of water use or the 25<sup>th</sup> day of August; provided further, that in lieu of advance payment, the District, at its option, may accept in a form satisfactory to the General Manager a written guarantee from a recognized financial lending institution or an assignment of any and all charges to land in the District owned by the water user. When any deadline established herein falls on a Saturday, Sunday, or holiday, it shall be extended to the next working day. Payments postmarked on or before the due date shall be deemed to have been received by the due date. Charges not paid by the applicable due date shall be delinquent.

9. All payments shall be made at the District's Fresno Office.

10. Advance payment shall be required for the acquisition costs of water transferred into the District from other agencies, pump-in water, or any allocation resulting from the District being able to obtain other water, prior to the allocation of such water to water users. The advance payment will be due by a date to be established by the General Manager. Conveyance-related costs for such water will be billed to water users upon water use.

11. All claims for overcharges or errors must be made in writing and filed with the District at its Fresno Office within 10 working days after the date the bill is received by the water user or landowner. In the event the water user or landowner files a timely written protest, the District's Finance & Administration Committee shall consider the protest at its next regular meeting and notify the water user or landowner in writing of its decision. The Committee's decision shall be final, unless a written appeal to the Board of Directors is filed with the Secretary of the District within 15 working days after notice of the decision. In the event of an appeal, the decision of the Board shall be final. The filing of a protest or an appeal does not nullify the payment requirement or the District's right to discontinue water service as provided in these terms and conditions. However, in the event the protest or appeal is sustained, the District will refund the amount of the overcharge and penalty, if any.

12. During any 12-month period, the penalty for a water user's first delinquent payment shall be 2 percent of the delinquent charges, except as described hereinafter. The second delinquency shall be 5 percent and the penalty for a water user's third and any subsequent delinquency shall be 10 percent, on current charges due, excluding any penalties or interest imposed on delinquent charges from a prior month. The 2 percent penalty shall not be levied with respect to a water user's first delinquency in any 12-month period if the delinquent payment is received by the District on or before the last working day of the month, but the delinquency shall continue to be the water user's first delinquency for purposes of this paragraph. Delinquent charges shall bear interest at a monthly rate of 1½ percent. Interest shall not, however, accrue after the delinquent charges together with applicable penalties and interest have been added to, and become a part of, the annual assessment levied on the land by the District. All payments and credits shall be applied to the earliest delinquent charges.

13. At the time of filing the District's assessment book with the District Tax Collector, delinquent charges, together with applicable penalties and interest, may be added to and become part of the assessment levied by the District on the land which received the water or for which other charges were incurred. If the water was not furnished, the applicable delinquent charges may be added to the land to which the water was allocated. The District shall notify the landowner of the anticipated amount(s) prior to adding the assessment. The added amount shall be a lien on the land and impart notice thereof to all persons. If the assessment becomes delinquent, penalties and interest will be added as provided by law.

14. To supplement the procedure described in Paragraph 13, the District may elect to file and record a Certificate of Unpaid Water Charges as provided in California Water Code Section 36729. This Certificate creates a lien in the amount of delinquent charges on any land owned by the delinquent water user, or acquired by the water user before the lien's expiration, within the recording County.

15. Agricultural water service shall not be provided to, nor shall a transfer of water be permitted to or from, any water user or parcel of land for which there are delinquent charges or assessments, regardless of the source of the water user's or parcel of land's obligation to the District or the nature of the District's service for which the charges were imposed, and notwithstanding the fact that the delinquent charges, including applicable penalties and interest, have been added to the assessment(s) on the parcel(s) for which they were incurred. Water service shall be discontinued on the 1<sup>st</sup> of the month following that in which charges or assessments become delinquent, or as soon thereafter as reasonably possible; provided, that when the 1st of the month falls on a Saturday, Sunday, or holiday, such service shall be discontinued on the next working day.

16. The General Manager may require that all current charges be paid before the transfer of remaining water will be allowed.

17. If a water user's delinquent charges are delinquent for 30 days or more, or if a water user's delinquent charges are added to the annual assessments on any lands within the District, or the procedure in paragraph 14 is implemented, the General Manager shall require, as a condition of resumption of water service, that advance payment of all water charges be made for the 12-month period immediately following resumption of service, according to a schedule to be determined by the General Manager. In lieu of advance payment, the District, at its option, may accept in a form satisfactory to the General Manager a written guarantee from a recognized financial lending institution.

18. The General Manager, after consultation with and approval by the Finance & Administration Committee, may also require advance payment and/or payment by cashier's check or such other actions as he may deem necessary when a water user's account is determined, based on the payment history or other actions of the water user, to create a financial risk or hardship for the District. Circumstances which constitute the basis for such a determination include but are not limited to the following: (1) instances of a water user's checks being returned unpaid or (2) instances where a water user whose account is delinquent has, in violation of District regulations, taken water from a District delivery. In lieu of advance payment, the District, at its option, may accept in a form satisfactory to the General Manager a written guarantee from a recognized financial lending institution.

19. As used in these terms and conditions, the term "charges" includes water charges, land-based charges and payments due the District under any lease or other agreement between the District and the water user.

20. Agricultural water service shall not be provided to any water user who has failed to file, or to any lands for which there has not been filed, the certification or reporting forms required pursuant to Reclamation law, and particularly the Reclamation Reform Act of 1982. Any water delivered in violation of this provision may be subject to charges and administrative fees pursuant to federal law or regulation.

21. Agricultural water service shall not be provided to any water user who fails to provide the District with crop information at the time(s) and in the form required by the General Manager.

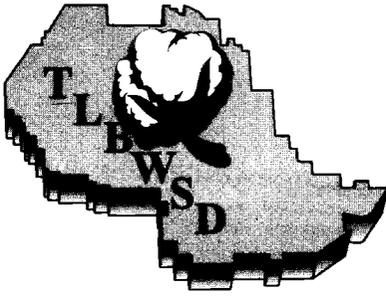
22. By applying for or taking delivery of agricultural water from the District, the water user agrees to these terms and conditions of service.

23. The District may modify or terminate these terms and conditions; provided, that such modifications or terminations are prospective only and notice thereof is given prior to the effective date.

ATTACHMENT DR26-6

# TLBWSD Water Entitlement

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# TULARE LAKE BASIN WATER STORAGE DISTRICT

ESTABLISHED SEPTEMBER 1926

1001 CHASE AVENUE, CORCORAN, CALIFORNIA 93212

PHONE (559) 992-4127 • FAX (559) 992-3891

February 12, 2009

Mr. Doug Wheeler  
GWF Power Systems  
4300 Railroad Ave.  
Pittsburg, CA 94565-6006

Dear Doug:

The Tulare Lake Basin Water Storage District ("District") was formed in 1926 pursuant to California Water Storage District Law (Division 14 of the California Water Code) and is a political subdivision of the State of California. To provide a more dependable surface water supply for lands within the District and reduce reliance on groundwater, a contract for State Project Water was entered into with the Department of Water Resources in 1963. The Contract provides for delivery of the District's annual entitlement and waters in excess of entitlement, when available. The District's current maximum annual entitlement is 95,922 acre feet.

Pursuant to the State Water Service Contract, GWF has contracted for 202 acre-feet of State Project Water Table A Entitlement. Enclosed is a summary reflecting the District's Landowner Table A amounts.

Please contact me if you have any questions.

