

TECHNICAL MEMORANDUM

DATE: February 10, 2021

Project No.: 702-60-20-34

SENT VIA: EMAIL

TO: Dan Herrera, PE
Senior Civil Engineer
City of Petaluma, Public Works and Utilities Department
202 North McDowell Boulevard
Petaluma, CA 94954

FROM: David J. Vossler

REVIEWED BY: Kenneth Loy, PG #7008

SUBJECT: Oak Hill Park Well Siting Study



This technical memorandum (TM) documents the evaluation of three sites for the potential construction of a municipal supply well at the City of Petaluma's (City's) Oak Hill Park. This work builds on the Well Siting Study TM prepared by West Yost Associates (West Yost), dated July 19, 2019, which identified and ranked potential municipal well sites on City-owned parcels.

Figure 1 provides an overview of the City's water system. Oak Hill Park would be the first municipal well site west of the Petaluma River (River) in Pressure Zone 1. The City's existing wells are all east of the River in Pressure Zones 2 and 4.

Figure 2 shows the three highest ranked potential well sites from the prior Well Siting Study. Oak Hill Park was selected out of the three locations as it best met the criteria developed with City input during the Well Siting Study. Oak Hill Park is comprised of two contiguous City-owned parcels: APN 006-221-007 (western parcel) and APN 006-081-010 (eastern parcel). Most of the park amenities are located on the eastern parcel (APN 006-081-010). Most of the western parcel (APN 006-221-007) is occupied by City water utility infrastructure, which includes an existing 2-million-gallon (MG) storage tank, Booster Station 3, water pipelines and associated driveways, electrical service and fencing. The tank and Booster Station 3 are not in use due to their age and condition, and the City plans to replace them in the future. A municipal well located on the parcel would be used in conjunction with the planned replacement for the Oak Hill Park storage tank. The replacement infrastructure and a municipal well would enable the City to provide water service to either Pressure Zones 1 or 2 and would enhance the reliability of the City's municipal water supply, especially in Pressure Zone 1. Installation of a municipal well on parcel APN 006-221-007 is consistent with the City's historical and planned use of the parcel.

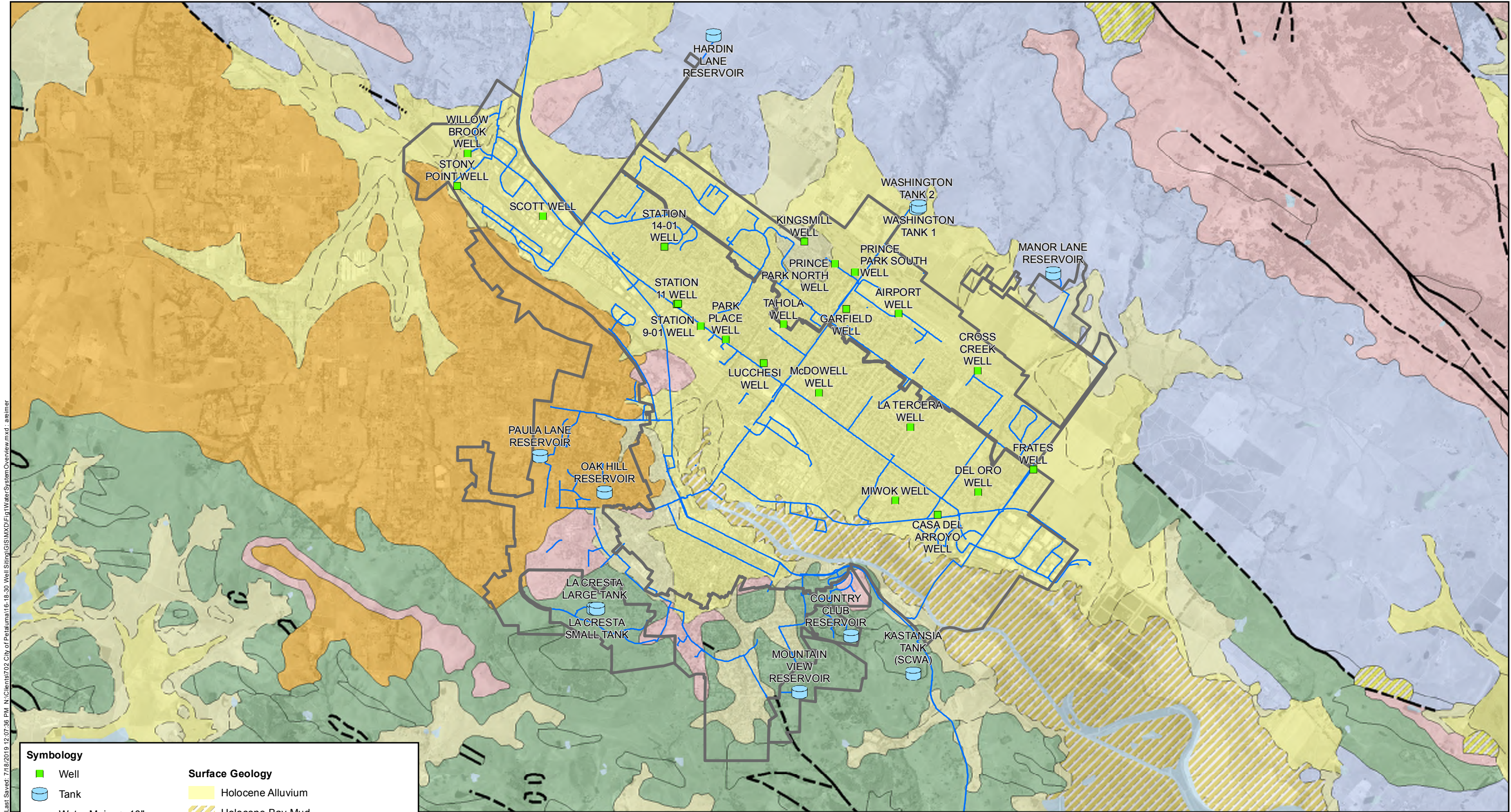
Site-specific hydrogeologic investigations have not been performed at Oak Hill Park. However, as documented in the Well Siting Study TM, the park is located within the mapped extent of the Wilson Grove Formation, which is one of the more productive aquifers in the Petaluma Groundwater Subbasin (Figure 1). To understand the water quality in the area, the City collected a water sample from a private well thought to be completed in the Wilson Grove Formation approximately 600 feet north-northwest of Oak Hill Park. No well log was available for the sampled well. The analytical results from the sample indicate water of good quality, except total dissolved solids (TDS) were elevated at 700 milligrams per liter (mg/L). The recommended California Secondary Maximum Contaminant Level (MCL) for TDS is 500 mg/L, and the short-term MCL is 1,500 mg/L. Nitrate as nitrogen was reported as 5.3 mg/L or approximately one-half the 10-mg/l California Primary MCL. The laboratory report is presented in Appendix A.

City staff identified three potential locations for a well site on Oak Hill Park parcel APN 006-221-007 in early 2020 and subsequently conducted a topographical survey and geotechnical study of the parcel (Cinquini & Passarino, Inc., 2020; Kleinfelder, 2020). These results were considered in the well site evaluation.

West Yost and City staff made an initial site visit to observe the three potential well sites on February 18, 2020. On March 11, 2020, West Yost and Maggoria Brothers Drilling visited the sites to assess access for well drilling and construction. Well siting criteria were developed with input with City staff during a conference call on August 6, 2020 and previous phone conversations. Observations from these site inspections and input from City staff are incorporated into this TM. Photographs of the three potential locations are presented in Appendix B.

This TM is organized in the following sections:

- Introduction (this section)
- Well Site Evaluation
- Conclusions
- Recommendations



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Symbology	
■	Well
	Tank
	Water Mains > 10"
	Pressure Zone Boundary
Surface Geology Lines	
	Contact (Certain)
	Contact (Approximate)
	Fault (Certain)
	Fault (Approximate)
	Fault (Concealed)
Surface Geology	
	Holocene Alluvium
	Holocene Bay Mud
	Quaternary Landslide Deposits
	Late Pleistocene Alluvium and Colluvium
	Wilson Grove Formation
	Sonoma Volcanics and Related Rocks
	Petaluma Formation
	Mesozoic Franciscan Complex
	Water

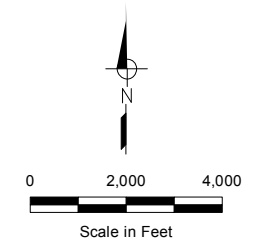
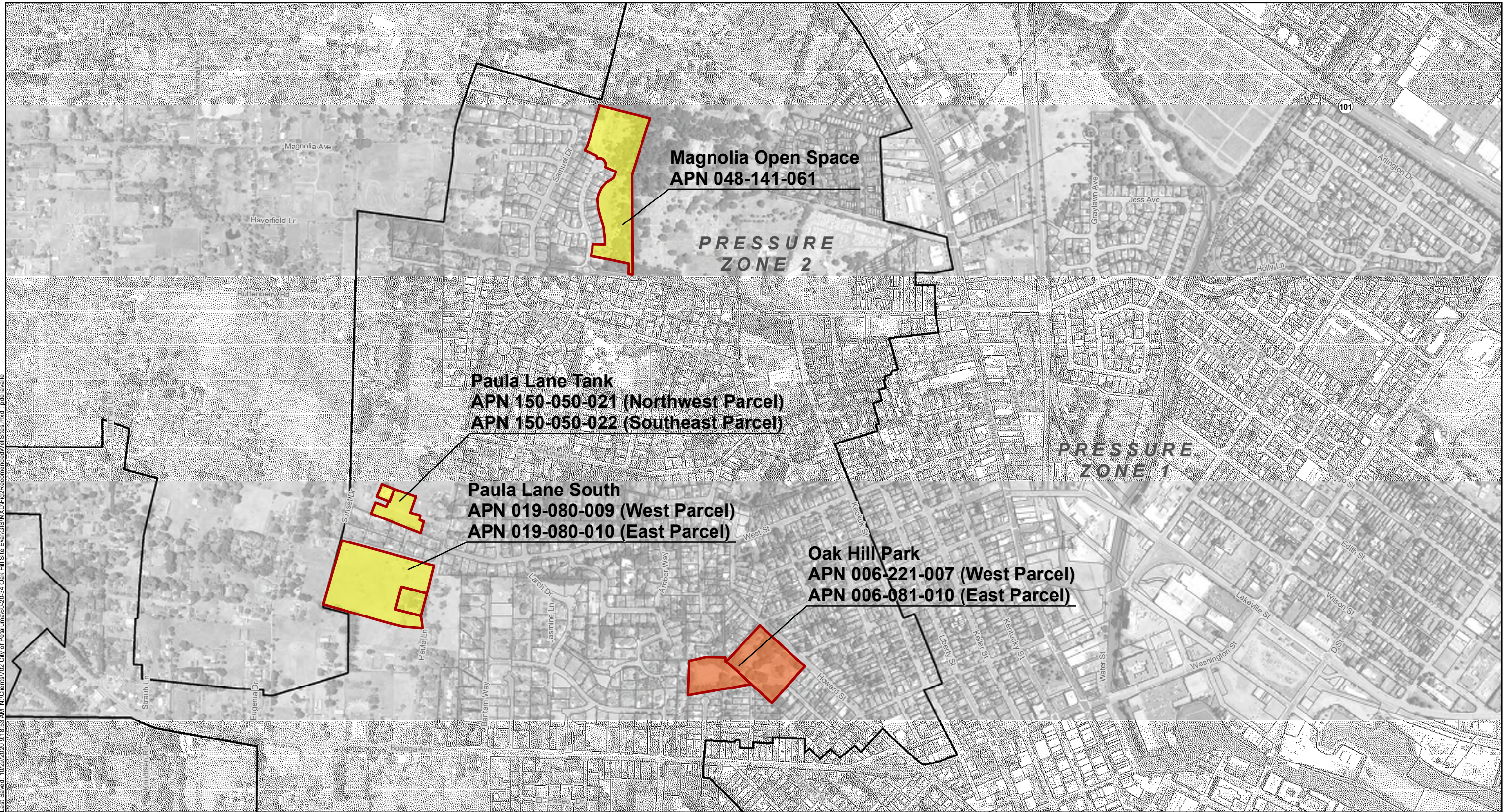
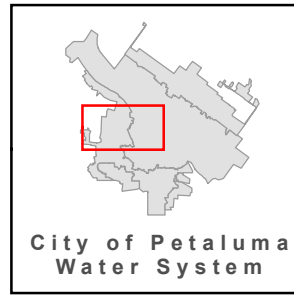


