

**Status Report on Polychlorinated Biphenyls  
in the Western Storm Drain  
University of California, Richmond Field Station  
Richmond, California**

**November 22, 2004**

Introduction

Beginning in 1999, the University of California, Berkeley (UC Berkeley) investigated and remediated a large area of legacy industrial wastes that had been deposited into Stege Marsh at the Richmond Field Station (RFS) by prior neighboring property owners. Investigation of sources and cleanup of contamination continues under an order issued by the San Francisco Bay Regional Water Quality Control Board in October 2001 (Order No. 01-102 Site Cleanup Requirements for Meade Street Operable Unit Subunit 2).

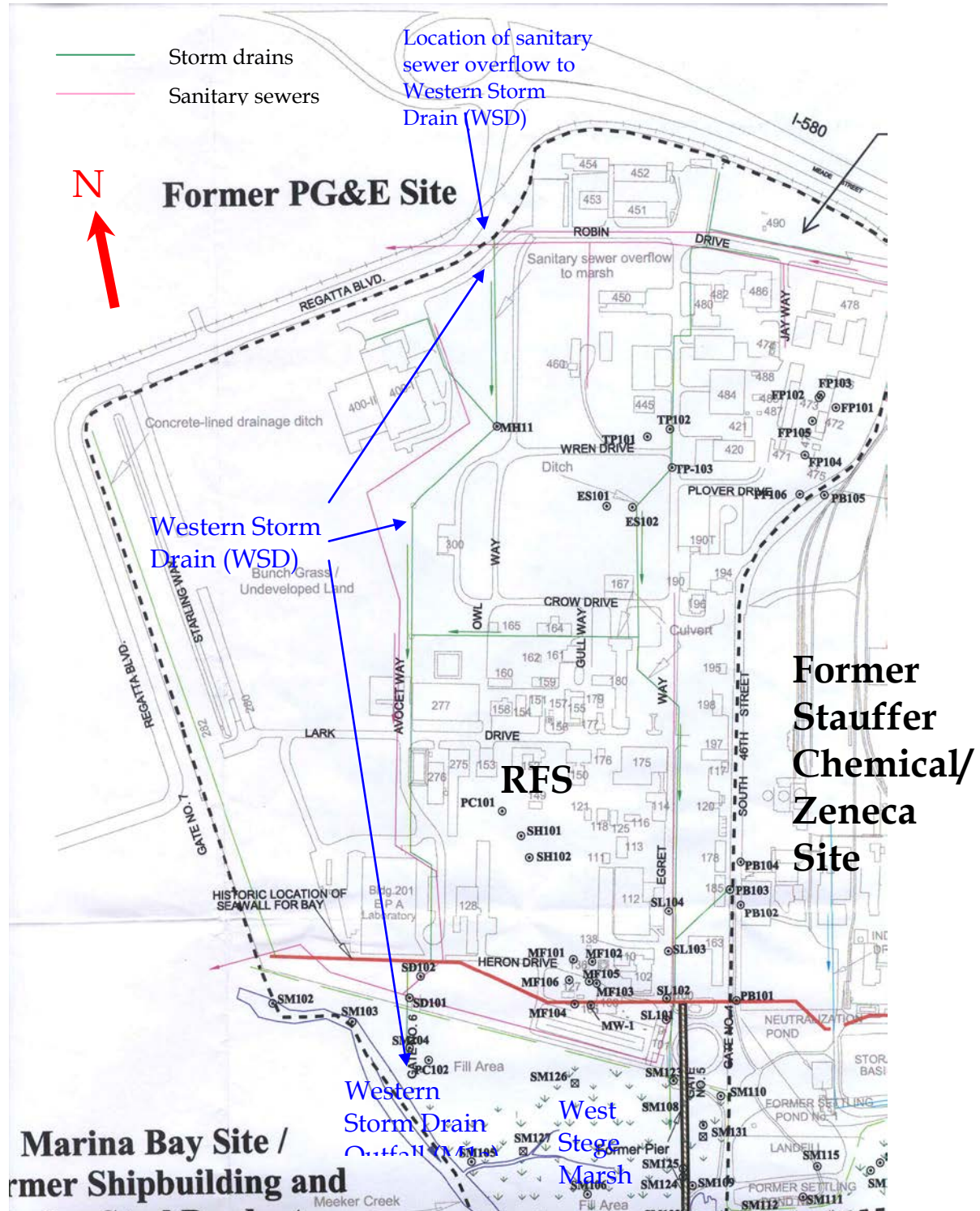
During site investigations, sediments contaminated with polychlorinated biphenyls (PCBs) were discovered at the base of the RFS Western Storm Drain outfall, a storm drain draining to Meeker Slough at the western edge of West Stege Marsh. The area with greatest PCB contamination was excavated and disposed of in 2003. Ongoing investigations continue to determine the source of PCBs. This report summarizes information collected on the Western Storm Drain and a possible source area at the former Pacific Gas & Electric Company (PG&E) yard to the north (upstream) of the RFS, currently owned by Legacy Partners.

