

**Appendix P  
Proposed Project Peak Discharge**

**Terminal Peak Discharge<sup>1</sup> for 100-Year Storm Event**

Location	Ground Cover	Area <sup>2</sup> (A) Sq ft	Runoff Coefficient <sup>3</sup> (c)	Rainfall intensity (i) inch/day MSP <sup>5</sup> =12.4 inches	Peak Discharge (Q) cubic ft/day
East Tank Farm	New Impervious	1,242	0.95	3.89	379
	Tank Area	120,637	0.95		36,844
	Tank Annular Space	361,911	0.8		93,080
	Area Outside Containment	724,422	0.6		139,496
	Stormwater Collection Pond	41,459	1.0		13,329
	<b>East Tank Farm Total Area</b>				
South Tank Farm	New Impervious	4,400	0.95	3.89	1,344
	Tank Area	417,396	0.95		134,187
	Containment Area	2,246,298	0.8		576,594
	<b>South Tank Farm Total Area</b>				
Marine Terminal	Wharf	10,980	0.95	3.89	<b>3,353</b>
PG&E Switchyard <sup>6</sup>	Concrete (sheet runoff)	1,868,647	0.95	3.89	<b>570,710</b>
<b>Total Discharge</b>					<b>1,569,321</b>

**Rail Transload Facility Peak Discharge<sup>1</sup> for 10-Year Storm Event<sup>7</sup>**

Location	Drainage Area/ Ground Cover	Area <sup>2</sup> (A) Acre	Runoff Coefficient <sup>3</sup> (c)	Rainfall intensity <sup>8</sup> (i) inch/hr	Peak Discharge (Q) cfs
Rail Transload Facility	1 - Pervious	0.5	0.5	1.6	0.4
	2- Impervious	3.7	1.0	2.5	9.3
	3- Pervious	3.5	0.5	0.9	1.5
<b>Total Discharge</b>					<b>11.2</b>

Notes

- ft= feet
- sq ft= square feet
- cfs= cubic feet per second
- in/hr inches per hour
- MSP= Mean Seasonal Precipitation
- CCCFCFD= Contra Costa County Flood Control District
- FAA= U.S. Federal Aviation Administration

Rational Method

- Q =CiA
- Q = Peak discharge (cfs)
- c = Runoff coefficient
- i= Rainfall intensity (inch/day)
- A= Drainage area (acre)

1= Peak Discharge calculated using rational method(Kuichling, E. 1889. *The relation between the rainfall and the discharge of sewers in populous districts* . Transactions, American Society of Civil Engineers 20: 1-56.)

2= Area estimated

3= Runoff coefficient assumed based on CCCFCFD standard coefficient values

4= Determined from CCCFCFD Precipitation Duration Frequency Depth Curves

5= Determined from CCCFCFD Mean Seasonal Isohyets Maps

6= PG&E Switchyard discharges to project drainage, however it is not part of the project.

7= Per the CCCFD and Water Conservation District. A ten year storm frequency design applies to areas smaller than 1 square mile.

8= Intensity is determined from the Intensity-Duration-Frequency (IDF) Curves. Time of Concentration per FAA Method assuming a 1% grade traveling approximately 1500-ft: 14 min ( FAA, 1970. *Circular on Airport Drainage* , Report A/C 050-5320-5B U.S Department of Transportation).

CCCFCFD Standards Runoff Coefficient Values

Industrial Area	0.5-0.9
Concrete	0.8-0.95

**Appendix P**  
**Terminal Storm Discharges<sup>1</sup> to Willow Creek**

<b>Location</b>	<b>Existing Discharges (cubic ft/day)</b>	<b>New Discharge (cubic ft/day)</b>	<b>Change in Discharge (cubic ft/day)</b>	<b>Percent Change</b>
East Tank Farm	0	283,128	283,128	100%
South Tank Farm	711,031	712,130	1,099	0.15%
Marine Terminal	0	3,353	3,353	100%
PG&E Switchyard <sup>2</sup>	570,710	570,710	0	0%
<b>Total</b>	<b>1,281,740</b>	<b>1,569,321</b>	<b>287,580</b>	<b>22%</b>

**Notes**

1= Peak Discharge calculated using rational method(Kuichling, E. 1889. *The relation between the rainfall and the discharge of sewers in populous districts* . Transactions, American Society of Civil Engineers 20: 1-56.)

2= PG&E Switchyard discharges to project drainage, but it is not included in the proposed project