Sincerely,

Mark Gilkey  
General Manager

Enclosure

## Tulare Lake Basin Water Storage District 2008 Water Supply Summaries

All Data In Acre Feet  
preliminary subject to revision

Water Users	TLB	TLB	TLB	Kings County	Kings County	Kings County	TLB	TLB	TLB
	Table A Ent. Water Allocation Acreage	Table A Ent. Water Allocation Contract Percentage	Table A Ent. Water Allocation Entitlement Allocation	Table A Ent. Water Allocation Contract Acreage	Table A Ent. Water Allocation Contract Percentage	Table A Ent. Water Allocation Entitlement Allocation	Yuba Dry Year Water Allocation Acreage	Yuba Dry Year Water Allocation Contract Percentage	Yuba Dry Year Water Allocation Entitlement Allocation
(1)									
1 JG Boswell Company	102,404.01	68.5077459%	65,714	102,404.01	69.5990171%	2,645	102,404.01	69.2399465%	974
2 Gilkey Farms, Inc.	1,178.83	0.7881404%	756	1,178.83	0.8006948%	30	-	0%	-
3 Hansen Ranches	9,176.46	6.1393632%	5,889	9,176.46	6.2371582%	237	9,176.46	6.2046214%	87
4 Westlake Farms, Inc.	24,791.64	16.5853506%	15,909	24,791.64	16.8495414%	640	24,791.64	16.7627329%	236
5 John N. Howe	235.93	0.1574196%	151	235.93	0.1599271%	6	-	0%	-
6 McCarthy Family Farms	195.82	0.1313567%	126	195.82	0.1334491%	5	2,319.82	1.5685642%	22
7 Newton Bros.	3,092.65	2.0693897%	1,985	3,092.65	2.1023534%	80	3,092.65	2.0910994%	30
8 Morris Proctor	20.00	0.0135527%	13	20.00	0.0137686%	1	-	0%	-
9 Sandridge Partners	5,377.77	3.5977148%	3,451	5,377.77	3.6550234%	139	4,627.23	3.1289311%	44
10 Tejon Ranch	2,029.30	1.3573528%	1,302	-	0%	-	-	0%	-
11 GWF Power Systems	314.70	0.2105878%	202	-	0%	-	-	0%	-
12 Carlo J. Wilcox	640.00	0.4284731%	411	640.00	0.4352984%	17	640.00	0.4327328%	6
13 John F. Valov	15.00	0.0104251%	10	15.00	0.0105912%	-	-	0%	-
14 White Ranch Land Company	4.51	0.0031275%	3	4.51	0.0031774%	-	204.51	0.1382806%	2
15 Bill Sexton (Sandridge Agent)							640.54	0.4330910%	6
16									-
<b>Total</b>	149,476.62			147,132.62			147,896.86		
Non Participating Lands				2,344.00			1,579.76		
Uncontracted Lands	187.38			187.38			187.38		
Lands w/ SPW Not Avail.	35,228.80			35,228.80			35,228.80		
<b>Total Assessed Acreage</b>	184,892.80	100.0000000%	95,922	184,892.80	100.0000000%	3,800	184,892.80	100.0000000%	1,407

ATTACHMENT DR29-1

# Preliminary Draft DESCOP for GWF Henrietta

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# Drainage, Erosion, and Sedimentation Control Plan for the GWF Henrietta Project

Prepared for  
**GWF Energy LLC**

February 2009

**CH2MHILL**  
2485 Natomas Park Drive  
Suite 600  
Sacramento, CA 95833

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# **Drainage, Erosion, and Sedimentation Control Plan for the GWF Henrietta Project**

Submitted to

**GWF Energy LLC**

February 2009

**CH2MHILL**

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## Figures (all figures are provided at the end of this document)

1	Location Map
2	Vicinity Map
3	Detailed Site Plan
4	Surface Water and Geology in the Area Surrounding GWF Henrietta
5	Grading and Drainage - Sheet 1
6	Grading and Drainage - Sheet 2

## Appendix

A	Post-construction Retention Pond Calculations
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# GWF Henrietta Project Drainage, Erosion, and Sedimentation Control Plan

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GWF Energy LLC (GWF) is proposing to modify the existing Henrietta Peaker Project (HPP) nominal 95-megawatt (MW) simple-cycle power plant by converting the facility into a combined-cycle power plant with a nominal 25 MW (net) of additional generating capacity. The modifications to the facility will be referred to hereinafter as GWF Henrietta Combined-Cycle Power Plant (GWF Henrietta) with a new nominal generating capacity for this site of 120 MW net. The project will tie into existing electric, gas, and water supply lines currently servicing the existing HPP and, therefore, does not involve any linear facilities. The GWF Henrietta facility will be constructed, owned, and operated by GWF.

GWF has prepared this Drainage, Erosion and Sedimentation Control Plan (DESCP) for the GWF Henrietta project to demonstrate that construction activities associated with the project will not result in an increase in offsite flooding potential or sedimentation and that the project will meet all local, state, and federal regulatory requirements associated with the protection of water quality and soil resources. The DESCP includes the following elements:

- A vicinity map showing the location of all project elements with depictions of all significant geographic features
- A site delineation that includes the boundary lines of all construction areas and the location of existing and proposed structures, pipelines, roads, and drainage facilities
- Site maps showing existing/proposed drainage systems
- A description of the drainage measures to be taken to protect the site and downstream facilities, including a discussion of compliance with the Regional Water Quality Control Board (RWQCB) discharge order
- A delineation of all areas to be cleared of vegetation
- Identification of the quantities of material excavated or filled for the site and all project elements, including those materials removed from the site due to contamination
- An illustration of existing topography and site-specific Best Management Practices (BMPs) to be implemented during construction, as well as a schedule of the timing and implementation of erosion and sediment control measures

## A. Vicinity Map

GWF Henrietta is located in unincorporated Kings County approximately 10 miles southwest of the City of Lemoore, near the Lemoore Naval Air Station, on a 20-acre parcel (APN 024-190-070) owned by GWF adjacent to the existing PG&E 70-kV Henrietta Substation (Figure 1). GWF Henrietta will permanently disturb 2.86 acres immediately east of the existing HPP fence line, expanding the total fenced area from 7.0 to 9.86 acres (Figure

2). GWF Henrietta is located at an elevation of 225 feet above mean sea level on the essentially flat floor of the San Joaquin Valley. GWF Henrietta will be located adjacent to property already in use for energy generation. Primary access to GWF Henrietta will be from 25<sup>th</sup> Avenue. Temporary disturbance of approximately 4.52 acres for construction laydown and parking will occur on land that is outside of the existing plant fence line (Figure 2).

## B. Site Delineation

Figure 3 shows the detailed site plan for the GWF Henrietta project.

The GWF Henrietta project includes the installation of new once-through steam generators (OTSGs) to allow the plant to be operated either in its current simple-cycle configuration with no steam generation or as a combined-cycle power plant. Since GWF Henrietta's interconnections to electrical transmission, natural gas, water supply, and sewer will occur through existing connections within the HPP site, there will not be any offsite linear connections as part of the project.