Historical Background

The exact history of the Western Storm Drain construction and use is not known because no specific documents have been found describing the history of utilities construction in the area. Following is a general history based on interviews and available aerial photographs, maps, and documents.

Urban development of the southern Richmond shoreline dates to the 1870s. Industrial plants, including the California Cap Company (previously situated on what is now a portion of the RFS property) and Stauffer Chemical Company (current site of the Cherokee Simeon Ventures/former Zeneca remediation) were constructed in the late 1800s. The Cap Company ceased production in 1948 and the property was purchased by the University in 1950 for use as an academic teaching and research facility. Stauffer Chemical Company and subsequent owners ceased production of sulfuric acid and other chemicals in the 1990s. Other neighboring properties have included the Kaiser Shipyard, BioRad, and a PG&E and CalTrans storage yard.

# Western Storm Drain Location



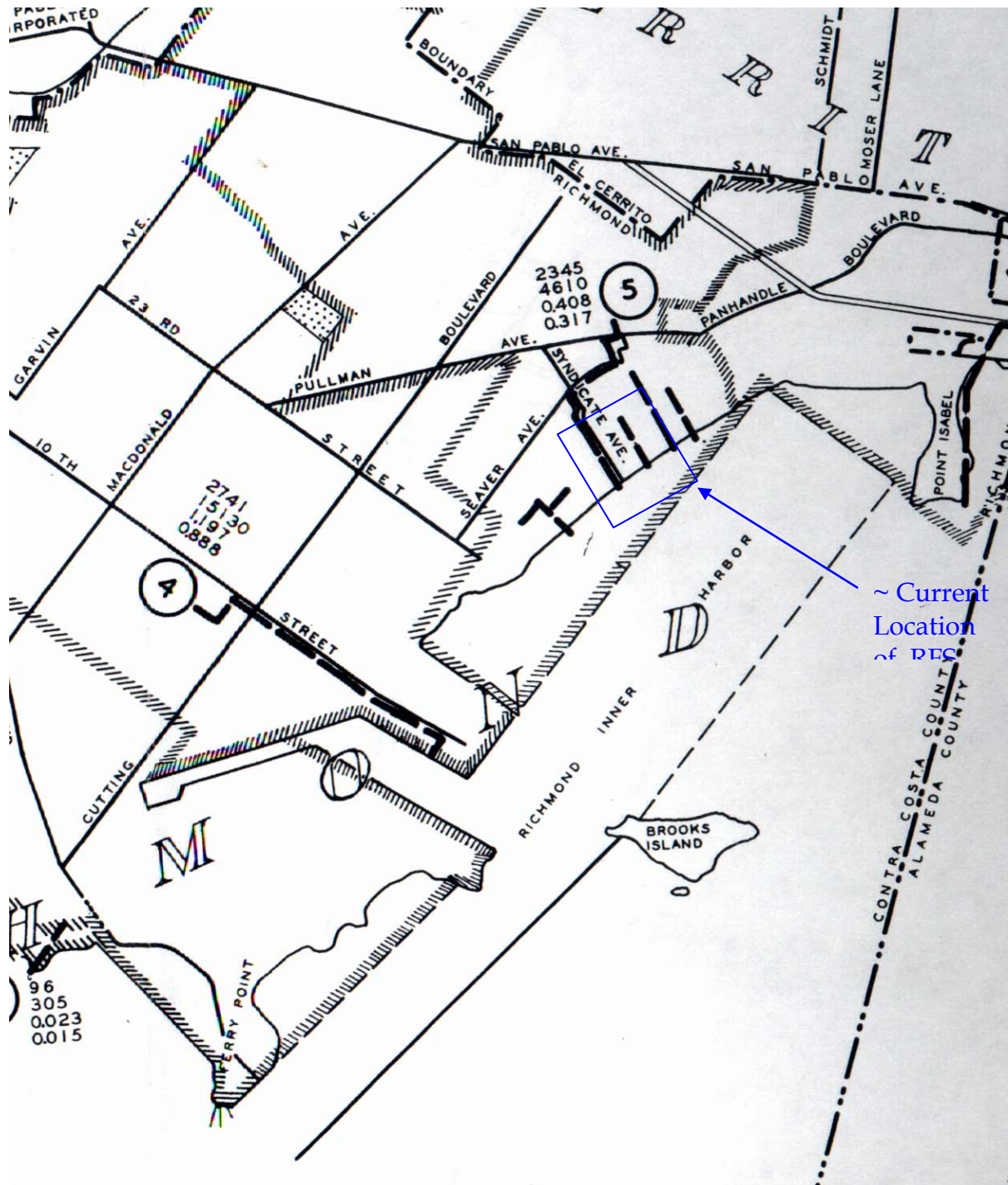
Richmond Field Station utility map showing location of storm drains (green) and sanitary sewers (pink).