Figure 1
Water System Overview
City of Petaluma
Well Siting Study



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- Symbology**
- Qualifying Parcels
 - Pressure Zone Boundary
 - Parcels
- Recommended Well Sites**
- Preferred Site
 - Alternative Sites

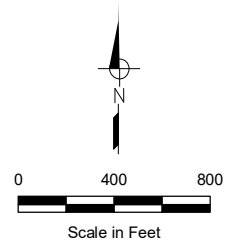


Figure 2
Recommended Well Sites
 City of Petaluma Well Siting Study

WELL SITE EVALUATION

This section documents the evaluation of three potential sites for a future municipal well on Oak Hill Park Parcel APN 006-221-007. Each location was evaluated and ranked based on logistical, infrastructure and cost considerations.

Figure 3 depicts the three potential well locations, all of which are in relatively close proximity to the existing tank. The tank is constructed mostly below grade in a cement-lined excavation located on the highest part an east-west trending ridge. The area immediately around the tank is level but bounded by slopes on all sides.

Site 1 is approximately 100 feet east and down slope of the existing tank on fairly level ground. There is room for a sound barrier, and for materials delivery, with no obstruction to the access road. Minimal grading and no vegetation clearing would be needed.

Site 2 is approximately 50 feet east of the existing tank adjacent to the access road that encircles the tank. The site is at the same grade as the tank access road and is restricted to the west by the tank and to the east by a steep slope. The space at this location is very limited, and access during well construction and operations would be difficult. The stability of the tank excavation wall and the slope to the east are of concern. Materials delivery would be difficult due to the restricted access. Construction of a sound wall would also be difficult and may not be feasible.

Site 3 is located at the southwest corner of the tank. This site is accessed by a small, steep paved road on the southern side of the tank site. The site has adequate area but is tree covered and close to adjacent houses. The construction of a sound barrier may be difficult without the removal of much of the tree canopy.

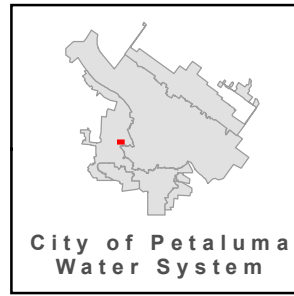
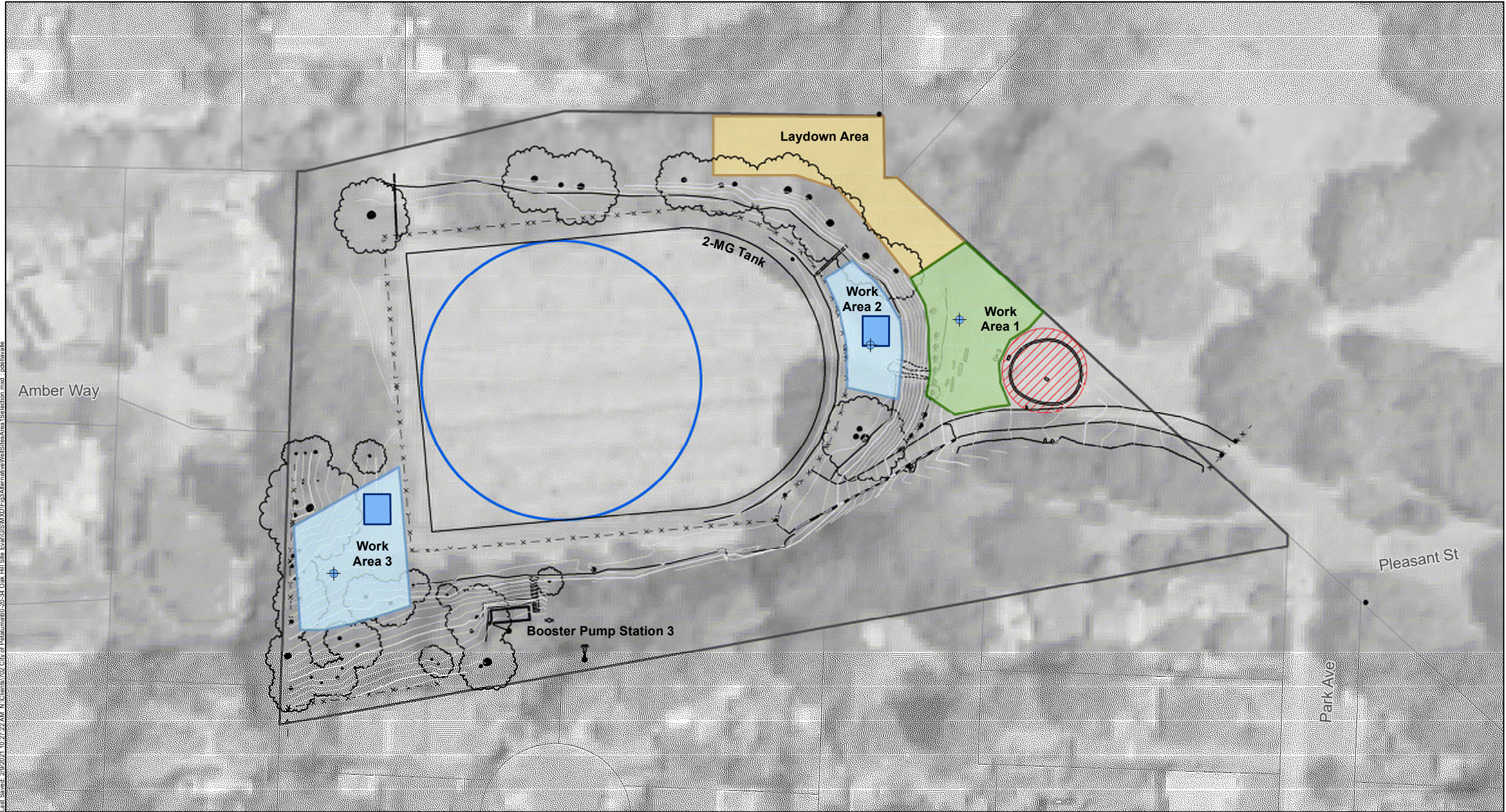
Based on discussions with City staff, if a municipal well is constructed at either Site 1 or 2, the future well building would be located at the tank site, as approximately shown on Figure 3. If a municipal well is constructed at Site 3, the future well building would also be located at Site 3.

Access would be from Park Avenue for all three sites. Security and safety fencing would be required.

The following sections provide scoring in the following categories:

- Drilling and Well Construction
- Operations and Maintenance (O&M)
- Infrastructure
- Life Cycle Costs

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Symbology

Possible Well Location	Equipment Building
Selected Work Area	Future Tank
Considered Work Areas	Oak Hill Parcel
Temporary Laydown Area	Parcels
Work Exclusion Area	

Note:
 1. Topographic contours from Cinquini & Passarino, Inc. 2020, Topographic Map, Oak Hill Well Site - Petaluma, April 13. One-foot contour interval.

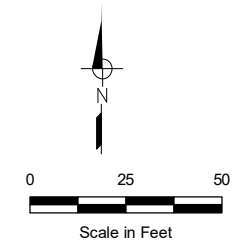


Figure 3
Alternative Well Sites
Oak Hill Park
 City of Petaluma
 Well Siting Study

Drilling and Well Construction Scoring

Table 1 summarizes the accessibility of each site for drilling and well construction equipment using numeric scores ranging from 1 to 3, from least to most favorable. Site 1, located east of the tank and on relatively level and open ground, is the top ranked location for a new well based on access and feasibility for drilling. The stone maze located on the site would need to be removed or protected during drilling and well construction. Benefits for this location are access and ease of drill rig set up and delivery of materials. No grading is required for the drill pad, but limited grading may be required for the sound barrier erection. Site 1 is also the furthest from neighboring houses. The access road to the tank would remain unobstructed, and there is ample room for drilling, staging and management of cuttings and fluids.

Site ^(a)	Size	Access	Sound and Light Control	Site Preparation	Score
1	Sufficient area for drilling, staging and management of cuttings and fluids.	Easy ingress and egress.	Minimal limitations for the erection of a sound and light barrier. Based on production well drilling - 24 hours a day.	Possible minimal site grading for sound and light barrier, and access for Maze protection. Protection of stone maze is required.	3
2	Limited work area. Slope stability is a concern and constraint. Current tank cavity has an unsupported dirt wall to 10-feet. Insufficient area for drilling, staging and cuttings and fluids management. May require additional planning and permitting for grading, tree removal, erection of noise and light barriers.	Difficult ingress and egress. Access road limited and may be impeded by drilling equipment, limiting access. Lacks turn around space.	Difficult and expensive to construct a sound and light barrier due to tank structure and slope to the east. Barrier would impede access. Based on production well drilling - 24 hours a day.	Tree canopy removal required for rig access and sound barrier erection. Stability shoring will be required along tank excavation and slope for well installation. Minimal grading required.	1
3	Area constrained by tank, trees and property line. Difficult ingress and egress. Limited area for drilling, staging and cuttings and fluids management. May require additional planning and permitting for grading, tree removal, noise and light barriers.	Narrow road and steep entry could limit delivery of materials. Lacks turn around space.	Difficult due to adjacent houses very close to property line and work area. Based on production well drilling - 24 hours a day.	Tree canopy removal required for rig access and sound barrier erection. Minimal grading required.	2

(a) Evaluation included comments and recommendations from Maggoria Brothers Drilling on access and room for drill rig setup. Site scoring based on a scale of 1 to 3, from least to most favorable for drilling and well construction.