Major components and features of the GWF Henrietta project relevant to this document include:

- Addition of two new OTSGs, each will be vertical flow boilers with rectangular stacks that will be 91.5 feet tall, by 13 feet wide, by 8.9 feet long
- Demolition and removal of the two existing oxidation catalyst and SCR systems, including the existing 85-foot stacks
- Addition of a new 74-foot tall by 120-foot long by 84-foot wide Air Cooled Condenser (ACC) for system heat rejection
- The addition of a new auxiliary boiler with an approximate overall height of 20 feet (the stack will be approximately 4 feet in diameter and 30 feet in height)
- Onsite modifications to the water piping, fire protection, and the stormwater drainage collection systems.
- Replacement of the existing HPP stormwater retention pond for stormwater management with a new pond that is larger than the existing pond by approximately 2,200 cubic yards and relocated to the east side of the site expanding the existing fence line
- Addition of a new water treatment building to house required equipment for boiler feed water makeup water
- Addition of a generator step-up transformer and circuit breaker into the existing onsite 70-kV switchyard to transmit the STG power output to the PG&E grid
- Temporary disturbance of 4.52 acres for construction laydown and parking
- 2.86 acres of permanent disturbance associated with the ACC, OTSGs, STG package, and stormwater pond relocation would expand the 7-acre site to a total of 9.86 acres

Construction of GWF Henrietta, from site preparation and grading to commercial operation, is expected to take place from February 2011 to April 2012, for a total duration of 15 months of actual construction. Construction access to GWF Henrietta generally will be from 25<sup>th</sup> Avenue. Materials and equipment will be delivered by truck. Water will be used for fugitive dust control during construction. The maximum daily use is expected to be approximately 6,000 gallons and the daily average is estimated at approximately 1,000 gallons.

A total of approximately 4.52 acres will be used for onsite construction laydown and parking. The first area, located along the south side of GWF Henrietta will accommodate construction parking. This area was previously disturbed when it was used for construction parking and laydown during the construction of the HPP. The second area, located to the northeast of the project site, will be used for construction laydown. This area was also previously disturbed; in part by HPP related construction activities and part by intensive agricultural use.

Wastewater produced by GWF Henrietta will be reclaimed and returned to the common raw water tank by a waste recovery system or it will be hauled offsite for recycle or disposal. Wastewater that is generated as a result of the demineralized water reverse osmosis system will be reclaimed and returned to the common raw water tank by a waste recovery system. Water retained in the oil holding tank associated with the oil/water separator as well as collected turbine wash water will be hauled offsite for final disposal. GWF Henrietta will not discharge water from plant operations; hence no water discharges will be released to surface waters or to the surrounding ground surface.

Natural gas will continue to be delivered to the site via an existing pipeline and pressurized onsite. GWF Henrietta's new steam turbine generator will be connected to an individual, dedicated, three-phase step-up transformer, which will be connected to the existing HPP's 70-kV switchyard. From the switchyard, the generated power will be transmitted into the PG&E substation adjacent to the facility.

## C. Watercourses and Critical Areas

The GWF Henrietta site is located in the San Joaquin Valley, which is a Mediterranean-subtropical region with mild winters and dry summers. The GWF Henrietta site is relatively flat with a minimal slope toward the southeast. The majority of rainfall occurs between November and April. The average annual rainfall is 8.18 inches (Western Regional Climate Center website, 2001). The rainfall for a 100-year 24-hour event is 2.5 inches and 1.5 inches for a 6-hour event; a 10-year 24-hour event is 1.5 inches and 1.1 inches for a 6-hour event (NOAA Atlas 2).

Soil resource information was obtained from a soil survey of Kings County published by the U.S. Department of Agriculture Soil Conservation Service (Arroues and Anderson, 1986). Project soil types in the area of the new project features are listed in Table 1.

TABLE 1  
Soil Mapping Unit Identified by Project Component

Project Component	Soil Mapping Unit	Soil Profile
GWF Henrietta Project Site	139 – Lethent clay loam: Very deep, saline-alkali, moderately well drained. Formed on alluvium derived dominantly from sedimentary rock.	Pale brown clay loam: 0 to 6 inches; Light brownish gray clay: 6 to 24 inches; Brownish gray clay loam: 24 to 31 inches; light yellowish brown sandy loam: 31 to 60 inches.
Construction Parking and Laydown	139 – Lethent clay loam: Very deep, saline-alkali, moderately well drained. Formed on alluvium derived dominantly from sedimentary rock.	Pale brown clay loam: 0 to 6 inches; Light brownish gray clay: 6 to 24 inches; Brownish gray clay loam: 24 to 31 inches; light yellowish brown sandy loam: 31 to 60 inches.

Source: Excerpted from Table 8.9-2 Characteristics of Soil Types in the Immediate Vicinity of the HPP (GWF, 2001a).

The GWF Henrietta site is devoid of natural vegetation or natural communities. The portion of the project site that falls within the existing HPP fence line is graded and covered with concrete foundations, crushed rock and a paved plant access road. There are two areas designated for construction parking and laydown use. The smaller of these two areas is located adjacent to the existing HPP, on the south side of the site, and will be used for construction parking. This area is generally flat, has been previously graded, has been altered by past and current industrial use, and supports only weedy annuals. This area was also used for construction laydown and parking during the construction of the HPP. The second, larger area will be used for construction laydown and is also located adjacent to the existing HPP, but on the northeast side of the site. This area is generally flat and has been previously graded, and the majority of the area is dominated by intensively managed agricultural activities.

Reconnaissance-level wildlife and floristic surveys of the proposed GWF Henrietta site were conducted on April 26, 2007. During the 2007 field effort, the entire site was surveyed on foot and a list of observed plant and wildlife species was compiled. Habitat areas within a one-mile radius of the site were assessed for their potential to support special-status wildlife. Based on the reconnaissance survey performed in April 2007, it was determined that suitable habitat for these plants is not available on the project site (or within a one-mile radius). No special-status plant species were observed in the project area during field reconnaissance for the GWF Henrietta, either within the power plant location or in the construction parking and laydown areas.

Crescent Ditch, which is parallel to the Avenal Cutoff Road on its southeast side, is approximately 0.7 miles to the southeast of the project site and carries water intermittently, depending on the season (Figure 4). A series of sewage treatment system detention basins, approximately 275 acres in extent, are located approximately 0.5 miles east of the project site and contain water year-round (Figure 4). These ponds are owned and operated by NAS Lemoore and serve to dispose of effluent from the NAS Lemoore sewage treatment plant located on the base. The water in these ponds is not allowed to flow into the watershed drainage network.

## D. Drainage Map

Figures 5 and 6 show the grading and drainage plans for the GWF Henrietta project.

## E. Drainage Narrative

The stormwater management system was designed in accordance with the EPA's guidance document entitled "Storm Water Management for Construction Activities – Developing Pollution Prevention Plans and Best Management Practices" (EPA 832-R-92-005, September 1992) and the California Storm Water Best Management Practices Handbook.

Under the National Pollutant Discharge Elimination System (NPDES) *General Permits for Storm Water Discharges from Construction Sites*, it is necessary to estimate the runoff coefficient of the site before and after construction is complete. For the GWF Henrietta project, calculations were prepared for the new retention pond (Appendix A). The calculations determined the retention pond volume necessary to accommodate runoff from the entire site (approximately 9.9 acres) – including the GWF Henrietta facility – in the case of a 10-day, 100 year storm. In this scenario, the existing pond volume approximates the pre-construction runoff volume for the site<sup>1</sup> and the required volume for the new pond represents the post-construction runoff volume. The runoff calculations used to support the sizing of the onsite retention pond were based on the Rational Method (as set forth in the Kings County Department of Public Works Improvement Standards). The Rational Method is expressed by equations and tables using the known runoff coefficient, average rainfall intensity, and drainage area.

