

BASMAA CW4CB Task 4 – Field Methods Report for Pulgas Street Flushing

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1.0 Field Sampling Procedures

Sediment sampling equipment was prepared in the laboratory prior to sampling. Sampling equipment included:

- Stainless steel vacuum cleaner with rubber hose, aluminum vacuum head, and metal tubing (wand)
- Stainless steel spoons and/or scoops
- Natural fiber brooms
- ISCO silicone peristaltic pump tubing and Teflon[®] tubing

Prior to sampling the equipment, where appropriate, was thoroughly cleaned. All ISCO peristaltic pump tubing and Teflon[®] tubing were cleaned by the contract laboratory ALS. Stainless steel spoons and/or scoops were cleaned by Kinnetic Laboratories. They were soaked (fully immersed) for three days in 2% Micro[®] solution and deionized water. Equipment was then rinsed three times with tap water to remove the soap, then rinsed three times in deionized water and then allowed to dry in a clean place. Equipment was then rinsed with a 1.0% solution of hydrochloric acid, followed by a triple rinse with deionized water to eliminate the acid. A rinse with reagent grade methanol was then followed by another triple rinse with deionized water. Equipment was then allowed to dry in a clean place. The spoons and/or scoops were wrapped in aluminum foil or stored in clean Ziploc bags until used in the field. A new natural fiber broom was used for each vacuum sample. The vacuum canisters were cleaned by washing with a 2% Micro[®] solution and deionized water. The canisters were then rinsed three times with tap water to remove the soap and then rinsed three times with deionized water. The canisters were then allowed to dry. The rubber hose metal wand set up was washed in the same manner but the clean dry vacuum was used to blow air through the system to dry the opaque hose and wand. Upon cleaning, all open hose/wand ends were sealed with plastic bags and a clean filter was placed around the old dirty filter that separates the vacuum head from the canister.



Field data sheets were filled out describing environmental conditions including descriptive details of the sediment and water collected. Photographic documentation was reported on an associated photo log. Photographs were taken documenting the sampling sites with each photograph listed in the photo log with time, date, location, description of the subject photographed, and the name of the person taking the photograph.

Sediment samples collected by the vacuum were placed directly into the sample container. No sieving of sediments was performed in the field however larger debris and cobble were removed from the samples. A random number generator was used to determine the location of 10 pre-washing and 10 post-washing transects for vacuum sediment collection. Some transects needed to be adjusted based on site conditions. For example, wet gutters were eliminated as they could not be vacuumed during the pre-washing samples. Vacuum sampling was performed by collecting from gutter to gutter transecting perpendicular to the road and across the crown of the road.



Water quality samples were pumped directly into their appropriate sample containers. The streets sampled were regularly used by local industries and accommodations were made to allow traffic to travel up and down the road. Flushing was performed by City of San Carlos Public Works personnel. Flushing was performed by flushing alternate sections of the road in a general west to east direction. Each section was flushed from the street crown to the gutter. City personnel would set up a vacor truck to collect the wash water before it could enter the storm drain system. The vacor truck would be positioned depending on the section of road being flushed and sampled. When approximately half of a road section was completed the vacor truck vacuum was turned off and water was allowed to back up behind sand bags where it could be pumped to collect one of the four aliquots. After the samples were collected the vacor truck vacuum was turned back on and continued to prevent wash water from reaching the storm drain system.



Prior to flushing each day, a sample of the flush water was collected from the “spray” truck for total mercury analysis. In addition, a daily sample of the flush water collected by the vacor truck was collected prior to discharge to the sanitary sewer for the analysis of total mercury, total copper, and PCBs. On the first day of sampling an aqueous field blank sample was collected for total mercury and PCBs by pumping analytical laboratory provided blank water through the cleaned sampling equipment. A sediment blank sample was collected at Kinnetic Laboratories on November 19th after the vacuum equipment was cleaned from the Varian Street collection but prior to sampling Bing Street on November 20th.

Disposable powder free nitrile gloves were worn while collecting water and sediment samples to mitigate potential contamination. Gloves were changed between each sample to reduce the potential for cross-contamination.

Samples were labeled for proper identification in the field and for tracking in the laboratory. The sample labels contained the following information: station location, date of collection, analytical parameter(s), and method of preservation.

At the conclusion of sample processing; all samples were wrapped in protective bubble wrap and stored on ice in the field. At the conclusion of the day’s sampling, all samples were either stored overnight in KLI’s refrigeration unit or delivered directly to the analytical laboratories.

2.0 Sample Chain-of-Custody Forms and Custody Seals

All sample shipments for analyses were be accompanied by a Kinnetic Laboratories chain-of-custody record (COC). COCs were completed and sent with samples for each laboratory and each shipment. The COC identified the contents of each shipment and maintained the custodial integrity of the samples.