Operations and Maintenance Scoring

Table 2 summarizes the scoring based on the accessibility of the wellhead, building and associated infrastructure for O&M activities.

Site ^(a)	Operations	Maintenance	Score
1	Excellent access to the wellhead for routine operations directly from Park Avenue. Access road required to protect Maze. Wellhead would require either fencing or placement in an underground vault due to its location in a publicly accessible area. Acceptable access to the well building.	Excellent access for general maintenance and major well work directly from Park Avenue. Acceptable access to the well building for maintenance.	3
2	Good access to the wellhead and building for routine operations. Limited site area for operations. Within fenced tank area.	Acceptable access to the wellhead and building for maintenance. Adequate site area for major maintenance (based on proposed tank replacement size and location). Possible slope stability issues.	1
3	Good access to the wellhead and building for routine operations. Within fenced tank area. Farthest location from Park Avenue.	Acceptable access to the wellhead and building for maintenance, but for major work, tree canopy may need to be removed.	2

(a) Evaluation included comments and recommendations from Maggoria Brothers Drilling on access and room for maintenance rig setup. Electrical service from Park Avenue. No storm sewer in vicinity and the sanitary sewer is on Park Avenue. Site scoring based on a scale of 1 to 3, from least to most favorable for O&M.

Infrastructure Scoring

Table 3 summarizes the scoring based on consideration of infrastructure improvements required to develop the selected location, including connections to existing potable water, electrical power and sanitary sewer lines.

The connection to the potable water distribution system was assumed to be to the 8-inch diameter pipelines located at the base of the tank site slope south of Site 2. These pipelines serve Pressure Zones 1 and 2. Pump to waste discharges from a future well were assumed to be to the 6-inch sanitary sewer pipeline terminating in the north end Park Avenue. Electrical power to the well site was assumed to be from the north end of Park Place. An 8-inch diameter sanitary sewer pipeline and electrical power service are located in Wallace Court but are not easily accessible due to the residences located between Wallace Court and Oak Hill Park.

Site 1 received the highest ranking in relation to existing infrastructure because the site is overall the closest to existing water, sanitary sewer and power infrastructure.

Table 3. Infrastructure Scoring		
Site^(a)	Required Infrastructure Improvements	Score
1	Connection to 8-inch potable water pipeline at tank site: 160 feet Connection to 6-inch sanitary sewer in Park Avenue: 300 feet Connection to electrical service in Park Avenue: 250 feet	3
2	Connection to 8-inch potable water pipeline at tank site: 140 feet Connection to 6-inch sanitary sewer in Park Avenue: 350 feet Connection to electrical service in Park Avenue: 300 feet	2
3	Connection to 8-inch potable water pipeline at tank site: 280 feet Connection to 6-inch sanitary sewer in Park Avenue: 650 feet Connection to electrical service in Park Avenue: 600 feet	1
(a) Evaluation included comments and recommendations from the City. Site scoring based on a scale of 1 to 3, from least to most favorable for infrastructure considerations.		

Life Cycle Costs

Conceptual-level life cycle cost estimates were developed for each location. These costs included well design, construction and O&M costs but not power costs, which were assumed to be similar for each site. The estimated costs do not include California Environmental Quality Act (CEQA) analyses or the costs of any associated mitigation measures.

Well Design and Construction Costs

Table 4 shows the well design and construction cost estimates based on recently completed well construction projects. Design and construction management services (CMS) were assumed to be 25 percent of the total cost of well construction. The well installation and construction for the three sites differ and is based on the location and additional work required to construct a well. Mobilization/demobilization costs and fluids management and disposal costs were estimated to vary between the sites, with Site 1 having the lowest cost for these items given its proximity to Park Avenue and the availability of space at the drill site to manage equipment, materials, cuttings and drilling fluids. Costs for these items were estimated to be highest at Site 2 because of the need for possible site grading, tree and canopy removal and shoring adjacent to the tank and the insufficient area to manage equipment, materials, cuttings and drilling fluids at the well site. Costs for these items were estimated to be intermediate at Site 3 and included site grading, tree and canopy removal, and increased cost due to the site’s distance from Park Avenue.

Site	Well Size (inch)	Well Depth (foot)	Casing	Well Construction and Pump, \$	Design and CMS, \$	Total, \$
1	10	500	F480/SDR17 PVC with Slotted Screens	598,000	149,500	747,500
2	10	500	F480/SDR17 PVC with Slotted Screens	598,000 (+120,000) ^(a, b)	179,500	897,500
3	10	500	F480/SDR17 PVC with Slotted Screens	598,000 (+40,000) ^(a)	159,500	797,500

(a) Incremental cost for mobilization/demobilization, access and fluids and cuttings management.
 (b) Estimated cost for design and stability shoring of current tank excavation and adjacent slope.

Well Equipping Costs

The well equipping cost estimates are based on recently completed well equipping projects. Table 5 summarizes well equipping cost, where design and CMS costs are estimated to be 25 percent of the total cost of the site work, pump, motor, housing (building and fencing around wellhead), electrical, instrumentation, chlorine disinfection system and appurtenances.

Site	Site Work, \$	Water Piping, \$	Well Housing, \$	Electrical & Controls, \$	Disinfection, \$	Design & CMS, \$	Total, \$
1	269,400 ^(a)	132,900	5,000	471,000	75,000	237,075	1,190,375
2	300,400 ^(a)	136,100	5,000	486,000	75,000	250,625	1,253,125
3	299,400 ^(a)	191,700	5,000	531,000	75,000	275,525	1,377,625

(a) Includes Upgrading Site Access.

Operation and Maintenance Costs

Table 6 summarizes the estimated O&M costs. The energy costs for pumping were assumed to be equal between the three sites given their close proximity and were not assessed. Municipal wells should be designed, constructed and maintained for high efficiency to minimize energy costs and overall life cycle costs.

O&M costs were estimated to be \$60 per hour at 600 hours per year. In addition to regular O&M, the well would undergo rehabilitation every six years at a cost of \$30,000 and the pump would be replaced every 15 years at a cost of \$20,000. Estimated costs for disinfection chemicals for a well producing 0.23 million gallons per day (MGD) would be approximately \$1,200 per year. The total annualized O&M costs were estimated to be approximately \$42,800 per year (averaged cost over 25 years, expected life of a large diameter PVC well in a municipal setting). These estimated costs for O&M are similar at the three proposed locations based on anticipated similar well designs at any of the three sites.

Life Cycle Costs

Table 6 summarizes the estimated life cycle costs, including capital and O&M costs. Power costs were assumed to be the same for each site and were not included in the life cycle costs. The well was assumed to produce 0.23 MGD over a 25-year life cycle. Future costs were discounted at a rate of 2.75 percent.

The estimated capital cost at Site 1 is \$1,937,875. The estimated O&M cost is \$42,800 per year. The total life cycle cost averaged over a 25-year well life and expressed in current dollars is \$2,704,000. This translates to an estimated life-cycle unit cost of \$418 per acre-foot of water produced, exclusive of power costs.

The estimated capital cost at Site 2 is \$2,150,625. The estimated O&M cost is \$42,800 per year. The total life cycle cost is \$2,917,000. The estimated life-cycle unit cost is \$452 per acre-foot of water produced, exclusive of power costs.

The estimated capital cost at Site 3 is \$2,175,125. The estimated O&M cost is \$42,800 per year. The total life cycle cost is \$2,942,000. The estimated life-cycle unit cost is \$456 per acre-foot of water produced, exclusive of power costs.

Site ^(a)	Development Capital Estimate ^(b) , \$	Operations Estimate ^(c) (per Year), \$	Maintenance Estimate ^(d) (per Year), \$	Life Cycle Cost ^(e) , \$	Life Cycle Unit Cost ^(e) , \$ per acre-foot	Score
1	1,937,875	37,200	5,600	2,704,000	418	3
2	2,150,625	37,200	5,600	2,917,000	452	2
3	2,175,125	37,200	5,600	2,942,000	456	1

(a) Estimated costs are based on the understanding and on available information at the time this TM was prepared. Scoring based on a scale of 1 to 3, from least to most favorable.

(b) Costs include engineering, design, well installation, equipping and site construction.

(c) Operations annualized over 25-year life cycle, not including energy costs.

(d) Maintenance annualized over 25-year life cycle.

(e) Life cycle costs estimated over a 25-year life cycle with a 2.75 percent discount rate (source: https://www.treasurydirect.gov/govt/rates/tcir/tcir_fy2020_opdirannual.htm#table4)

CONCLUSIONS

Three sites were evaluated, and one site was identified as the potential location of the new municipal well at Oak Hill Park Parcel APN 006-221-007 using the selection criteria developed with input from the City staff.

Table 7 provides a summary of the scoring and ranking of the three Oak Hill Park well sites. Site 1 received the highest score in all the evaluation categories and was the highest ranked site. Sites 2 and 3 have the same score but each have relative advantages and disadvantages, as indicated by their scores in the individual evaluation categories but received similar overall scores.

Site ^(a)	Construction	O&M	Infrastructure	Cost	Score	Rank	Comments
1	3	3	3	3	12	1	Recommended well site.
2	2	1	2	1	6	2	Alternative well site.
3	1	2	1	2	6	3 ^(b)	Alternative well site.

(a) Scoring based on a scale of 1 to 3, from least to most favorable.

(b) Based on overall costs.

RECOMMENDATIONS

Site 1 is recommended as the site for the new municipal well. Sites 2 and 3 are available as alternative sites.

Due to the complexity of the geology of the study area, the well yield and water quality at Oak Hill Park parcel APN 006-221-007 should be evaluated prior to the development of a well design and preparation of specifications.