Relevant sections of Appendix A include:

- Runoff Coefficient Calculations
- Volume Required
- Pond Volume Calculations

A summary of the calculations is presented in Table 2.

TABLE 2  
Summary of Retention Pond Improvement Calculations

Site Area	9.9 acres
Volume needed for runoff	215,622 ft <sup>3</sup>
Existing Pond Volume	187,428 ft <sup>3</sup>
Proposed Pond Volume	222,278 ft <sup>3</sup>

ft<sup>3</sup> = cubic feet

The existing GWF Henrietta site is devoid of natural vegetation or natural communities and is graded and covered with concrete foundations, crushed rock and a paved plant access road. During construction, approximately 2.86 acres of land associated with the GWF

<sup>1</sup> This assumes that the existing retention pond was sized to accommodate the maximum runoff flows of the existing facilities – including the GWF Henrietta project site in its existing condition – thus representing an approximate pre-construction runoff volume for the site.

Henrietta project will be re-graded. After the project site has been re-graded, compacted, drainage systems installed, and covered with concrete or gravel, there will be little remaining potential for natural erosion. Therefore, the disturbed area will not be returned to a landscaped, vegetated state after construction.

The GWF Henrietta site will be graded to ensure that all noncontact stormwater runoff is collected and drained to the new onsite stormwater detention pond. The existing HPP stormwater retention pond will be relocated and resized to accommodate GWF Henrietta. The new pond will be expanded by approximately 2,200 cubic yards and relocated to the east side of the site. GWF Henrietta will create an additional 2.86 acres of permanent disturbance due to the necessary relocation of the stormwater retention pond. The drainage systems for GWF Henrietta have been designed to accommodate the stormwater flow resulting from a 10-day, 100 year storm and can accommodate the small increase in stormwater flow from GWF Henrietta.

Contact stormwater runoff (from equipment areas on the site) will be controlled and contained within the GWF Henrietta site. This runoff will be confined within the site and routed to an oil-water separator. The water from the oil-water separator will be recycled onsite or disposed of offsite. Any oil separated from the oil-water separator will be diverted to a waste oil tank and periodically disposed of offsite.

## F. Clearing and Grading Plans

Figures 5 and 6 show the grading and drainage plans for the GWF Henrietta project.

## G. Clearing and Grading Narrative

The information provided in this section is preliminary and will be updated and expanded upon once the information is available. Once the project design is finalized and prior to any soil disturbance, GWF will update this DESC and the SWPPP to reflect design changes.

Construction of GWF Henrietta is expected to take place from February 2011 through April 2012, for a total duration of 15 months of construction. Construction will be scheduled between 6 a.m. and 6 p.m., Monday through Saturday. Additional hours may be necessary to make up schedule deficiencies or to complete critical construction activities. During the start-up phase of the project, some activities will continue 24 hours a day, seven days a week. Access to GWF Henrietta will be from 25<sup>th</sup> Avenue. It is anticipated that materials and equipment will be delivered to the site by truck. Major milestones are listed in Table 3.

TABLE 3  
GWF Henrietta Major Construction Milestones

Activity	Date
Contractor Mobilization	Month 1
Site Preparation	Month 1
SCR Demolition	Month 1 - 2
Underground Piping	Month 2 - 5

TABLE 3  
GWF Henrietta Major Construction Milestones

Activity	Date
Foundations	Month 2 - 7
Tank	Month 6 - 7
Pipe Rack	Month 6 - 10
Air Cooled Condenser	Month 8 - 12
Pipe	Month 7 - 12
Once Through Steam Generator	Month 9 - 11
Steam Turbine and Generator	Month 8 - 13
STG Enclosure	Month 12 - 13
Mechanical Equipment	Month 7 - 13
Electrical Equipment	Month 7 - 15
Substation	Month 8 - 11
Start-up and Commissioning	Month 13 - 15
Contractor De-mobilization	Month 15

The Construction Contractor will perform clearing and grubbing of the construction areas using scrapers or the equivalent. Areas cleared and grubbed will be smoothed by earthwork equipment, possibly a grader or similar piece of equipment, and compacted by vibrating rollers. Concrete, mechanical and electrical works will be performed over a period of 15 months, with the aid of graders, rollers, front loaders, dump trucks, trenching machines, concrete mixer and pump trucks, cranes, and pick-ups. Table 4 outlines the amount of cut and fill planned for specific components of the project.

TABLE 4  
Clearing and Grading

Description	Stockpile (yd <sup>3</sup> )	Total Cut (yd <sup>3</sup> )	Total Fill (yd <sup>3</sup> )
To be determined			
Total			

yd<sup>3</sup> = cubic yards

The following subsections provide a discussion of clearing and grading associated with each of the major construction elements of the project.

### **GWF Henrietta Site**

Earthwork will consist of removal of topsoil, vegetation, and debris; excavation and compaction of earth to create the plant grade; and excavation for foundations and underground systems. Soil disturbing activities will include grubbing and clearing, rough grading, excavating, filling, and final grading. Grading for GWF Henrietta will be designed to ensure that stormwater runoff during operations and maintenance is confined within the site and drained to the new stormwater retention pond located on the east side of the project site. For all areas where earthwork will be executed, materials suitable for compaction will be stockpiled in designated onsite locations. Cut from the retention pond relocation will be retained onsite and incorporated into filling the existing pond and final facility grading. Materials not suitable for compaction will be stored in separate stockpiles and reused on the site, as appropriate. Any contaminated materials encountered during excavation will be disposed of in accordance with applicable laws, ordinances, regulations, and standards.

### **Construction Laydown and Parking Areas**

A total of approximately 4.52 acres will be used for onsite construction laydown and parking. The first area, located along the south side of GWF Henrietta will accommodate construction parking. The second area, located to the northeast of the project site, will be used for construction laydown. The construction laydown and parking areas may be graded and covered in gravel.

## **H. Best Management Practices**

Discussed below in the narrative is a list and description of all potential BMPs to be used on the site during construction activities. BMP maps shall be provided once the SWPPP is complete. As part of the SWPPP, a current version of the BMP drawings are maintained in the project construction trailer and updated regularly to reflect modified or new BMPs that are being implemented and maintained onsite.

## **I. Best Management Practices Narrative**

A preliminary project construction schedule is provided in Table 5 (upon completion of final design engineering and prior to construction, a refined schedule of constructions activities will be included in the DESCP). An implementation and maintenance schedule for the drainage, erosion, and sediment control methods and practices that will be implemented at the GWF Henrietta site are included in Table 6.