Prior to the construction of the City of Richmond's publicly owned treatment works in the early 1950s, sewage and industrial wastes were discharged directly to the Bay through a system of combined sanitary sewer and storm drains. The RFS Western Storm Drain was one of a number of wastewater and stormwater conveyance pipes located on and around the RFS. The date of construction of the Western Storm Drain at the RFS is unknown. It is believed to have served as a combined sewer through the 1900s until the early 1950s, draining industrial and residential wastewater and stormwater from upstream of the California Cap Company and from portions of the property itself.

Sometime in the late 1940s or early 1950s, the City of Richmond wastewater treatment plant was constructed and historic sewers were routed to newly constructed sanitary sewer lines. Two sanitary sewer lines were constructed perpendicular to the Western Storm Drain. On the south end of the RFS, a pipe draining Stauffer Chemical Company and portions of the RFS was routed west across what is now BioRad property. On the north end, a sewer line was constructed to continue to convey wastewater from the northeast corner of the RFS and upstream areas west to the treatment plant. At that time, a manhole with an overflow bypass was placed at the intersection of the Western Storm Drain and new sewer line so that the old line functioned as a sanitary sewer overflow to Meeker Slough in addition to conveying storm water runoff.

Since 1950, the Western Storm Drain has conveyed stormwater runoff from portions of the RFS and it is believed to have conveyed stormwater runoff and storm drain discharges from properties north of the RFS, including the former PG&E yard. Due to reconfiguration of the Regatta Boulevard/I-580 interchange in the 1990s, historic drainage patterns no longer exist. UC Berkeley has connected storm drains to this line from the middle and lower areas of the RFS, including roof drains from new buildings, such as the Northern Regional Library Facility. No connections were made above the manhole directly east of the Library (Manhole #11). The northernmost manhole of the Western Storm Drain line is north of the UC property line and covered by a eucalyptus tree.

Following is a map showing the general configuration of sewers in the RFS area (then known as Stege) in the early 1940s, prior to construction of the Richmond publicly owned treatment works. The Western Storm Drain is located along the street then named Syndicate Avenue. Aerial photos from the 1940s show a pipe in Meeker Slough in the same location (parallel to what was then Syndicate Avenue).