Test hole drilling and sampling should be completed at the site before designing a municipal well and preparation of specifications. Test hole drilling and sampling should include lithologic logging, geophysical logging, and aquifer zone sampling to evaluate groundwater quality in permeable zones identified in the lithologic and geophysical logs. The findings will assist in the evaluation of the yield and water quality at the proposed well site and in developing the well design. Based on the test hole findings, a preliminary well design and specifications may be prepared. Alternatively, nested monitoring wells could be installed within the test hole to characterize groundwater quality and measure groundwater levels in the focused water bearing zones if deemed necessary. Groundwater quality samples should be analyzed for all regulated drinking water constituents and unregulated contaminants for which monitoring is required by the Division of Drinking Water, unless there are site-specific data or information that provide justification for a reduced list of analytes. This justification would be based on the City's analysis of the well design and construction risks. Chemical analysis of groundwater samples from a test hole would support the City's decision making on whether to develop the well site but is not a regulatory requirement.

Test hole drilling and sampling is expected to be categorically exempt as a Class 6 data collection activity under CEQA. The City should verify this with its CEQA consultant.

REFERENCES

Cinquini & Passarino, Inc., 2020, Topographic Map, Oak Hill Well Site – Petaluma, April 13.

Kleinfelder, 2020, Geotechnical Investigation, Oak Hill Park Proposed Well Structures, July.

West Yost, 2019, Technical Memorandum City of Petaluma Draft Well Siting Study, prepared for the City of Petaluma, July.

Analytical Report – 518 Amber Way Well



alpha

Alpha Analytical Laboratories, Inc. email: clientservices@alpha-labs.com
Corporate: 208 Mason Street | Ukiah, CA 95482 | T: 707-468-0401 | F: 707-468-5267 | ELAP# 1551

27 January 2020

Petaluma, City of - Drinking Water

Attn: Joel McIntyre

202 N. McDowell Blvd.

Petaluma, CA 94953

RE: Source Chemical Monitoring (SCM)

Work Order: 19L2896

Enclosed are the results of analyses for samples received by the laboratory on 12/18/19 12:05. If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Jeanette L. Poplin For Robbie C. Phillips

Project Manager



Alpha Analytical Laboratories, Inc. email: clientservices@alpha-labs.com
Corporate: 208 Mason Street | Ukiah, CA 95482 | T: 707-468-0401 | F: 707-468-5267 | ELAP# 1551

Petaluma, City of - Drinking Water 202 N. McDowell Blvd. Petaluma, CA 94953	Project Manager: Joel McIntyre Project: Source Chemical Monitoring (SCM) Project Number: 4910006	Reported: 01/27/20 08:50
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Bay Area: 262 Rickenbacker Circle | Livermore, CA 94551 | T: 925-828-6226 | F: 925-828-6309 | ELAP# 2728
Central Valley: 9090 Union Park Way Suite 113 | Elk Grove, CA 95624 | T: 916-686-5190 | F: 916-686-5192 | ELAP# 2922
North Bay: 110 Liberty Street | Petaluma, CA 94952 | T: 707-769-3128 | F: 707-769-8093 | ELAP# 2303
San Diego Service Center: 2722 Loker Avenue West Suite A | Carlsbad, CA 92010 | T: 760-930-2555 | F: 760-930-2510

ANALYTICAL REPORT FOR SAMPLES

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
518 Amber way Well	19L2896-01	Water	12/18/19 08:30	12/18/19 12:05
Trip Blank	19L2896-02	Water	12/18/19 08:45	12/18/19 12:05
Field/ Trip Blank	19L2896-03	Water	12/18/19 08:45	12/18/19 12:05

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.



Alpha Analytical Laboratories, Inc. email: clientservices@alpha-labs.com
 Corporate: 208 Mason Street | Ukiah, CA 95482 | T: 707-468-0401 | F: 707-468-5267 | ELAP# 1551

Petaluma, City of - Drinking Water
 202 N. McDowell Blvd.
 Petaluma, CA 94953

Project Manager: Joel McIntyre
 Project: Source Chemical Monitoring (SCM)
 Project Number: 4910006

Reported:
 01/27/20 08:50

	Result	Reporting Limit	Dilution	Batch	Prepared	Analyzed	ELAP#	Method	Note
518 Amber way Well (19L2896-01)		Sample Type: Water			Sampled: 12/18/19 08:30				
Metals (Drinking Water) by EPA 200 Series Methods									
Mercury	ND ug/L	0.50	1	AL94802	12/19/19 08:51	12/19/19 15:34	2303	EPA 245.1	
Silver	ND ug/L	10	1	AL94691	12/19/19 09:55	12/19/19 16:51	2303	EPA 200.7	
Metals by EPA 200 Series Methods									
Aluminum	ND ug/L	50	1	AL94691	12/19/19 09:55	12/19/19 16:51	2303	EPA 200.7	
Barium	ND ug/L	100	1	AL94691	12/19/19 09:55	12/19/19 16:51	2303	EPA 200.7	
Calcium	77 mg/L	0.20	2	AL94691	12/19/19 09:55	12/19/19 16:51	2303	EPA 200.7	
Chromium	ND ug/L	10	1	AL94691	12/19/19 09:55	12/19/19 16:51	2303	EPA 200.7	
Chromium, hexavalent	ND ug/L	1.0	1	AL94725	12/19/19 08:00	12/19/19 11:39	2303	EPA 218.6	
Copper	85 ug/L	50	1	AL94691	12/19/19 09:55	12/19/19 16:51	2303	EPA 200.7	
Iron	150 ug/L	100	1	AL94691	12/19/19 09:55	12/19/19 16:51	2303	EPA 200.7	
Magnesium	18 mg/L	0.10	1	AL94691	12/19/19 09:55	12/19/19 16:51	2303	EPA 200.7	
Manganese	ND ug/L	20	1	AL94691	12/19/19 09:55	12/19/19 16:51	2303	EPA 200.7	
Nickel	ND ug/L	10	1	AL94691	12/19/19 09:55	12/19/19 16:51	2303	EPA 200.7	
Sodium	53 mg/L	0.20	1	AL94691	12/19/19 09:55	12/19/19 16:51	2303	EPA 200.7	
Zinc	64 ug/L	50	1	AL94691	12/19/19 09:55	12/19/19 16:51	2303	EPA 200.7	
Metals by EPA Method 200.8 ICP/MS									
Antimony	ND ug/L	6.0	4	AL95265	12/30/19 13:30	01/03/20 15:25	1551	EPA 200.8	
Arsenic	ND ug/L	2.0	4	AL95265	12/30/19 13:30	01/03/20 15:25	1551	EPA 200.8	
Beryllium	ND ug/L	1.0	4	AL95265	12/30/19 13:30	01/03/20 15:25	1551	EPA 200.8	
Cadmium	ND ug/L	1.0	4	AL95265	12/30/19 13:30	01/03/20 15:25	1551	EPA 200.8	
Selenium	28 ug/L	5.0	4	AL95265	12/30/19 13:30	01/06/20 17:56	1551	EPA 200.8	
Thallium	ND ug/L	1.0	4	AL95265	12/30/19 13:30	01/06/20 17:56	1551	EPA 200.8	
Uranium	ND pCi/l	1.0	4	AL95265	12/30/19 13:30	01/06/20 17:56	1551	EPA 200.8	

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Petaluma, City of - Drinking Water
 202 N. McDowell Blvd.
 Petaluma, CA 94953

Project Manager: Joel McIntyre
 Project: Source Chemical Monitoring (SCM)
 Project Number: 4910006

Reported:
 01/27/20 08:50

Result	Reporting Limit	Dilution	Batch	Prepared	Analyzed	ELAP#	Method	Note	
518 Amber way Well (19L2896-01)		Sample Type: Water		Sampled: 12/18/19 08:30					
Conventional Chemistry Parameters by APHA/EPA Methods									
Aggressive Index	11.25 NU	2.00	1	AL94691	12/19/19 09:55	01/08/20 17:08	2303 AWWA		
Color	ND CU	5.0	1	AL94083	12/18/19 16:00	12/18/19 16:02	2303 SM2120B		
MBAS, calculated as LAS, mw 340	ND mg/L	0.010	1	AL94857	12/19/19 09:15	12/20/19 16:18	2303 SM5540C		
Odor	1.0 T.O.N.	1.0	1	AL94083	12/18/19 16:00	12/18/19 16:02	2303 SM2120B		
pH	6.75 pH Units	1.00	1	AL94559	12/18/19 15:00	12/18/19 16:00	2303 SM4500-H+ B	T-14	
Specific Conductance (EC)	920 umhos/cm	10	1	AL94559	12/18/19 15:00	12/18/19 16:00	2303 SM2510B		
Total Alkalinity as CaCO3	120 mg/L	5.0	1	AL94804	12/20/19 08:00	12/20/19 11:20	2303 SM2320B		
Total Dissolved Solids	700 mg/L	10	1	AL94874	12/21/19 07:00	01/02/20 12:01	1551 SM2540C		
Turbidity	0.87 NTU	0.25	1	AL94083	12/18/19 16:00	12/18/19 16:02	2303 SM2130B		
Bicarbonate Alkalinity as CaCO3	120 mg/L	5.0	1	AL94804	12/20/19 08:00	12/20/19 11:20	2303 SM2320B		
Carbonate Alkalinity as CaCO3	ND mg/L	5.0	1	AL94804	12/20/19 08:00	12/20/19 11:20	2303 SM2320B		
Hydroxide Alkalinity as CaCO3	ND mg/L	5.0	1	AL94804	12/20/19 08:00	12/20/19 11:20	2303 SM2320B		
Hardness, Total	266 mg/L	1	1	AL94691	12/19/19 09:55	12/19/19 16:51	2303 SM2340B		
Miscellaneous Physical/Conventional Chemistry Parameters									
Cyanide (total)	ND mg/L	0.10	1	AL95032	12/26/19 09:00	12/26/19 14:20	1551 10-204-00-1X		
Anions by EPA Method 300.0									
Chloride	180 mg/L	50	100	AL94689	12/19/19 08:45	12/19/19 14:59	2303 EPA 300.0		
Fluoride	ND mg/L	0.10	1	AL94689	12/19/19 08:45	12/19/19 09:56	2303 EPA 300.0		
Nitrate as N	5.3 mg/L	0.80	2	AL94689	12/19/19 08:45	12/19/19 15:17	2303 EPA 300.0		
Nitrite as N	ND mg/L	0.20	1	AL94689	12/19/19 08:45	12/19/19 09:56	2303 EPA 300.0		
Sulfate as SO4	9.6 mg/L	0.50	1	AL94689	12/19/19 08:45	12/19/19 09:56	2303 EPA 300.0		