TABLE 5  
Key Construction Events

Event Description	Expected Dates
Date of Certification by CEC	TBD
Start of Rainy Season	October 15 (Typical) <i>Project site and linears must have SWPPP protection measures implemented prior to first rain and these measures must remain in effect for years 2010 through 2012.</i>
End of Rainy Season	May 1 (Typical)
Clearing and Grubbing	Second quarter 2010
Rough Grading	Second quarter 2010
Construction of Storm Drain Improvements	Third quarter 2010
Final Grade	Fourth quarter 2011
Building Construction	Second quarter 2010
Paving	Third quarter 2011
Completion of Construction	Fourth Quarter 2011
Start of Operation	First Quarter 2012

TABLE 6  
BMP Implementation and Maintenance Schedule

Best Management Practices	Implementation	Inspection Frequency	Maintenance
Silt Fence	Two weeks prior to construction	Inspect before and after storm events (and once each 24-hour period during extended storm events), once a week during rainy season, and bi-weekly during dry season	Replace torn sections, repair up-rooted sections, clean out collected soils when greater the 1/3 height of fence
Straw Wattle Dikes	Two weeks prior to construction	Inspect before and after storm events (and once each 24-hour period during extended storm events), once a week during rainy season, and bi-weekly during dry season	Replace crushed sections, replace rotted sections, clean out collected soil when greater than 1/3 height of roll
Coir logs (rolls)	Two weeks prior to construction	Inspect before and after storm events (and once each 24-hour period during extended storm events), once a week during rainy season, and bi-weekly during dry season	Replace crushed sections, replace rotted sections, clean out collected soil when greater than 1/3 height of roll

TABLE 6  
BMP Implementation and Maintenance Schedule

<b>Best Management Practices</b>	<b>Implementation</b>	<b>Inspection Frequency</b>	<b>Maintenance</b>
Erosion control blankets (geotextiles)	Two weeks prior to construction	Inspect before and after storm events (and once each 24-hour period during extended storm events), once a week during rainy season, and bi-weekly during dry season	Replace/repair as necessary
Straw bales	Two weeks prior to construction	Inspect before and after storm events (and once each 24-hour period during extended storm events) and once a week during dry periods	Clean out collected soil when greater than 1/3 height of roll
Sandbags	Two weeks prior to construction	Inspect before and after storm events (and once each 24-hour period during extended storm events), once a week during rainy season, and bi-weekly during dry season	Repair, reshape, replace bags as necessary, replace bags exposed to sunlight every 2 to 3 months, clean out collected soil when greater than 1/3 height of bag
Gravelbags	Two weeks prior to construction	Inspect before and after storm events (and once each 24-hour period during extended storm events), once a week during rainy season, and bi-weekly during dry season	Repair, reshape, replace bags as necessary, replace bags exposed to sunlight every 2 to 3 months, clean out collected soil when greater than 1/3 height of bag
Hydraulic Mulch	Two weeks prior to construction	Inspect before and after storm events (and once each 24-hour period during extended storm events), once a week during rainy season, and bi-weekly during dry season	Areas where erosion is evident shall be repaired and BMPs re-applied as soon as possible; maintain an unbroken, temporary mulched ground cover throughout the period of construction when the soils are not being reworked
Straw, Wood, Organic Mulch	Two weeks prior to construction	Inspect before and after storm events (and once each 24-hour period during extended storm events), once a week during rainy season, and bi-weekly during dry season	Reapply mulch when bare earth becomes visible
Aggregate surfacing	Two weeks prior to construction	Once a week during rainy season and bi-weekly during dry season	Keep all temporary roadway ditches clear, periodically apply additional aggregate on gravel roads, active dirt construction roads are commonly watered three or more times per day during the dry season.

TABLE 6  
BMP Implementation and Maintenance Schedule

Best Management Practices	Implementation	Inspection Frequency	Maintenance
Stockpile Management	Place prior to the commencement of associated activities	Once a week during rainy season and bi-weekly during dry season	Repair and/or replace perimeter controls and covers as needed to keep them functioning properly
Stabilized Construction Entrance/Exit	Two weeks prior to construction	Once a week during rainy season and bi-weekly during dry season	Inspect local roads adjacent to the site daily, remove aggregate, separate and dispose of sediment if construction entrance/exit is clogged with sediment, keep all temporary roadway ditches clear, check for damage and repair as needed, replace gravel material when surface voids are visible, remove all sediment deposited on paved roadways within 24 hours, remove gravel and filter fabric at completion of construction
Street Sweeping, Vacuuming	Once construction commences	Inspect before and after storm events (and once each 24-hour period during extended storm events), when actively in use, points of ingress and egress must be inspected daily, otherwise once a week	When tracked or spilled sediment is observed outside the construction limits, it must be removed at least daily; after sweeping is finished, properly dispose of sweeper wastes at an approved dumpsite

The following describes the BMPs that will be implemented at GWF Henrietta and the construction laydown area as necessary during the pre-construction, construction, and post-construction phases of the project.

**Preservation of Natural Features.** Prior to the commencement of soil-disturbing activities, areas of existing vegetation that are to remain and environmentally sensitive areas shall be fenced for protection. In general, site designs shall preserve existing vegetation to the maximum extent possible. During construction, existing vegetation shall be preserved and protected by fencing for as long as possible to minimize erosion.

**Stormwater run-on and Concentrated Flows.** To the extent feasible, all concentrated water flows shall be channeled away from disturbed soil areas and stockpiles. Concentrated water flows shall be conveyed in a non-eroding fashion. Erosion in areas of concentrated flow paths shall be controlled by applying erosion control blankets, erosion control seeding, and lining of swales.

**Stockpile Management.** Stockpiles shall be managed according to the type of material being stockpiled and the season, as follows:

- Soil stockpiles shall be covered or protected with soil stabilization measures and perimeter sediment barriers during the rainy season and covered or protected with perimeter sediment barriers during the non-rainy season.
- Concrete/asphalt rubble, rock, and aggregate base and sub-base stockpiles shall be covered or protected with perimeter sediment barriers year-round.
- Cold mix asphalt stockpiles shall be covered year-round.

**Disturbed Soil Area Management.** Disturbed soil areas shall be protected with an effective combination of measures including soil stabilization, sediment barriers, and basins/traps.

- Soil Stabilization – Hydraulic mulch; hydroseeding; suitably stabilized, non-polluting straw/wood/organic mulch; geotextiles; stabilized construction roadways.
- Sediment Barriers – Silt fences; sand and gravel bag barriers; straw bale barriers; fiber rolls.
- Basin/Traps –sediment traps.

Temporary erosion control shall be applied to remaining active and non-active areas as needed. Temporary erosion control measures shall be implemented prior to the start of the rainy season (defined as October 15 to May 1). Vegetative stabilization shall occur as soon as possible after disturbance has permanently or temporarily ceased, but in no case more than 14 days after the construction activity in an area has ceased. An exception to this requirement is for when construction activity will resume on that portion of the site within 21 days.

A range of seedbed preparation methods shall be used. The seedbed preparation method used for any individual site shall depend on various factors including size of the area, slope, and potential for erosion. The seedbed shall be prepared to a depth of 3 to 4 inches, where possible, by harrowing, disking, or mechanical raking. Seed shall be dispersed by dry broadcasting where slopes are less than 2:1. Manually operated cyclone type spreaders will be employed to uniformly broadcast the seed. After broadcasting, the seed shall be manually raked, on contour, into the top 3/8 inch of soil.

Permanent erosion control for the construction laydown area and any temporary access roads will consist of revegetation with an erosion control seed mix. A successfully revegetated site must achieve 75 percent coverage.

**Structural Practices.** Proposed drainage improvements to the project site include relocating and expanding the onsite stormwater retention pond. The stormwater retention pond will be relocated to the east side of the project site and be expanded by approximately 2,200 cubic yards to accommodate the increase in stormwater flow resulting from the construction and operation of GWF Henrietta. The drainage systems for GWF Henrietta have been designed to accommodate the stormwater flow resulting from a 10-day, 100 year storm. The calculations for detention storage volume are included in Appendix A.