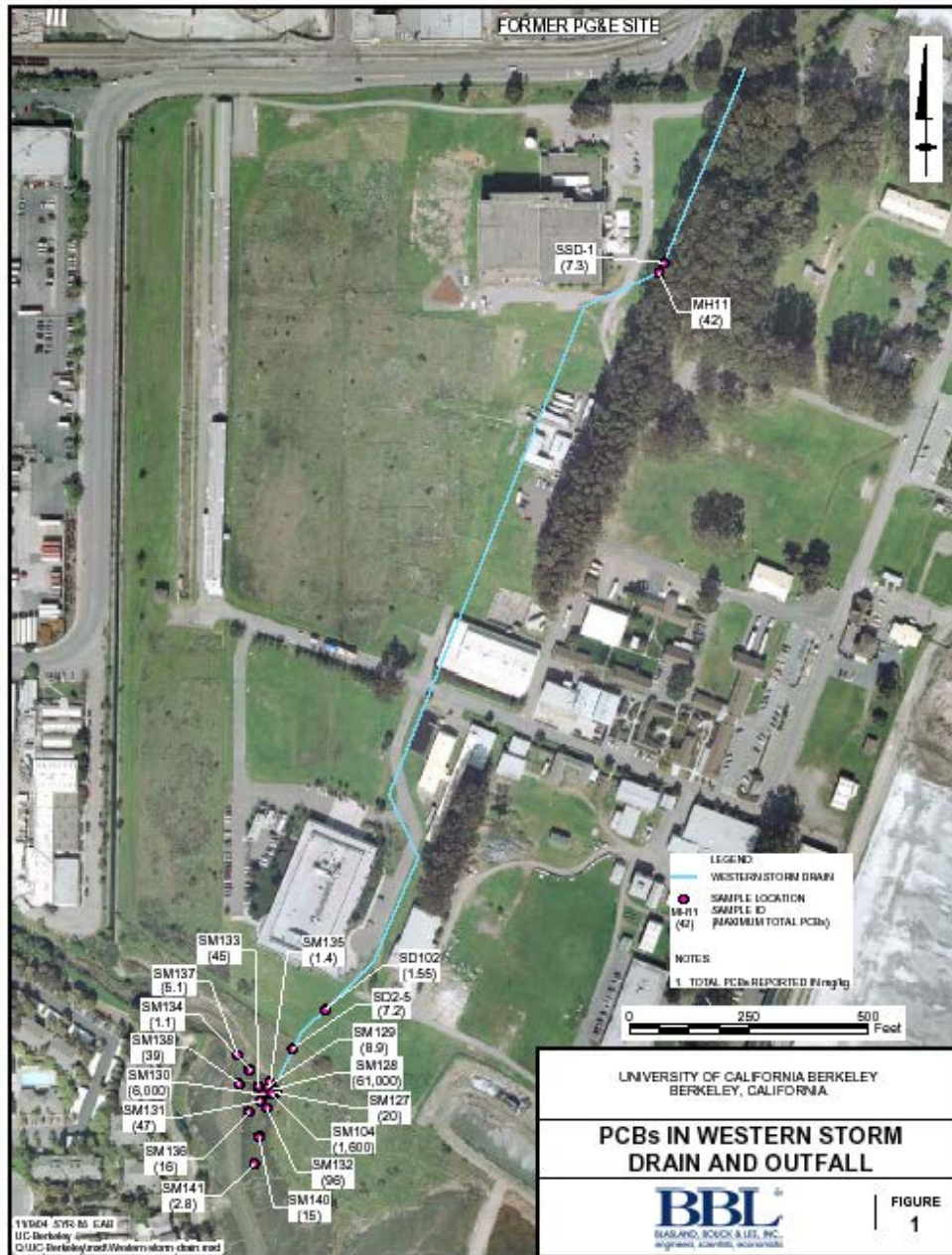


1941 sewer map from: "East Bay Cities Sewage Disposal Survey, Report Upon the Collection, Treatment, and Disposal of Sewage and Industrial Wastes of the East Bay Cities, California" June 30, 1941, by the Board of Consulting Engineers (Charles Gilman Hyde, Harold Farnsworth Gray, A.M. Rawn) to the Mayor and Council representing the

City of Berkeley as the sponsoring agent for the seven cooperating cities - Alameda, Albany, Berkeley, Emeryville, Oakland, Piedmont, and Richmond.

### PCB Sampling and Analysis

In 1999, the University initiated a field sampling and analysis program at the RFS and discovered PCB contaminated sediments at the outfall of the Western Storm Drain. Based on estimated sedimentation rates in West Stege Marsh, the high concentration of PCBs (up to 61,000 ppm) and depth of maximum concentration (1-2 feet) indicate the probable source of PCBs was a discharge of oil through the Western Storm Drain a few decades ago. Sampling of sediment in the Western Storm Drain found PCBs up to Manhole #11 at the northern end of the RFS. Following is a map of sampling analytical results. A complete table with Aroclor analysis appears at the end of the report.