3.0 Center Street

The Center Street sediment and water quality sampling was performed on 13 September 2013. The field sampling crew consisted of Jonathan Toal of Kinnetic Laboratories Inc. and Krista McDonald of 2ND Nature LLC. The field crew initially arrived at Center Street in San Carlos at 06:45. Mr. Lou Duran (Senior Maintenance Worker City of San Carlos Public Works Department) supervised the City of San Carlos work crew.

Initially, pre- and post-washing transects were determined using a random number generator (see table below). Sampling was determined to be performed on Center Street between Old County Road (western end) and Bayport Avenue (eastern end). The sampling and flushing section of the street was started just east of the alleyway approximately 130 feet (39.6 meters) east of Old county Road. This area not sampled had a very short driveway like curb, no sidewalk, and dirt extending from the adjacent properties onto the road. In addition, this also eliminated sampling the gravel extending from the alleyway onto the road.



The road consisted of a mix of low curbs, normal curbs, driveways, sidewalks, and no sidewalks. The complete length of sampled road was approximately 530 feet or 161.5 meters. The roadway width was approximately 35.8 feet or 10.9 meters. Latitude and longitude values were determined using Google Earth for the middle of the street for both the start and finish of the sampling area (see table below).

Center Street Sweeping Transects 13 September 2013											
Start: 37.4977° N and 122.2473° W Finish: 37.4987° N and 122.2460° W											
TRANSECT	Eliminated	1	2	3	4	5	6	7	8	9	10
PRE feet	130 to 0	80	117	344	355	366	385	419	427	468	517
PRE meters	39.6 to 0	24.4	35.7	104.9	108.2	111.6	117.3	127.7	130.1	142.6	157.6
POST feet	130 to 0	30	107	340	351	370	390	410	436	484	503
POST meters	39.6 to 0	9.1	32.6	103.6	107.0	112.8	118.9	125.0	132.9	147.5	153.3

The pre-sediment sample was completed at 08:15 and the post-sediment sample was completed at 14:40. The pre-sediment sample was split to provide a blind field duplicate for QA/QC purposes. Street flushing was started at approximately 09:00 with an approximate flush rate of 15 gallons per minute (gpm). Approximately 1,400 gallons of wash water was used during the entire event. Aliquot one was collected at 09:15 with aliquots two, three, and four collected at 10:40, 12:25, and 13:30 respectively. Duplicate samples were collected during each aliquot to provide a blind field duplicate for QA/QC purposes.



4.0 Washington Street

The Washington Street sediment and water quality sampling was performed on 16 September 2013. The field sampling crew consisted of Jonathan Toal of Kinnetic Laboratories Inc. and Michael Founds of 2ND Nature LLC. The field crew initially arrived at Washington Street in San Carlos at 06:10. Mr. Lou Duran (Senior Maintenance Worker City of San Carlos Public Works Department) supervised the City of San Carlos work crew.

Initially, pre- and post-washing transects were determined using a random number generator (see table below). Sampling was determined to be performed on Washington Street between Bayport Avenue (western end) and Bayside Boulevard (eastern end). The sampling and flushing section of the street was started next to the fire hydrant on Washington Street at the intersection of Washington Street and Bayport Avenue. The road contained a lot of driveways, sidewalks, and no sidewalks. Upon arrival at the site, UNICA Party Rentals Inc. was washing trucks in their driveway with runoff flowing to the gutter. The field sampling crew has to adjust the pre-washing transects to avoid the runoff and started the vacuuming early to stay ahead of the water flowing down the gutter. The complete length of sampled road was approximately 500 feet or 152.4 meters. The roadway width was approximately 36 feet or 11.0 meters. Latitude and longitude values were determined using Google Earth for the middle of the street for both the start and finish of the sampling area (see table below).



Washington Street Sweeping Transects 16 September 2013											
Start: 37.4983° N and 122.2453° W Finish: 37.4993° N and 122.2440° W											
TRANSECT	Eliminated	1	2	3	4	5	6	7	8	9	10
PRE feet	NA	44	107	119	218	292	308	344	348	366	458
PRE meters	NA	13.4	32.6	36.3	66.4	89.0	93.9	104.9	106.1	111.6	139.6
POST feet	NA	112	123	210	212	293	295	385	440	448	475
POST meters	NA	34.1	37.5	64.0	64.6	89.3	89.9	117.3	134.1	136.6	144.8

The pre-sediment sample was completed at 07:45 and the post-sediment sample was completed at 12:50. Street flushing was started at approximately 08:30 with an approximate flush rate of 15 gallons per minute (gpm). Approximately 900 gallons of wash water was used during the entire event. Aliquot one was collected at 08:45 with aliquots two, three, and four collected at 09:25, 09:55, and 10:40 respectively.