**Offsite Sediment Tracking.** The construction entrance off of 25<sup>th</sup> Avenue will be constructed and maintained to reduce tracking of sediments onto public streets. Excess material tracked onto public streets will be removed as necessary using a street sweeper with a water supply. Dump trucks hauling material from the site will be covered with tarpaulin. These BMPs will be implemented during the rainy and non-rainy seasons as needed.

**Petroleum Products.** Construction equipment will require use of diesel fuel and oil on a regular basis. While a potential exists for spills or leaks, all onsite vehicles will be monitored for leaks and receive regular preventive maintenance to ensure proper operation and reduce the chance of leakage. No “topping off” of fuel tanks will be allowed to further reduce the possibility of spills.

Petroleum products will be stored in clearly labeled and tightly sealed containers or tanks. Any asphalt used onsite will be applied according to the manufacturer’s recommendations. Any soil impacted by fuel or oil spills will be removed and disposed of by the Contractor at an approved disposal site. It will be the Contractor’s responsibility to ensure that secondary containment around fuel/oil tanks (stationary or mobile) will meet the minimum requirements of the U.S. Environment Protection Agency (EPA) 40 CFR Part 112 with regard to secondary containment or more stringent state requirements, if applicable. Any spills will be contained and cleaned up immediately.

**Sanitary Wastes.** A licensed sanitary waste management contractor will collect all construction or temporary sanitary wastes from the portable units. The units will be maintained on a regular basis. Portable units shall be placed on a flat area at least 50 feet from streets or drain inlets. Portable units shall be anchored to prevent blowing or tipping over and all leaks or spills shall be reported immediately (sampling may be required).

**Hazardous Wastes.** Potentially hazardous waste associated with construction of the project will be limited to small quantities of liquids and solids such as lubricating oils, acids for equipment cleanup, concrete curing compounds, and waste paint. These wastes are typical of industrial construction activities and will be placed in containers onsite and disposed in accordance with applicable LORS and with the manufacturer’s recommendations. Hazardous wastes will be either recycled or disposed of in a licensed Class I disposal facility, as appropriate. Waste oil and used oil filters will be recycled if the maintenance activities will take place onsite. Waste generated during each chemical cleaning operation will be temporarily stored onsite in portable tanks and disposed offsite by the chemical cleaning contractor at an appropriate disposal facility. Site personnel will be instructed of these procedures and the Contractor’s Site Manager will be responsible for implementing these practices.

To prevent contact of hazardous wastes with stormwater runoff, secondary containment will be provided such as curbs and berms. As much as possible, all materials will be kept in a dry covered area.

**Paints.** All containers will be tightly sealed and properly stored to prevent leaks or spills. Excess paint will not be discharged to the stormwater system. Unused paints will be disposed in labeled original containers according to applicable local, state, and federal laws and regulations. Spray painting will not occur on windy or rainy days, and a drop cloth will be used to collect and dispose of drips associated with painting activities. All paints will be mixed indoors, in a containment area. If using water based paints, equipment will be cleaned in a sink that is connected to the sanitary sewer.

**Concrete Trucks.** Concrete trucks will not be allowed to discharge surplus concrete and drum wash at the site, unless these materials are fully contained in an engineered structure that can contain all free liquid until dry. Dried concrete shall then be removed and disposed

of at an offsite location. Alternatively, concrete washout will be taken offsite for disposal by the concrete contractor. No surplus concrete or drum wash water will be disposed of onto the ground surface.

**Waste Materials.** All construction waste material, trash, and construction debris will be collected and stored in a metal dumpster, leased from a licensed solid waste management contractor. The dumpster will meet all local and state solid waste management regulations. The dumpster will be emptied a minimum of twice per week or more often if necessary, and the trash will be hauled to the local dump. No construction waste will be buried onsite. All site personnel will be instructed regarding the correct procedure for waste disposal. The Site Manager will be responsible for seeing that these procedures are followed. All dumpsters will be covered, where possible.

**Allowable Non-Stormwater Discharges.** The following sources of non-stormwater discharges may be combined with stormwater discharges from project construction activities:

- Pavement wash waters and dust control water not containing toxic or hazardous substances.
- Uncontaminated dewatering discharges.
- Firefighting waters.
- Vegetation watering.
- Potable or spring water discharges.

**Good Housekeeping.** Good housekeeping practices are designed to maintain a clean and orderly work environment. The good housekeeping practices listed below will be followed to reduce the risk of potential pollutants entering stormwater discharges. All construction personnel will be responsible for monitoring and maintaining housekeeping tasks and reporting potential problems to the Contractor's Site Manager:

- Store only enough products required for doing the job.
- Store all materials in a neat and orderly manner in the appropriate containers. Materials that may adversely impact stormwater, such as: paint, oils, greases, sealers, etc., will be stored in covered areas such as temporary/permanent buildings or trailers, in accordance with the SWPPP.
- Keep products in the original container with the original manufacturer's label.
- Do not mix products unless recommended by the manufacturer.
- Use all of a product before disposing of the container.
- Use and dispose of products according to the Contractor's Site Manager's direction or manufacturer's recommendations.
- Perform regular inspections of the stormwater system and the material storage areas.

- When and where appropriate, use posters, bulletin boards, or meetings to remind and inform construction personnel of required procedures.
- Preventive maintenance includes regular inspection and maintenance of structural stormwater controls (catch basins, oil water separators, etc.) as well as other facility equipment and systems.

Storage areas for hazardous materials such as oils, greases, paints, fuels, and chemicals will be provided with secondary containment to ensure that spills in these areas do not reach stormwater. All hazardous chemical storage areas will be surrounded by curbs or dikes to contain the chemicals in the event of leaks or spills. The Contractor shall establish contingencies for the proper disposal of contaminated soils (use of licensed hauler, approved landfill) early in the construction period. Secondary containment will be designed to hold the entire contents of the largest single storage container plus rainfall from a 50-year, 24-hour storm for all outdoor storage areas. Curbs and dikes will be provided around all chemical storage areas, hazardous waste products, areas with possibility of oil spill, and washout areas.

Spills and leaks are one of the largest potential sources of stormwater pollutants at industrial facilities. Chemicals will be stored in chemical storage facilities appropriately designed for their individual characteristics. Bulk chemicals will be stored outdoors in aboveground storage tanks. Other chemicals will be stored and used in their delivery containers. All hazardous chemical storage areas will be surrounded by curbs or dikes to contain the chemicals in the event of leaks or spills. Secondary containment will be sized to hold the entire contents of the largest single storage tank. All drains and vent piping for volatile chemicals will be trapped and isolated from other drains. Containment areas for bulk storage tanks will not be drained. Any chemical spills in these areas will be removed with portable equipment and reused or properly disposed. It is anticipated that all substances will be applied/dispensed at manufacturer's recommendations.

In addition to the housekeeping and hazardous materials storage procedures described above, spill prevention and cleanup practices will be as follows:

- GWF's Site Manager or appointee is responsible for informing construction personnel of the manufacturer's recommended spill cleanup methods, and the location of that information and cleanup supplies.
- Materials and equipment for the cleanup of a relatively small spill will be kept in the materials storage area. These facilities may include brooms, rags, gloves, shovels, goggles, sand, sawdust, absorbent, plastic or metal trash containers, and protective clothing.
- All containers will be labeled, tightly sealed, and stacked or stored neatly and securely.