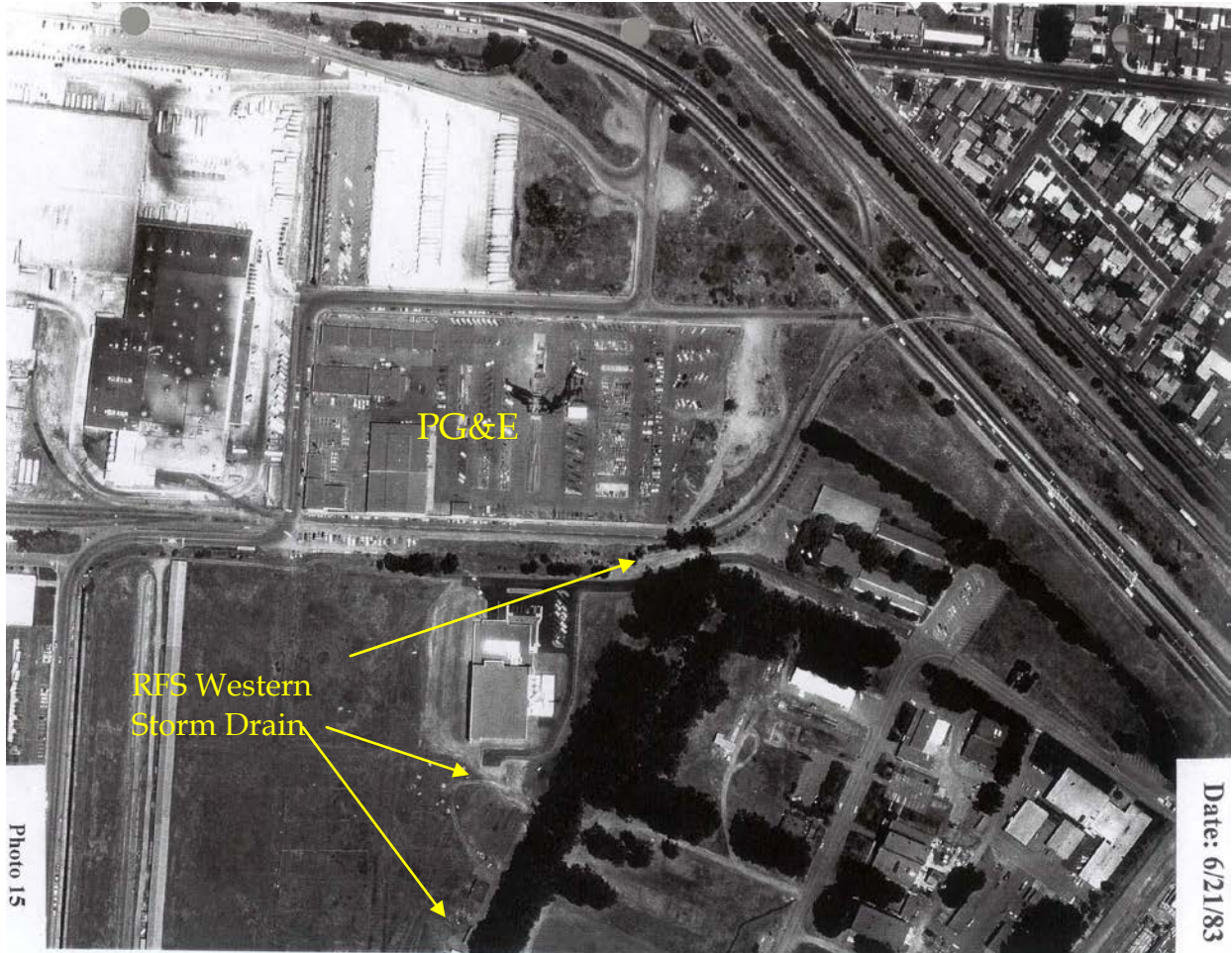


Possible upstream sources of PCB discharges include direct discharges into the storm drains connected to the Western Storm Drain and sanitary sewer overflows from oil discharged from upstream locations, including Stauffer Chemical.