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Petaluma, City of - Drinking Water 202 N. McDowell Blvd. Petaluma, CA 94953	Project Manager: Joel McIntyre Project: Source Chemical Monitoring (SCM) Project Number: 4910006	Reported: 01/27/20 08:50
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	Result	Reporting Limit	Dilution	Batch	Prepared	Analyzed	ELAP#	Method	Note
518 Amber way Well (19L2896-01)		Sample Type: Water			Sampled: 12/18/19 08:30				
Volatile Organic Compounds by EPA Method 524.2									
Benzene	ND ug/L	0.50	1	AL94548	12/18/19 15:00	12/18/19 16:39	2303	EPA 524.2	
Carbon tetrachloride	ND ug/L	0.50	1	AL94548	12/18/19 15:00	12/18/19 16:39	2303	EPA 524.2	
Chlorobenzene	ND ug/L	0.50	1	AL94548	12/18/19 15:00	12/18/19 16:39	2303	EPA 524.2	
1,2-Dichlorobenzene	ND ug/L	0.50	1	AL94548	12/18/19 15:00	12/18/19 16:39	2303	EPA 524.2	
1,4-Dichlorobenzene	ND ug/L	0.50	1	AL94548	12/18/19 15:00	12/18/19 16:39	2303	EPA 524.2	
1,1-Dichloroethane	ND ug/L	0.50	1	AL94548	12/18/19 15:00	12/18/19 16:39	2303	EPA 524.2	
1,2-Dichloroethane	ND ug/L	0.50	1	AL94548	12/18/19 15:00	12/18/19 16:39	2303	EPA 524.2	
1,1-Dichloroethene	ND ug/L	0.50	1	AL94548	12/18/19 15:00	12/18/19 16:39	2303	EPA 524.2	
cis-1,2-Dichloroethene	ND ug/L	0.50	1	AL94548	12/18/19 15:00	12/18/19 16:39	2303	EPA 524.2	
trans-1,2-Dichloroethene	ND ug/L	0.50	1	AL94548	12/18/19 15:00	12/18/19 16:39	2303	EPA 524.2	
1,2-Dichloropropane	ND ug/L	0.50	1	AL94548	12/18/19 15:00	12/18/19 16:39	2303	EPA 524.2	
1,3-Dichloropropene (total)	ND ug/L	0.50	1	AL94548	12/18/19 15:00	12/18/19 16:39	2303	EPA 524.2	
Ethylbenzene	ND ug/L	0.50	1	AL94548	12/18/19 15:00	12/18/19 16:39	2303	EPA 524.2	
Methyl tert-butyl ether	ND ug/L	3.0	1	AL94548	12/18/19 15:00	12/18/19 16:39	2303	EPA 524.2	
Methylene chloride	ND ug/L	0.50	1	AL94548	12/18/19 15:00	12/18/19 16:39	2303	EPA 524.2	
Styrene	ND ug/L	0.50	1	AL94548	12/18/19 15:00	12/18/19 16:39	2303	EPA 524.2	
1,1,2,2-Tetrachloroethane	ND ug/L	0.50	1	AL94548	12/18/19 15:00	12/18/19 16:39	2303	EPA 524.2	
Tetrachloroethene	ND ug/L	0.50	1	AL94548	12/18/19 15:00	12/18/19 16:39	2303	EPA 524.2	
Toluene	ND ug/L	0.50	1	AL94548	12/18/19 15:00	12/18/19 16:39	2303	EPA 524.2	
1,2,4-Trichlorobenzene	ND ug/L	0.50	1	AL94548	12/18/19 15:00	12/18/19 16:39	2303	EPA 524.2	
1,1,1-Trichloroethane	ND ug/L	0.50	1	AL94548	12/18/19 15:00	12/18/19 16:39	2303	EPA 524.2	
1,1,2-Trichloroethane	ND ug/L	0.50	1	AL94548	12/18/19 15:00	12/18/19 16:39	2303	EPA 524.2	
Trichloroethene	ND ug/L	0.50	1	AL94548	12/18/19 15:00	12/18/19 16:39	2303	EPA 524.2	
Trichlorofluoromethane	ND ug/L	5.0	1	AL94548	12/18/19 15:00	12/18/19 16:39	2303	EPA 524.2	
Trichlorotrifluoroethane	ND ug/L	10	1	AL94548	12/18/19 15:00	12/18/19 16:39	2303	EPA 524.2	
Vinyl chloride	ND ug/L	0.50	1	AL94548	12/18/19 15:00	12/18/19 16:39	2303	EPA 524.2	
Xylenes (total)	ND ug/L	1.5	1	AL94548	12/18/19 15:00	12/18/19 16:39	2303	EPA 524.2	
Surrogate: Bromofluorobenzene	92.9 %	70-130		AL94548	12/18/19 15:00	12/18/19 16:39	2303	EPA 524.2	
Surrogate: 1,2-Dichlorobenzene-d4	97.2 %	70-130		AL94548	12/18/19 15:00	12/18/19 16:39	2303	EPA 524.2	

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Petaluma, City of - Drinking Water
 202 N. McDowell Blvd.
 Petaluma, CA 94953

Project Manager: Joel McIntyre
 Project: Source Chemical Monitoring (SCM)
 Project Number: 4910006

Reported:
 01/27/20 08:50

	Result	Reporting Limit	Dilution	Batch	Prepared	Analyzed	ELAP#	Method	Note
518 Amber way Well (19L2896-01)									
Sample Type: Water									
Sampled: 12/18/19 08:30									
Chlorinated Pesticides and PCBs by EPA Method 508									
Endrin	ND ug/L	0.10	1	AL94889	12/21/19 08:05	01/09/20 01:13	1551	EPA 508	
HCH-gamma (Lindane)	ND ug/L	0.20	1	AL94889	12/21/19 08:05	01/09/20 01:13	1551	EPA 508	
Heptachlor	ND ug/L	0.010	1	AL94889	12/21/19 08:05	01/09/20 01:13	1551	EPA 508	
Heptachlor epoxide	ND ug/L	0.010	1	AL94889	12/21/19 08:05	01/09/20 01:13	1551	EPA 508	
Hexachlorobenzene	ND ug/L	0.50	1	AL94889	12/21/19 08:05	01/09/20 01:13	1551	EPA 508	
Hexachlorocyclopentadiene	ND ug/L	1.0	1	AL94889	12/21/19 08:05	01/09/20 01:13	1551	EPA 508	
Methoxychlor	ND ug/L	10	1	AL94889	12/21/19 08:05	01/09/20 01:13	1551	EPA 508	
PCB-1016	ND ug/L	0.50	1	AL94889	12/21/19 08:05	01/09/20 01:13	1551	EPA 508	
PCB-1221	ND ug/L	0.50	1	AL94889	12/21/19 08:05	01/09/20 01:13	1551	EPA 508	
PCB-1232	ND ug/L	0.50	1	AL94889	12/21/19 08:05	01/09/20 01:13	1551	EPA 508	
PCB-1242	ND ug/L	0.50	1	AL94889	12/21/19 08:05	01/09/20 01:13	1551	EPA 508	
PCB-1248	ND ug/L	0.50	1	AL94889	12/21/19 08:05	01/09/20 01:13	1551	EPA 508	
PCB-1254	ND ug/L	0.50	1	AL94889	12/21/19 08:05	01/09/20 01:13	1551	EPA 508	
PCB-1260	ND ug/L	0.50	1	AL94889	12/21/19 08:05	01/09/20 01:13	1551	EPA 508	
Total PCBs	ND ug/L	0.50	1	AL94889	12/21/19 08:05	01/09/20 01:13	1551	EPA 508	
Toxaphene	ND ug/L	1.0	1	AL94889	12/21/19 08:05	01/09/20 01:13	1551	EPA 508	
Chlordane (tech)	ND ug/L	0.10	1	AL94889	12/21/19 08:05	01/09/20 01:13	1551	EPA 508	
Surrogate: Dibutylchlorendate	93.6 %	70-130		AL94889	12/21/19 08:05	01/09/20 01:13	1551	EPA 508	
Nitrogen- and Phosphorus- Pesticides by EPA Method 507									
Alachlor	ND ug/L	1.0	1	AL95078	12/26/19 15:00	01/11/20 02:25	1551	EPA 507	
Atrazine	ND ug/L	0.50	1	AL95078	12/26/19 15:00	01/11/20 02:25	1551	EPA 507	
Molinate	ND ug/L	2.0	1	AL95078	12/26/19 15:00	01/11/20 02:25	1551	EPA 507	
Simazine	ND ug/L	1.0	1	AL95078	12/26/19 15:00	01/11/20 02:25	1551	EPA 507	
Thiobencarb	ND ug/L	1.0	1	AL95078	12/26/19 15:00	01/11/20 02:25	1551	EPA 507	
Surrogate: 1,3-Dimethyl-2-nitrobenzene	104 %	70-130		AL95078	12/26/19 15:00	01/11/20 02:25	1551	EPA 507	

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Petaluma, City of - Drinking Water
 202 N. McDowell Blvd.
 Petaluma, CA 94953

Project Manager: Joel McIntyre
 Project: Source Chemical Monitoring (SCM)
 Project Number: 4910006

Reported:
 01/27/20 08:50

	Result	Reporting Limit	Dilution	Batch	Prepared	Analyzed	ELAP#	Method	Note
518 Amber way Well (19L2896-01)		Sample Type: Water			Sampled: 12/18/19 08:30				
Organic Analytes by EPA Method 504.1									
1,2-Dibromo-3-chloropropane	ND ug/L	0.010	1	AL95152	12/27/19 12:45	12/28/19 07:47	1551	EPA 504.1	
1,2-Dibromoethane (EDB)	ND ug/L	0.020	1	AL95152	12/27/19 12:45	12/28/19 07:47	1551	EPA 504.1	
Chlorinated Acids by EPA Method 515.3									
Bentazon	ND ug/L	2.0	1	AL95164	12/30/19 00:00	01/02/20 21:44	1551	EPA 515.3	
2,4-D	ND ug/L	10	1	AL95164	12/30/19 00:00	01/02/20 21:44	1551	EPA 515.3	
Dalapon	ND ug/L	10	1	AL95164	12/30/19 00:00	01/02/20 21:44	1551	EPA 515.3	
Dinoseb	ND ug/L	2.0	1	AL95164	12/30/19 00:00	01/02/20 21:44	1551	EPA 515.3	
Pentachlorophenol	ND ug/L	0.20	1	AL95164	12/30/19 00:00	01/02/20 21:44	1551	EPA 515.3	
Picloram	ND ug/L	1.0	1	AL95164	12/30/19 00:00	01/02/20 21:44	1551	EPA 515.3	
2,4,5-TP (Silvex)	ND ug/L	1.0	1	AL95164	12/30/19 00:00	01/02/20 21:44	1551	EPA 515.3	
Surrogate: DCAA	109 %	70-130		AL95164	12/30/19 00:00	01/02/20 21:44	1551	EPA 515.3	
Carbamates by EPA Method 531.1									
Carbofuran	ND ug/L	5.0	1	AL94610	12/19/19 08:00	12/19/19 21:59	1551	EPA 531.1	
Oxamyl	ND ug/L	20	1	AL94610	12/19/19 08:00	12/19/19 21:59	1551	EPA 531.1	
Endothall by EPA Method 548.1									
Endothall	ND ug/L	45	1	AL94745	12/19/19 15:33	12/31/19 03:27	1551	EPA 548.1	
Glyphosate by EPA Method 547									
Glyphosate	ND ug/L	25	1	AL94991	12/23/19 12:36	12/23/19 21:40	1551	EPA 547	