Spill response procedures will be as follows:

- Step 1: Upon discovery of a spill, stop the source of the spill.
- Step 2: Cease all spill material transfer until the release is stopped and waste removed from the spill site.

- Step 3: Initiate containment to prevent spill from reaching State waters.
- Step 4: Notify Supervisor and GWF’s Site Manager of the spill.
- Step 5: GWF’s Site Manager will immediately notify the GWF emergency coordinator, and coordinate further cleanup activities
- Step 6: Any significant spill of hazardous material will be reported to the appropriate state and/or local agencies by GWF personnel or qualified contractors. Table 7 lists the project’s environmental emergency contacts.

TABLE 7  
Environmental Emergency Telephone List

Company/Organization	Telephone Numbers
<b>GWF Energy LLC (During Construction)</b>	
Primary Facility Emergency Coordinator: Name, Manager 24-Hour Telephone Number: GWF Dispatch	To be determined
Alternate Facility Emergency Coordinator: Name, Principal Engineer GWF Environmental Specialist: Name GWF Media Representative: Name GWF Headquarters Telephone Name	
<b>GWF Energy LLC (During Operation)</b>	
Primary Facility Emergency Coordinator: Name, Manager 24-Hour Telephone Number: GWF Dispatch	To be determined
Alternate Facility Emergency Coordinator: Name, O&M Supervisor GWF Environmental Specialist: Onsite Employee GWF Media Representative: Name GWF Headquarters Telephone Operator	
<b>Other Resources</b>	
3E Company (MSDS by FAX):	(800) 451-8346
Chemtrec (emergency chemical information):	(800) 424-9300
Poison Control Center:	(800) 662-9886
<b>Federal Agency</b>	
U.S. Coast Guard/National Response Center:	(800) 424-8802
<b>State Agencies</b>	
California Office of Emergency Services (OES):	(800) 852-7550
California Department of Toxic Substances Control (DTSC)*:	(800) 852-7550
California Department of Fish and Game*:	(800) 852-7550
California State Lands Commission:	(562) 590-5201
Regional Water Quality Control Board (RWQCB)*:	(800) 852-7550

TABLE 7  
Environmental Emergency Telephone List

Company/Organization	Telephone Numbers
<b>Local Contacts</b>	
Administering Agency – Kings County Department of Public Health:	(559) 584-1411
Fire – County of Kings Fire Department:	911 or (559) 584-9276
Sheriff – County of Kings Sheriff Department:	911 or (559) 584-9276
Hospital – Hanford Community Hospital:	911 or (559) 585-5110
Ambulance/Paramedics:	911

\* DTSC, RWQCB and California Department of Fish and Game have requested that emergency notifications to these offices be made through the OES 800 number.

- Step 7: Submit a Notice of Discharge Form within 7 days of the discharge event.
- Step 8: Review the construction stormwater pollution prevention plan and amend, if needed. Record a description of the spill, cause, and cleanup measures taken.

**Inspection, Maintenance, and Recordkeeping Procedures.** Site inspection and facility maintenance are important features of an effective stormwater management system. The Contractor’s qualified personnel will inspect disturbed areas of the site that have not been stabilized, storage areas exposed to precipitation, all control measures, and site access areas to determine if the control measures and stormwater management system are effective in preventing significant impacts to receiving waters.

Inspections will be performed during the non-rainy season once every 2 weeks. Maintenance shall be performed as necessary.

Inspections will be performed before and after storm events and once each 24-hour period during extended storm events to identify BMP effectiveness and implement repairs or design changes as soon as feasible depending on field conditions. The discharger will complete an inspection checklist, which will include the following information:

- Inspection date
- Weather conditions
- A description of any inadequate BMPs
- List of observations of all BMPs
- Corrective actions required, including any changes to DESC
- Inspector name, title, and signature

**Erosion and Sediment Controls.** The following procedures will be used to maintain erosion and sedimentation controls:

- All control measures will be inspected before and after storm events and once each 24-hour period during extended storm events.
- All measures will be maintained in good working order; if a repair is necessary, that repair will be initiated within 24 hours of the report.
- Sediment will be removed from the silt barriers when it has reached one-third of the height of the barrier.

- Silt barriers will be inspected for depth of accumulated sediment, tears, attachment to posts, and stability on a weekly basis.
- Aggregate-covered areas will be inspected for bare spots and washouts.
- The GWF Site Manager will select individuals to be responsible for inspections, maintenance, repairs, and reporting. The designated inspectors will receive the necessary training from GWF's Site Manager to properly inspect and maintain the controls in good working order.
- An Inspection Form will be completed after each inspection.
- The completed Inspection Forms will be retained onsite.

**Non-Stormwater Controls.** The following procedures will be used to maintain the non-stormwater controls:

- All control measures will be inspected before and after storm events and once each 24-hour period during extended storm events.
- All measures will be maintained in good working order; if a repair is necessary, that repair will be initiated within 24 hours of the report.
- The designated inspector will visually observe all drainage areas for the presence of unauthorized non-stormwater discharges and their sources.
- If a spill occurs that cannot be cleaned up before the next rain event, or under other circumstances warranting sample collection, the designated inspector will collect stormwater samples during the first two hours (even including weekends or holidays) of discharge. Similarly, if it appears that BMPs have failed or been damaged to the extent that they could result in discharge of pollutants in stormwater; and are discharging potentially impacted water, samples should be collected. Another instance that requires sampling is where stormwater comes in contact with exposed materials that could potentially contaminate stormwater runoff. The samples should be analyzed for visible and non-visible compounds with the analytical testing suite determined from the specific materials spilled or not contained properly, and for any constituents in the spill that occur in high enough concentrations to cause an impact to water quality.
- The GWF Site Manager will select individuals to be responsible for inspections, maintenance, repairs, and reporting. The designated inspectors will receive the necessary training from GWF's Site Manager to properly inspect and maintain the controls in good working order.
- An Inspection Form will be completed after each inspection.
- The completed Inspection Forms will be retained onsite.

**Recordkeeping.** Two inspection forms will be completed demonstrating that inspections and maintenance of the control measures are implemented: Erosion and Sedimentation Controls, and Non-stormwater Source Controls. All disturbed areas and materials storage areas require inspection at least every 1 day before and after storm events and once each 24-hour period during extended storm events. After each inspection, the inspector

completes an inspection report and retains a copy of the report. Any maintenance required is initiated within 24 hours of the inspection.

A copy of this DESCP and any supporting materials must be maintained at the construction site from the date of CEC approval to the date of final stabilization. All records and supporting documents will be compiled in an orderly manner, and maintained onsite until final site stabilization is completed.

The generation of reports, as part of the construction process and inspection or amendment procedures, provides accurate records, which can be used to evaluate the effectiveness of this DESCP and document compliance. Changes in design or construction of the stormwater management system are documented and included with the DESCP to facilitate review or evaluation.