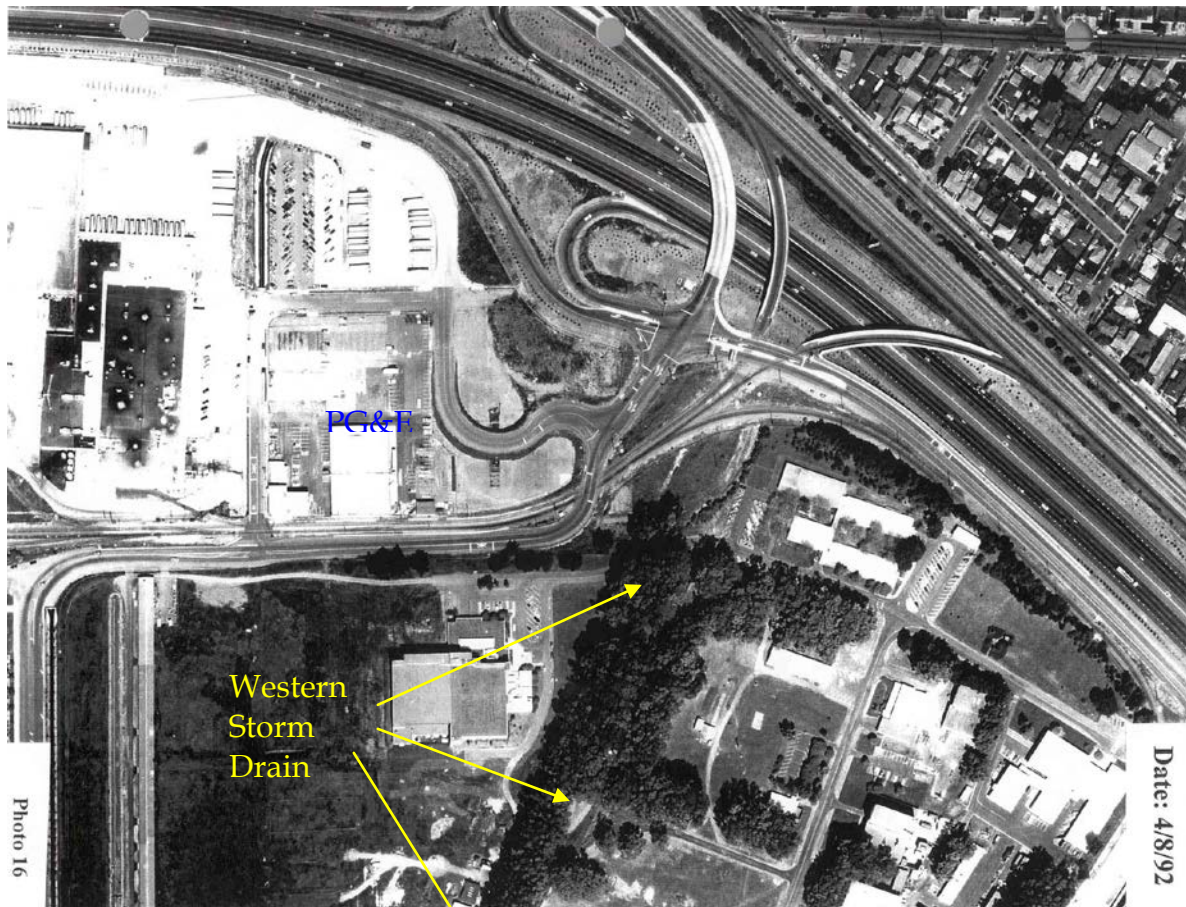
A possible source for PCBs in the Western Storm Drain includes a PG&E facility built in the mid 1950s just north of the RFS. Based on historic aerial photographs, the facility appears to have been used for parking vehicles and storing equipment. The storage yard was located immediately north of the Western Storm Drain. It is unclear how the



stormwater drained from the site because historic utility maps have not been located and the drainage was reconfigured in the early 1990s during the construction of the I-580 freeway and reconfiguration of the Regatta Boulevard interchange. The following aerial photos show the PG&E yard location in 1983 and in again in 1992 after I-580 construction reconfigured overland and piped storm drainage conveyance.