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Petaluma, City of - Drinking Water 202 N. McDowell Blvd. Petaluma, CA 94953	Project Manager: Joel McIntyre Project: Source Chemical Monitoring (SCM) Project Number: 4910006	Reported: 01/27/20 08:50
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	Result	Reporting Limit	Dilution	Batch	Prepared	Analyzed	ELAP#	Method	Note
518 Amber way Well (19L2896-01)		Sample Type: Water			Sampled: 12/18/19 08:30				
Diquat by EPA Method 549.2									
Diquat	ND ug/L	4.0	1	AL94773	12/20/19 05:49	12/23/19 19:16	1551	EPA 549.2	
Semivolatile Organic Compounds by EPA Method 525.3									
Benzo (a) pyrene	ND ug/L	0.10	1	AL95046	12/26/19 09:09	01/23/20 06:04	1551	EPA 525.3	
Di(2-ethylhexyl)adipate	ND ug/L	5.0	1	AL95046	12/26/19 09:09	01/23/20 06:04	1551	EPA 525.3	
Di(2-ethylhexyl)phthalate	ND ug/L	3.0	1	AL95046	12/26/19 09:09	01/23/20 06:04	1551	EPA 525.3	
Surrogate: Benzo (a) pyrene-d12	99.2 %	70-130		AL95046	12/26/19 09:09	01/23/20 06:04	1551	EPA 525.3	
Trip Blank (19L2896-02)		Sample Type: Water			Sampled: 12/18/19 08:45				
Volatile Organic Compounds by EPA Method 524.2									
Benzene	ND ug/L	0.50	1	AL94548	12/18/19 15:00	12/18/19 16:16	2303	EPA 524.2	
Carbon tetrachloride	ND ug/L	0.50	1	AL94548	12/18/19 15:00	12/18/19 16:16	2303	EPA 524.2	
Chlorobenzene	ND ug/L	0.50	1	AL94548	12/18/19 15:00	12/18/19 16:16	2303	EPA 524.2	
1,2-Dichlorobenzene	ND ug/L	0.50	1	AL94548	12/18/19 15:00	12/18/19 16:16	2303	EPA 524.2	
1,4-Dichlorobenzene	ND ug/L	0.50	1	AL94548	12/18/19 15:00	12/18/19 16:16	2303	EPA 524.2	
1,1-Dichloroethane	ND ug/L	0.50	1	AL94548	12/18/19 15:00	12/18/19 16:16	2303	EPA 524.2	
1,2-Dichloroethane	ND ug/L	0.50	1	AL94548	12/18/19 15:00	12/18/19 16:16	2303	EPA 524.2	
1,1-Dichloroethene	ND ug/L	0.50	1	AL94548	12/18/19 15:00	12/18/19 16:16	2303	EPA 524.2	
cis-1,2-Dichloroethene	ND ug/L	0.50	1	AL94548	12/18/19 15:00	12/18/19 16:16	2303	EPA 524.2	
trans-1,2-Dichloroethene	ND ug/L	0.50	1	AL94548	12/18/19 15:00	12/18/19 16:16	2303	EPA 524.2	
1,2-Dichloropropane	ND ug/L	0.50	1	AL94548	12/18/19 15:00	12/18/19 16:16	2303	EPA 524.2	
1,3-Dichloropropene (total)	ND ug/L	0.50	1	AL94548	12/18/19 15:00	12/18/19 16:16	2303	EPA 524.2	
Ethylbenzene	ND ug/L	0.50	1	AL94548	12/18/19 15:00	12/18/19 16:16	2303	EPA 524.2	
Methyl tert-butyl ether	ND ug/L	3.0	1	AL94548	12/18/19 15:00	12/18/19 16:16	2303	EPA 524.2	
Methylene chloride	ND ug/L	0.50	1	AL94548	12/18/19 15:00	12/18/19 16:16	2303	EPA 524.2	
Styrene	ND ug/L	0.50	1	AL94548	12/18/19 15:00	12/18/19 16:16	2303	EPA 524.2	
1,1,2,2-Tetrachloroethane	ND ug/L	0.50	1	AL94548	12/18/19 15:00	12/18/19 16:16	2303	EPA 524.2	
Tetrachloroethene	ND ug/L	0.50	1	AL94548	12/18/19 15:00	12/18/19 16:16	2303	EPA 524.2	
Toluene	ND ug/L	0.50	1	AL94548	12/18/19 15:00	12/18/19 16:16	2303	EPA 524.2	
1,2,4-Trichlorobenzene	ND ug/L	0.50	1	AL94548	12/18/19 15:00	12/18/19 16:16	2303	EPA 524.2	
1,1,1-Trichloroethane	ND ug/L	0.50	1	AL94548	12/18/19 15:00	12/18/19 16:16	2303	EPA 524.2	
1,1,2-Trichloroethane	ND ug/L	0.50	1	AL94548	12/18/19 15:00	12/18/19 16:16	2303	EPA 524.2	
Trichloroethene	ND ug/L	0.50	1	AL94548	12/18/19 15:00	12/18/19 16:16	2303	EPA 524.2	
Trichlorofluoromethane	ND ug/L	5.0	1	AL94548	12/18/19 15:00	12/18/19 16:16	2303	EPA 524.2	
Trichlorotrifluoroethane	ND ug/L	10	1	AL94548	12/18/19 15:00	12/18/19 16:16	2303	EPA 524.2	
Vinyl chloride	ND ug/L	0.50	1	AL94548	12/18/19 15:00	12/18/19 16:16	2303	EPA 524.2	
Xylenes (total)	ND ug/L	1.5	1	AL94548	12/18/19 15:00	12/18/19 16:16	2303	EPA 524.2	
Surrogate: Bromofluorobenzene	94.2 %	70-130		AL94548	12/18/19 15:00	12/18/19 16:16	2303	EPA 524.2	
Surrogate: 1,2-Dichlorobenzene-d4	96.9 %	70-130		AL94548	12/18/19 15:00	12/18/19 16:16	2303	EPA 524.2	

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Petaluma, City of - Drinking Water 202 N. McDowell Blvd. Petaluma, CA 94953	Project Manager: Joel McIntyre Project: Source Chemical Monitoring (SCM) Project Number: 4910006	Reported: 01/27/20 08:50
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Metals (Drinking Water) by EPA 200 Series Methods - Quality Control

Analyte(s)	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Flag
Batch AL94691 - NB EPA 200 series Direct Analysis										
Blank (AL94691-BLK1)					Prepared & Analyzed: 12/19/19					
Silver	ND	10	ug/L							
LCS (AL94691-BS1)					Prepared & Analyzed: 12/19/19					
Silver	123	10	ug/L	125		98.4	85-115			
LCS Dup (AL94691-BSD1)					Prepared & Analyzed: 12/19/19					
Silver	123	10	ug/L	125		98.6	85-115	0.162	20	
Duplicate (AL94691-DUP1)					Source: 19L2713-01 Prepared & Analyzed: 12/19/19					
Silver	ND	10	ug/L		ND			200	20	
Matrix Spike (AL94691-MS1)					Source: 19L2930-01 Prepared & Analyzed: 12/19/19					
Silver	116	10	ug/L	125	ND	92.7	70-130			
Matrix Spike (AL94691-MS2)					Source: 19L2968-01 Prepared & Analyzed: 12/19/19					
Silver	112	10	ug/L	125	ND	89.4	70-130			
Matrix Spike Dup (AL94691-MSD1)					Source: 19L2930-01 Prepared: 12/19/19 Analyzed: 01/08/20					
Silver	ND	10	ug/L	125	ND		70-130	200	20	
Batch AL94802 - NB EPA 245.1 Hg										
Blank (AL94802-BLK1)					Prepared & Analyzed: 12/19/19					
Mercury	ND	0.50	ug/L							
LCS (AL94802-BS1)					Prepared & Analyzed: 12/19/19					
Mercury	6.88	0.50	ug/L	7.50		91.7	85-115			

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Petaluma, City of - Drinking Water
 202 N. McDowell Blvd.
 Petaluma, CA 94953

Project Manager: Joel McIntyre
 Project: Source Chemical Monitoring (SCM)
 Project Number: 4910006

Reported:
 01/27/20 08:50

Metals (Drinking Water) by EPA 200 Series Methods - Quality Control

Analyte(s)	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Flag
Batch AL94802 - NB EPA 245.1 Hg										
LCS Dup (AL94802-BSD1)				Prepared & Analyzed: 12/19/19						
Mercury	7.42	0.50	ug/L	7.50		99.0	85-115	7.69	20	
Matrix Spike (AL94802-MS1)				Source: 19L2713-01 Prepared & Analyzed: 12/19/19						
Mercury	8.72	0.50	ug/L	7.50	ND	116	70-130			



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Metals by EPA 200 Series Methods - Quality Control