5.0 Varian Street

The Varian Street sediment and water quality sampling was performed on 18 September 2013. The field sampling crew consisted of Jonathan Toal of Kinnetic Laboratories Inc. and Michael Founds of 2ND Nature LLC. The field crew initially arrived at Washington Street in San Carlos at 06:45. Mr. Lou Duran (Senior Maintenance Worker City of San Carlos Public Works Department) supervised the City of San Carlos work crew.

Initially, pre- and post-washing transects were determined using a random number generator (see table below). Sampling was determined to be performed on Varian Street between Old County Road (western end) and Bayport Avenue (eastern end). The sampling and flushing section of the street was started approximately 120 feet (36.6 meters) east of Old county Road. This area was eliminated as the south side of the street was affected by a gravel driveway and dirt extending from adjacent properties, where there was no sidewalk, into the gutter. The road consisted of a mix of low curbs, normal curbs, driveways, sidewalks, and no sidewalks. The complete length of sampled road was approximately 550 feet or 167.6 meters. The roadway width was approximately 36 feet or 11 meters. Latitude and longitude values were determined using Google Earth for the middle of the street for both the start and finish of the sampling area (see table below).



Varian Street Sweeping Transects 18 September 2013											
Start: 37.4967° N and 122.2462° W Finish: 37.4977° N and 122.2449° W											
TRANSECT	Eliminated	1	2	3	4	5	6	7	8	9	10
PRE feet	120 to 0	7	66	121	164	196	275	333	426	498	506
PRE meters	36.6 to 0	2.1	20.1	36.9	50.0	59.7	83.8	101.5	129.8	151.8	154.2
POST feet	120 to 0	28	32	91	205	244	247	274	345	352	438
POST meters	36.6 to 0	8.5	9.8	27.7	62.5	74.4	75.3	83.5	105.2	107.3	133.5

The pre-sediment sample was completed at 08:00 and the post-sediment sample was completed at 14:00. Street flushing was started at approximately 08:20 with an approximate flush rate of 15 gallons per minute (gpm). Approximately 1000 gallons of wash water was used during the entire event. Aliquot one was collected at 08:47 with aliquots two, three, and four collected at 09:35, 10:35, and 12:10 respectively.



6.0 Bing Street

The Bing Street sediment and water quality sampling was performed on 20 September 2013. The field sampling crew consisted of Jonathan Toal of Kinnetic Laboratories Inc. and Michael Founds of 2ND Nature LLC. The field crew initially arrived at Washington Street in San Carlos at 06:35. Mr. Lou Duran (Senior Maintenance Worker City of San Carlos Public Works Department) supervised the City of San Carlos work crew.

Initially, pre- and post-washing transects were determined using a random number generator (see table below). Sampling was determined to be performed on Bing Street between Bayport Avenue (western end) and Industrial Road (eastern end). The sampling and flushing section of the street was started approximately 200 feet (61.0 meters) east of Bayport Avenue. This area was eliminated as the north side of the street was affected by irrigation runoff and a large amount of leaves in the gutter. In addition, pre-washing transects were adjusted due to accumulated pools of irrigation water in the gutter on the northern side of the street. These areas were not excluded in the post-washing transect area as they were washed and allowed to dry after the flushing. The road consisted of a mix of low curbs, normal curbs, driveways, sidewalks, and no sidewalks. The complete length of sampled road was approximately 500 feet or 152.4 meters. The roadway width was approximately 40 feet or 12.2 meters. Latitude and longitude values were determined using Google Earth for the middle of the street for both the start and finish of the sampling area (see table below).



Bing Street Sweeping Transects 20 September 2013											
Start: 37.4977° N and 122.2432° W Finish: 37.4986° N and 122.2419° W											
TRANSECT	Eliminated	1	2	3	4	5	6	7	8	9	10
PRE feet	200 to 0	113	203	248	262	333	362	397	401	444	480
PRE meters	61.0 to 0	34.4	61.9	75.6	79.9	101.5	110.3	121.0	122.2	135.3	146.3
POST feet	200 to 0	46	50	67	116	138	187	255	327	380	488
POST meters	61.0 to 0	14.0	15.2	20.4	35.4	42.1	57.0	77.7	99.7	115.8	148.7

The pre-sediment sample was completed at 08:25 and the post-sediment sample was completed at 14:00. Street flushing was started at approximately 09:15 with an approximate flush rate of 15 gallons per minute (gpm). Approximately 1400 gallons of wash water was used during the entire event. Aliquot one was collected at 09:25 with aliquots two, three, and four collected at 10:15, 12:17, and 13:35 respectively.