Richmond Field Station and PG&E- June 21, 1983 aerial



Richmond Field Station and PG&E- April 8, 1992 aerial

### Conclusion

Investigation of possible sources of PCB contamination in the Western Storm Drain and its outfall have been inconclusive, but indicate that at least one possible upstream location, the former PG&E yard, may have contributed PCBs from overland flow of spilled transformer oil or direct dumping into the storm drain.

Extensive field sampling and analysis investigations at the RFS have included reviews of records, aerial photos and environmental sampling for PCBs. There are no records indicating that any large transformer PCB oil leak or spill ever occurred. Some isolated areas with low levels of PCBs have been found in the upland soils, but PCB concentrations have been found to be low (approximately 10 ppm or less) and do not indicate the historic presence of a significant source of PCBs release. Drainage routes from all RFS subcatchment areas draining to the Western Storm Drain have been sampled and no significantly elevated areas of PCBs were found.

Other sources of PCBs and additional historical documents will continue to be investigated in efforts to identify the probable source of contaminated sediments in West Stege Marsh.

Table: Richmond Field Station Western Storm Drain polychlorinated biphenyl sampling analytical results

Sample ID	Sample Depth (Feet)	Date Collected	Total PCBs	Aroclor-1016	Aroclor-1221	Aroclor-1232	Aroclor-1242	Aroclor-1248	Aroclor-1254	Aroclor-1260
		Units	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
MH11	in pipe	No Date	42	NA	NA	NA	NA	42	NA	NA
SSD-1	in pipe	09/23/04	7.3	0.16 U	0.32 U	0.16 U	0.16 U	7.3	0.16 U	0.16 U
SD2-5	in pipe	04/10/03	7.2	0.46 U	0.91 U	0.46 U	0.46 U	7.2	0.46 U	0.46 U
SD102	3 - 3.5	02/25/00	1.55	0.029 U	0.029 U	0.029 U	0.029 U	0.88	0.029 U	0.67
SM104	0 - 0.5	03/24/00	23	NA	NA	NA	NA	23	NA	NA
SM104	2 - 2.5	03/24/00	1600	NA	NA	NA	NA	1600	NA	NA
SM104	4 - 4.5	03/24/00	1200	NA	NA	NA	NA	1200	NA	NA
SM127	0 - 0.5	08/07/01	20	0.45 U	0.91 U	0.45 U	20	0.45 U	0.45 U	0.45 U
SM127	2 - 2.5	08/07/01	8.2	0.37 U	0.75 U	0.37 U	8.2	0.37 U	0.37 U	0.37 U
SM127	3.5 - 4	08/07/01	0.94	0.072 U	0.14 U	0.072 U	0.94	0.072 U	0.072 U	0.072 U
SM128	0 - 0.5	08/07/01	370	7.8 U	16 U	7.8 U	370	7.8 U	7.8 U	7.8 U
SM128	2 - 2.5	08/07/01	61000	2100 U	4300 U	2100 U	61000	2100 U	2100 U	2100 U
SM128	4 - 4.5	08/07/01	1600	36 U	73 U	36 U	1600	36 U	36 U	36 U
SM129	0 - 0.5	08/07/01	8.9	0.22 U	0.44 U	0.22 U	8.9	0.22 U	0.22 U	0.22 U
SM129	2.5 - 3	08/07/01	1.3	0.074 U	0.15 U	0.074 U	1.3	0.074 U	0.074 U	0.074 U
SM129	3.5 - 4	08/07/01	1.2	0.074 U	0.15 U	0.074 U	1.2	0.074 U	0.074 U	0.074 U
SM130	0 - 0.5	08/07/01	4.5	0.18 U	0.36 U	0.18 U	4.5	0.18 U	0.18 U	0.18 U
SM130	2 - 2.5	08/07/01	6000	120 U	240 U	120 U	6000	120 U	120 U	120 U
SM130	4 - 4.5	08/07/01	770	15 U	29 U	15 U	770	15 U	15 U	15 U
SM131	0 - 0.5	08/07/01	47	1.2 U	2.4 U	1.2 U	47	1.2 U	1.2 U	1.2 U
SM131	2 - 2.5	08/07/01	0.14	0.015 U	0.03 U	0.015 U	0.14	0.015 U	0.015 U	0.015 U
SM132	0 - 0.5	08/07/01	96	1.9 U	3.8 U	1.9 U	96	1.9 U	1.9 U	1.9 U
SM132	2 - 2.5	08/07/01	14	0.9 U	1.8 U	0.9 U	14	0.9 U	0.9 U	0.9 U
SM132	3 - 3.5	08/07/01	0.96	0.074 U	0.15 U	0.074 U	0.96	0.074 U	0.074 U	0.074 U
SM133	0 - 0.5	08/07/01	45	0.82 U	1.6 U	0.82 U	45	0.82 U	0.82 U	0.82 U
SM133	0.5 - 1	08/07/01	0.14	0.015 U	0.03 U	0.015 U	0.14	0.015 U	0.015 U	0.015 U
SM133	2 - 2.5	08/07/01	0.17	0.014 U	0.029 U	0.014 U	0.17	0.014 U	0.014 U	0.014 U
SM134	0 - 0.5	10/01/02	0.59	0.033 U	0.066 U	0.033 U	0.033 U	0.59	0.033 U	0.033 U
SM134	2 - 2.5	10/01/02	1.1	0.025 U	0.05 U	0.025 U	0.025 U	1	0.025 U	0.1
SM134	2.5 - 3	10/01/02	0.017	0.016 U	0.031 U	0.016 U	0.016 U	0.017	0.016 U	0.016 U
SM135	0 - 0.5	10/01/02	1.4	0.038 U	0.076 U	0.038 U	0.038 U	1.4	0.038 U	0.038 U
SM135	2 - 2.5	10/01/02	0.5	0.019 U	0.038 U	0.019 U	0.019 U	0.5	0.019 U	0.019 U
SM135	2.5 - 3	10/01/02	0.238	0.016 U	0.032 U	0.016 U	0.016 U	0.21	0.016 U	0.028
SM136	0 - 0.5	10/01/02	0.73	0.04 U	0.081 U	0.04 U	0.04 U	0.73	0.04 U	0.04 U
SM136	2 - 2.5	10/01/02	15.7	0.45 U	0.9 U	0.45 U	0.45 U	15	0.45 U	0.68
SM136	6 - 6.5	10/01/02	0.081	0.019 U	0.038 U	0.019 U	0.019 U	0.081	0.019 U	0.019 U
SM137	0 - 0.5	10/07/02	5.09	0.13 U	0.27 U	0.13 U	0.13 U	4.8	0.13 U	0.29
SM137	0.5 - 1	10/07/02	0.015	0.015 U	0.03 U	0.015 U	0.015 U	0.015	0.015 U	0.015 U
SM138	0 - 0.5	10/07/02	39	1.5 U	3 U	1.5 U	1.5 U	39	1.5 U	1.5 U
SM138	2 - 2.5	11/05/02	19.7	0.59 U	1.2 U	0.59 U	0.59 U	18	0.59 U	1.7