Analyte(s)	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Flag
Batch AL94691 - NB EPA 200 series Direct Analysis										
Blank (AL94691-BLK1)				Prepared & Analyzed: 12/19/19						
Aluminum	ND	50	ug/L							
Barium	ND	100	ug/L							
Calcium	ND	0.10	mg/L							
Chromium	ND	10	ug/L							
Copper	ND	50	ug/L							
Iron	ND	100	ug/L							
Magnesium	ND	0.10	mg/L							
Manganese	ND	20	ug/L							
Nickel	ND	10	ug/L							
Sodium	ND	0.20	mg/L							
Zinc	ND	50	ug/L							
LCS (AL94691-BS1)				Prepared & Analyzed: 12/19/19						
Aluminum	480	50	ug/L	500		96.0	85-115			
Barium	484	100	ug/L	500		96.7	85-115			
Calcium	0.471	0.10	mg/L	0.500		94.3	85-115			
Chromium	489	10	ug/L	500		97.7	85-115			
Copper	480	50	ug/L	500		96.1	85-115			
Iron	512	100	ug/L	500		102	85-115			
Magnesium	0.498	0.10	mg/L	0.500		99.7	85-115			
Manganese	505	20	ug/L	500		101	85-115			
Nickel	512	10	ug/L	500		102	85-115			
Sodium	0.499	0.20	mg/L	0.500		99.9	85-115			
Zinc	511	50	ug/L	500		102	85-115			
LCS Dup (AL94691-BS1)				Prepared & Analyzed: 12/19/19						
Aluminum	482	50	ug/L	500		96.5	85-115	0.436	20	
Barium	483	100	ug/L	500		96.7	85-115	0.0827	20	
Calcium	0.470	0.10	mg/L	0.500		93.9	85-115	0.383	20	
Chromium	487	10	ug/L	500		97.5	85-115	0.266	20	
Copper	484	50	ug/L	500		96.7	85-115	0.664	20	
Iron	513	100	ug/L	500		103	85-115	0.117	20	
Magnesium	0.498	0.10	mg/L	0.500		99.5	85-115	0.181	20	
Manganese	504	20	ug/L	500		101	85-115	0.139	20	
Nickel	512	10	ug/L	500		102	85-115	0.0586	20	
Sodium	0.503	0.20	mg/L	0.500		101	85-115	0.758	20	

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Project Manager: Joel McIntyre
 Project: Source Chemical Monitoring (SCM)
 Project Number: 4910006

Reported:
 01/27/20 08:50

Metals by EPA 200 Series Methods - Quality Control

Analyte(s)	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Flag
Batch AL94691 - NB EPA 200 series Direct Analysis										
LCS Dup (AL94691-BSD1)				Prepared & Analyzed: 12/19/19						
Zinc	514	50	ug/L	500		103	85-115	0.449	20	
Duplicate (AL94691-DUP1)				Source: 19L2713-01 Prepared & Analyzed: 12/19/19						
Aluminum	ND	50	ug/L		ND				20	
Barium	ND	100	ug/L		ND			1.38	20	
Calcium	10.3	0.10	mg/L		10.2			1.56	20	
Chromium	ND	10	ug/L		ND				20	
Copper	ND	50	ug/L		ND			200	20	
Iron	ND	100	ug/L		ND				20	
Magnesium	4.26	0.10	mg/L		4.21			1.11	20	
Manganese	ND	20	ug/L		ND			2.12	20	
Nickel	ND	10	ug/L		ND				20	
Sodium	45.7	0.20	mg/L		45.1			1.40	20	
Zinc	ND	50	ug/L		ND				20	
Matrix Spike (AL94691-MS1)				Source: 19L2930-01 Prepared & Analyzed: 12/19/19						
Aluminum	522	50	ug/L	500	ND	104	70-130			
Barium	527	100	ug/L	500	ND	95.6	70-130			
Chromium	475	10	ug/L	500	ND	95.0	70-130			
Copper	507	50	ug/L	500	ND	101	70-130			
Iron	603	100	ug/L	500	ND	101	70-130			
Manganese	517	20	ug/L	500	29.7	97.4	70-130			
Nickel	498	10	ug/L	500	ND	99.6	70-130			
Sodium	175	0.20	mg/L	0.500	179	NR	70-130			QM-02
Zinc	541	50	ug/L	500	ND	105	70-130			
Matrix Spike (AL94691-MS2)				Source: 19L2968-01 Prepared & Analyzed: 12/19/19						
Aluminum	521	50	ug/L	500	ND	104	70-130			
Barium	707	100	ug/L	500	222	97.1	70-130			
Chromium	488	10	ug/L	500	ND	97.5	70-130			
Copper	476	50	ug/L	500	ND	95.1	70-130			
Iron	509	100	ug/L	500	ND	102	70-130			
Manganese	1540	20	ug/L	500	1060	96.1	70-130			
Nickel	481	10	ug/L	500	ND	96.2	70-130			
Sodium	50.1	0.20	mg/L	0.500	49.9	39.6	70-130			QM-02
Zinc	507	50	ug/L	500	ND	101	70-130			

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Petaluma, City of - Drinking Water 202 N. McDowell Blvd. Petaluma, CA 94953	Project Manager: Joel McIntyre Project: Source Chemical Monitoring (SCM) Project Number: 4910006	Reported: 01/27/20 08:50
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Metals by EPA 200 Series Methods - Quality Control

Analyte(s)	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Flag
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Batch AL94691 - NB EPA 200 series Direct Analysis

Matrix Spike Dup (AL94691-MSD1)		Source: 19L2930-01		Prepared: 12/19/19		Analyzed: 01/08/20				
Aluminum	ND	50	ug/L	500	ND		70-130	200	20	
Barium	ND	100	ug/L	500	ND	NR	70-130	200	20	
Chromium	ND	10	ug/L	500	ND		70-130	200	20	
Copper	ND	50	ug/L	500	ND		70-130	200	20	
Iron	ND	100	ug/L	500	ND	NR	70-130	200	20	
Manganese	ND	20	ug/L	500	29.7	NR	70-130	200	20	
Nickel	ND	10	ug/L	500	ND		70-130	200	20	
Sodium	ND	0.20	mg/L	0.500	179	NR	70-130	200	20	
Zinc	ND	50	ug/L	500	ND	NR	70-130	200	20	

Batch AL94725 - NB EPA 218.6

Blank (AL94725-BLK1)				Prepared & Analyzed: 12/19/19	
Chromium, hexavalent	ND	1.0	ug/L		
LCS (AL94725-BS1)				Prepared & Analyzed: 12/19/19	
Chromium, hexavalent	10.1	1.0	ug/L	10.0	101 90-110
Duplicate (AL94725-DUP1)		Source: 19L2896-01		Prepared & Analyzed: 12/19/19	
Chromium, hexavalent	ND	1.0	ug/L	ND	20
Matrix Spike (AL94725-MS1)		Source: 19L2930-01		Prepared & Analyzed: 12/19/19	
Chromium, hexavalent	10.5	1.0	ug/L	10.0	ND 105 90-110
Matrix Spike Dup (AL94725-MSD1)		Source: 19L2930-01		Prepared & Analyzed: 12/19/19	
Chromium, hexavalent	10.5	1.0	ug/L	10.0	ND 105 90-110 0.476 20

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 Project: Source Chemical Monitoring (SCM)
 Project Number: 4910006

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Metals by EPA Method 200.8 ICP/MS - Quality Control

Analyte(s)	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Flag
Batch AL95265 - EPA 200.8										
Blank (AL95265-BLK1)										
				Prepared: 12/30/19 Analyzed: 01/03/20						
Antimony	ND	6.0	ug/L							
Arsenic	ND	2.0	ug/L							
Beryllium	ND	1.0	ug/L							
Cadmium	ND	1.0	ug/L							
Selenium	ND	5.0	ug/L							
Thallium	ND	1.0	ug/L							
Uranium	ND	1.0	pCi/l							
LCS (AL95265-BS1)										
				Prepared: 12/30/19 Analyzed: 01/03/20						
Antimony	21.5	6.0	ug/L	20.0		107	85-115			
Arsenic	20.8	2.0	ug/L	20.0		104	85-115			
Beryllium	22.1	1.0	ug/L	20.0		110	85-115			
Cadmium	20.9	1.0	ug/L	20.0		105	85-115			
Selenium	20.3	5.0	ug/L	20.0		101	85-115			
Thallium	20.2	1.0	ug/L	20.0		101	85-115			
Uranium	13.6	1.0	pCi/l	13.4		101	85-115			
Duplicate (AL95265-DUP1)										
				Source: 19L2896-01			Prepared: 12/30/19 Analyzed: 01/03/20			
Antimony	ND	6.0	ug/L		ND				20	
Arsenic	ND	2.0	ug/L		ND				20	
Beryllium	ND	1.0	ug/L		ND				20	
Cadmium	ND	1.0	ug/L		ND				20	
Selenium	28.9	5.0	ug/L		28.2			2.60	20	
Thallium	ND	1.0	ug/L		ND				20	
Uranium	ND	1.0	pCi/l		ND				20	
Matrix Spike (AL95265-MS1)										
				Source: 19L2896-01			Prepared: 12/30/19 Analyzed: 01/03/20			
Antimony	21.9	6.0	ug/L	20.0	ND	110	70-130			
Arsenic	22.4	2.0	ug/L	20.0	ND	112	70-130			
Beryllium	22.4	1.0	ug/L	20.0	ND	112	70-130			
Cadmium	20.8	1.0	ug/L	20.0	ND	104	70-130			
Selenium	50.2	5.0	ug/L	20.0	28.2	110	70-130			
Thallium	19.7	1.0	ug/L	20.0	ND	98.4	70-130			
Uranium	14.1	1.0	pCi/l	13.4	ND	105	70-130			

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 Project: Source Chemical Monitoring (SCM)
 Project Number: 4910006

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Metals by EPA Method 200.8 ICP/MS - Quality Control

Analyte(s)	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Flag
Batch AL95265 - EPA 200.8										
Matrix Spike (AL95265-MS2)		Source: 19L2860-02			Prepared: 12/30/19		Analyzed: 01/03/20			
Antimony	21.6	6.0	ug/L	20.0	ND	108	70-130			
Arsenic	22.2	2.0	ug/L	20.0	ND	111	70-130			
Beryllium	20.8	1.0	ug/L	20.0	ND	104	70-130			
Cadmium	20.9	1.0	ug/L	20.0	ND	105	70-130			
Selenium	21.4	5.0	ug/L	20.0	ND	96.7	70-130			
Thallium	19.7	1.0	ug/L	20.0	ND	98.3	70-130			
Uranium	25.2	1.0	pCi/l	13.4	12.1	97.9	70-130			
Matrix Spike Dup (AL95265-MSD1)		Source: 19L2896-01			Prepared: 12/30/19		Analyzed: 01/03/20			
Antimony	21.7	6.0	ug/L	20.0	ND	109	70-130	0.924	20	
Arsenic	22.5	2.0	ug/L	20.0	ND	112	70-130	0.0703	20	
Beryllium	20.8	1.0	ug/L	20.0	ND	104	70-130	7.31	20	
Cadmium	20.2	1.0	ug/L	20.0	ND	101	70-130	2.78	20	
Selenium	49.0	5.0	ug/L	20.0	28.2	104	70-130	2.40	20	
Thallium	19.5	1.0	ug/L	20.0	ND	97.6	70-130	0.873	20	
Uranium	13.8	1.0	pCi/l	13.4	ND	103	70-130	2.15	20	

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Conventional Chemistry Parameters by APHA/EPA Methods - Quality Control

Analyte(s)	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Flag
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Batch AL94083 - NB General Prep