**Post-construction Stormwater Management.** Final erosion and sediment control measures for final stabilization or exposed soil will be in place prior to final sign off of improvements. Post-construction erosion and sediment control measures to be used at this construction site once all construction is complete includes:

- Seeding
- Hydroseeding
- Mulching
- Removal of debris from drain inlet bags
- Removal of temporary erosion sediment control measures
- Permanent turf on all unprotected soil surface
- Removal of temporary erosion and sediment control measures (if necessary)

## J. References

Arroues, Kerry D., and Carl H. Anderson, Jr., 1986. *Soil Survey of Kings County, California*. U.S. Department of Agriculture, Soil Conservation Service.

National Oceanic Atmospheric Administration (NOAA). *Precipitation-Frequency Atlas of the Western (NOAA Atlas 2). Volume XI, California*.

Western Regional Climatic Data Center. Climate information obtained from <http://www.wrcc/dri/edu>.

## Appendix A: Post-construction Retention Pond Calculations



Owner	<b>GWF</b>	Computed By	<b>Leroy Kashka</b>	Date	<b>05/16/08</b>
Plant	<b>Henrietta</b>	Checked By		Date	
Project #	<b>160129</b>			Page	<b>#REF!</b>

**POST-CONSTRUCTION RETENTION POND DESIGN**

The pond shall be designed to provide storage for a 100-year, 10 day storm. Calculate the volume of runoff for the 2 yr. -24 hr., 5 yr. - 24 hr., 25 yr. - 24 hr. and a 100 yr. - 24 hr. storms and compare to the volume of storage available.

**Compute Runoff Coefficient:**

	C	Area (ac)	Product A*C
paved	0.95	2.03	1.93
aggregate	0.75	6.05	4.88
pond	1.00	1.82	1.82
Total Area		9.90	acres
Wt C		0.87	

**Volume Required :**

Sources: Kings County, CA Department of Public Works Improvement Standards, and Technical Paper No. 40, Rainfall Frequency Atlas of the United States, US Department of Commerce Weather Bureau, 1961.

Volume of Runoff to be Contained:  $V_{req} (ft^3) = C A R$  (Based on Kings County Public Works)  
 Design for 10 yr - 10 day storm (4 in.), Check for 100 yr - 10 day storm (6 in.)

C = Runoff Coef. 0.87  
 A = Drainage Area (ft<sup>2</sup>) 431,244.00  
 R = Rainfall (ft) for 10 yr, 10 day 0.33  
 R = Rainfall (ft) for 100 yr, 10 day 0.50

Vrunoff (10 yr - 10 day )= 142,310 ft<sup>3</sup>  
 Vrunoff (100 yr - 10 day )= 215,622 ft<sup>3</sup>

Volume of Runoff for the 5, 10, 25, and 100 yr storms

Storm	Rainfall (in)	Volume (ft <sup>3</sup> )	x 2*
5 yr, 24 hr	1.3	46,718.10	93,436.20
10 yr, 24 hr	1.5	53,905.50	107,811.00
25 yr, 24 hr	1.9	68,189.30	136,378.60
100 yr, 24 hr	2.3	82,655.10	165,310.20

\* indicates the volume of runoff in the event of 2 storms back to back

**Calculate Volume of Pond :**

Contour Elevation	Area of Contour (ac)	Average Area Volume (ft <sup>3</sup> )	Cumm. Avg Volume (ft <sup>3</sup> )
222.5	1.82	39,340	222,278
222	1.78	38,404	182,938
221.5	1.74	37,477	144,534
221	1.70	36,559	107,057
220.5	1.66	35,650	70,498
220	1.62	34,848	34,848
219.5	1.58	0	0

Required top of basin elevation = Water surface elevation for 10 yr -10 day storm + 1 ft.

Water surface elevation for 10 yr - 10 day storm event = 221.47 ft.

Required top of basin elevation = 222.47 ft.

Actual top of basin is approximately 221.5 ft. due to natural topography

Basin shall hold 100 yr. - 10 day event without overflowing

Water surface elevation for 100 yr. - 10 day event = 222.425 ft.

Top of Basin Elevation	222.50	Depth	Freeboard
Water Elevation for 10 yr. - 10 day storm	221.47 ft.	1.97 ft.	1.03 ft.
Water Elevation for 100 yr. - 10 day storm	222.425 ft.	2.925 ft	0.075 ft.
Water Elevation for 2 - 25 Yr, 24 Hr. Storms	221.1 ft.	1.6 ft.	1.4 ft.
Water Elevation for 2 - 100 Yr, 24 Hr. Storms	221.73 ft.	2.23 ft.	0.77 ft.

ATTACHMENT DR30-1

# GWF Henrietta Post-Construction Retention Pond Design

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Owner	<b>GWF</b>	Computed By	<b>Leroy Kashka</b>	Date	<b>05/16/08</b>
Plant	<b>Henrietta</b>	Checked By		Date	
Project #	<b>160129</b>			Page	<b>#REF!</b>

**POST-CONSTRUCTION RETENTION POND DESIGN**

The pond shall be designed to provide storage for a 100-year, 10 day storm. Calculate the volume of runoff for the 2 yr. -24 hr., 5 yr. - 24 hr., 25 yr. - 24 hr. and a 100 yr. - 24 hr. storms and compare to the volume of storage available.

**Compute Runoff Coefficient:**

	C	Area (ac)	Product A*C
paved	0.95	2.03	1.93
aggregate	0.75	6.05	4.88
pond	1.00	1.82	1.82
Total Area		9.90	acres
Wt C		0.87	

**Volume Required :**

Sources: Kings County, CA Department of Public Works Improvement Standards, and Technical Paper No. 40, Rainfall Frequency Atlas of the United States, US Department of Commerce Weather Bureau, 1961.

Volume of Runoff to be Contained:  $V_{req} (ft^3) = C A R$  (Based on Kings County Public Works)  
 Design for 10 yr - 10 day storm (4 in.), Check for 100 yr - 10 day storm (6 in.)

C = Runoff Coef. 0.87  
 A = Drainage Area (ft<sup>2</sup>) 431,244.00  
 R = Rainfall (ft) for 10 yr, 10 day 0.33  
 R = Rainfall (ft) for 100 yr, 10 day 0.50

Vrunoff (10 yr - 10 day )= 142,310 ft<sup>3</sup>  
 Vrunoff (100 yr - 10 day )= 215,622 ft<sup>3</sup>

Volume of Runoff for the 5, 10, 25, and 100 yr storms

Storm	Rainfall (in)	Volume (ft <sup>3</sup> )	x 2*
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\* indicates the volume of runoff in the event of 2 storms back to back

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220	1.62	34,848	34,848
219.5	1.58	0	0

Required top of basin elevation = Water surface elevation for 10 yr -10 day storm + 1 ft.

Water surface elevation for 10 yr - 10 day storm event = 221.47 ft.

Required top of basin elevation = 222.47 ft.

Actual top of basin is approximately 221.5 ft. due to natural topography

Basin shall hold 100 yr. - 10 day event without overflowing

Water surface elevation for 100 yr. - 10 day event = 222.425 ft.

Top of Basin Elevation	222.50	Depth	Freeboard
Water Elevation for 10 yr. - 10 day storm	221.47 ft.	1.97 ft.	1.03 ft.
Water Elevation for 100 yr. - 10 day storm	222.425 ft.	2.925 ft	0.075 ft.
Water Elevation for 2 - 25 Yr, 24 Hr. Storms	221.1 ft.	1.6 ft.	1.4 ft.
Water Elevation for 2 - 100 Yr, 24 Hr. Storms	221.73 ft.	2.23 ft.	0.77 ft.