SM140	0 - 0.5	10/01/02	2.6	0.059 U	0.12 U	0.059 U	0.059 U	2.6	0.059 U	0.059 U
SM140	2 - 2.5	10/01/02	15	0.48 U	0.95 U	0.48 U	0.48 U	15	0.48 U	0.48 U
SM140	4.5 - 5	10/01/02	7.03	0.22 U	0.45 U	0.22 U	0.22 U	6.8	0.22 U	0.23
<b>Sample ID</b>	<b>Sample Depth (Feet)</b>	<b>Date Collected</b>	<b>Total PCBs</b>	<b>Aroclor-1016</b>	<b>Aroclor-1221</b>	<b>Aroclor-1232</b>	<b>Aroclor-1242</b>	<b>Aroclor-1248</b>	<b>Aroclor-1254</b>	<b>Aroclor-1260</b>
SM141	0 - 0.5	10/01/02	2.81	0.071 U	0.14 U	0.071 U	0.071 U	2.6	0.071 U	0.21
SM141	2 - 2.5	10/01/02	1.64	0.03 U	0.06 U	0.03 U	0.03 U	1.5	0.03 U	0.14
SM141	6 - 6.5	10/01/02	0.36	0.032 U	0.064 U	0.032 U	0.032 U	0.36	0.032 U	0.032 U

Note: U indicates value is below reporting limit, i.e., ND

NA = not available