Duplicate (AL94083-DUP1)		Source: 19L1955-01			Prepared & Analyzed: 12/11/19					
Odor	1.00	1.0	T.O.N.		ND			200	20	
Turbidity	4.31	0.25	NTU		4.38			1.61	20	
Color	ND	5.0	CU		ND				20	

Batch AL94559 - NB General Prep

Duplicate (AL94559-DUP1)		Source: 19L2709-01			Prepared: 12/17/19 Analyzed: 12/18/19					
Specific Conductance (EC)	415	10	umhos/cm		417			0.481	5	
pH	7.53	1.00	pH Units		7.52			0.133	20	

Duplicate (AL94559-DUP2)		Source: 19L3819-01			Prepared: 12/27/19 Analyzed: 12/30/19					
Specific Conductance (EC)	460	10	umhos/cm		458			0.436	5	
pH	6.66	1.00	pH Units		6.65			0.150	20	

Batch AL94691 - NB EPA 200 series Direct Analysis

Blank (AL94691-BLK1)		Prepared: 12/19/19 Analyzed: 01/08/20								
Aggressive Index	ND	2.00	NU							
Hardness, Total	ND	1	mg/L							

Duplicate (AL94691-DUP1)		Source: 19L2713-01			Prepared & Analyzed: 12/19/19					
Hardness, Total	43	1	mg/L		43			1.38	20	

Batch AL94804 - NB General Prep

Blank (AL94804-BLK1)		Prepared & Analyzed: 12/20/19								
Total Alkalinity as CaCO3	ND	5.0	mg/L							
Bicarbonate Alkalinity as CaCO3	ND	5.0	mg/L							
Carbonate Alkalinity as CaCO3	ND	5.0	mg/L							
Hydroxide Alkalinity as CaCO3	ND	5.0	mg/L							

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 Project: Source Chemical Monitoring (SCM)
 Project Number: 4910006

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 01/27/20 08:50

Conventional Chemistry Parameters by APHA/EPA Methods - Quality Control

Analyte(s)	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Flag
Batch AL94804 - NB General Prep										
LCS (AL94804-BS1)					Prepared & Analyzed: 12/20/19					
Total Alkalinity as CaCO3	990	5.0	mg/L	1000		99.0	80-120			
Duplicate (AL94804-DUP1)					Source: 19L2705-01 Prepared & Analyzed: 12/20/19					
Total Alkalinity as CaCO3	96.9	5.0	mg/L		95.9			1.05	20	
Bicarbonate Alkalinity as CaCO3	96.4	5.0	mg/L		95.4			1.05	20	
Carbonate Alkalinity as CaCO3	ND	5.0	mg/L		ND				20	
Hydroxide Alkalinity as CaCO3	ND	5.0	mg/L		ND				20	
Batch AL94857 - NB EPA 3510B Water										
Blank (AL94857-BLK1)					Prepared: 12/19/19 Analyzed: 12/20/19					
MBAS, calculated as LAS, mw 340	ND	0.010	mg/L							
LCS (AL94857-BS1)					Prepared: 12/19/19 Analyzed: 12/20/19					
MBAS, calculated as LAS, mw 340	0.0422	0.010	mg/L	0.0500		84.4	80-120			
LCS Dup (AL94857-BSD1)					Prepared: 12/19/19 Analyzed: 12/20/19					
MBAS, calculated as LAS, mw 340	0.0407	0.010	mg/L	0.0500		81.4	80-120	3.62	20	
Matrix Spike (AL94857-MS1)					Source: 19L2896-01 Prepared: 12/19/19 Analyzed: 12/20/19					
MBAS, calculated as LAS, mw 340	0.0414	0.010	mg/L	0.0500	ND	82.8	80-120			
Batch AL94874 - General Preparation										
Blank (AL94874-BLK1)					Prepared: 12/21/19 Analyzed: 01/02/20					
Total Dissolved Solids	ND	10	mg/L							

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 01/27/20 08:50

Conventional Chemistry Parameters by APHA/EPA Methods - Quality Control

Analyte(s)	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Flag
Batch AL94874 - General Preparation										
Duplicate (AL94874-DUP1)		Source: 19L3189-01			Prepared: 12/21/19 Analyzed: 01/02/20					
Total Dissolved Solids	106	10	mg/L		104			1.90	15	
Duplicate (AL94874-DUP2)		Source: 19L3273-01			Prepared: 12/21/19 Analyzed: 01/02/20					
Total Dissolved Solids	264	10	mg/L		268			1.50	15	

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Miscellaneous Physical/Conventional Chemistry Parameters - Quality Control

Analyte(s)	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Flag
Batch AL95032 - General Preparation										
Blank (AL95032-BLK1)				Prepared & Analyzed: 12/26/19						
Cyanide (total)	ND	0.10	mg/L							
LCS (AL95032-BS1)				Prepared & Analyzed: 12/26/19						
Cyanide (total)	0.180	0.10	mg/L	0.200		89.8	85-115			
Duplicate (AL95032-DUP1)				Source: 19L2361-02		Prepared & Analyzed: 12/26/19				
Cyanide (total)	ND	0.10	mg/L		ND				25	
Matrix Spike (AL95032-MS1)				Source: 19L2361-02		Prepared & Analyzed: 12/26/19				
Cyanide (total)	0.194	0.10	mg/L	0.200	ND	97.0	85-115			
Matrix Spike (AL95032-MS2)				Source: 19L2811-01		Prepared & Analyzed: 12/26/19				
Cyanide (total)	0.195	0.10	mg/L	0.200	ND	95.7	85-115			
Matrix Spike Dup (AL95032-MSD1)				Source: 19L2361-02		Prepared & Analyzed: 12/26/19				
Cyanide (total)	0.193	0.10	mg/L	0.200	ND	96.4	85-115	0.595	25	

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Petaluma, City of - Drinking Water
 202 N. McDowell Blvd.
 Petaluma, CA 94953

Project Manager: Joel McIntyre
 Project: Source Chemical Monitoring (SCM)
 Project Number: 4910006

Reported:
 01/27/20 08:50

Anions by EPA Method 300.0 - Quality Control

Analyte(s)	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Flag
Batch AL94689 - NB General Prep										
Blank (AL94689-BLK1)				Prepared & Analyzed: 12/19/19						
Fluoride	ND	0.10	mg/L							
Nitrate as N	ND	0.40	mg/L							
Sulfate as SO4	ND	0.50	mg/L							
Chloride	ND	0.50	mg/L							
Nitrite as N	ND	0.20	mg/L							
LCS (AL94689-BS1)				Prepared & Analyzed: 12/19/19						
Chloride	3.73	0.50	mg/L	4.00		93.3	90-110			
Nitrite as N	0.653	0.20	mg/L	0.609		107	90-110			
Sulfate as SO4	8.06	0.50	mg/L	8.00		101	90-110			
Nitrate as N	1.86	0.40	mg/L	1.81		103	90-110			
Fluoride	2.02	0.10	mg/L	2.00		101	90-110			
Duplicate (AL94689-DUP1)				Source: 19L2968-01 Prepared & Analyzed: 12/19/19						
Sulfate as SO4	49.5	0.50	mg/L		40.9			19.0	20	
Fluoride	0.129	0.10	mg/L		0.126			2.35	20	
Chloride	129	0.50	mg/L		90.8			35.1	20	QD-01
Nitrite as N	ND	0.20	mg/L		ND				20	
Nitrate as N	2.06	0.40	mg/L		2.43			16.8	20	
Matrix Spike (AL94689-MS1)				Source: 19L2896-01 Prepared & Analyzed: 12/19/19						
Nitrite as N	0.576	0.20	mg/L	0.609	ND	94.6	80-120			
Sulfate as SO4	17.1	0.50	mg/L	8.00	9.61	93.6	80-120			
Chloride	202	0.50	mg/L	4.00	183	490	80-120			QM-02
Nitrate as N	6.60	0.40	mg/L	1.81	5.29	72.4	80-120			QM-02
Fluoride	1.90	0.10	mg/L	2.00	ND	95.0	80-120			
Matrix Spike (AL94689-MS2)				Source: 19L2913-01 Prepared & Analyzed: 12/19/19						
Nitrite as N	0.668	0.20	mg/L	0.609	ND	110	80-120			
Fluoride	1.98	0.10	mg/L	2.00	ND	94.6	80-120			
Chloride	10.5	0.50	mg/L	4.00	7.21	81.3	80-120			
Nitrate as N	1.85	0.40	mg/L	1.81	ND	102	80-120			
Sulfate as SO4	9.58	0.50	mg/L	8.00	2.65	86.6	80-120			

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Petaluma, City of - Drinking Water 202 N. McDowell Blvd. Petaluma, CA 94953	Project Manager: Joel McIntyre Project: Source Chemical Monitoring (SCM) Project Number: 4910006	Reported: 01/27/20 08:50
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Anions by EPA Method 300.0 - Quality Control

Analyte(s)	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Flag
Batch AL94689 - NB General Prep										
Matrix Spike Dup (AL94689-MSD1)	Source: 19L2896-01			Prepared & Analyzed: 12/19/19						
Chloride	204	0.50	mg/L	4.00	183	530	80-120	0.789	20	QM-02
Fluoride	1.82	0.10	mg/L	2.00	ND	90.8	80-120	4.47	20	
Nitrate as N	6.69	0.40	mg/L	1.81	5.29	77.6	80-120	1.41	20	QM-02
Nitrite as N	0.555	0.20	mg/L	0.609	ND	91.1	80-120	3.71	20	
Sulfate as SO4	18.2	0.50	mg/L	8.00	9.61	108	80-120	6.34	20	

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 Project: Source Chemical Monitoring (SCM)
 Project Number: 4910006

Reported:
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Volatile Organic Compounds by EPA Method 524.2 - Quality Control

Analyte(s)	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Flag
Batch AL94548 - NB EPA 5030 Water GCMS										
Blank (AL94548-BLK1)				Prepared & Analyzed: 12/17/19						
Benzene	ND	0.50	ug/L							
Carbon tetrachloride	ND	0.50	ug/L							
Chlorobenzene	ND	0.50	ug/L							
1,2-Dichlorobenzene	ND	0.50	ug/L							
1,4-Dichlorobenzene	ND	0.50	ug/L							
1,1-Dichloroethane	ND	0.50	ug/L							
1,2-Dichloroethane	ND	0.50	ug/L							
1,1-Dichloroethene	ND	0.50	ug/L							
cis-1,2-Dichloroethene	ND	0.50	ug/L							
trans-1,2-Dichloroethene	ND	0.50	ug/L							
1,2-Dichloropropane	ND	0.50	ug/L							
1,3-Dichloropropene (total)	ND	0.50	ug/L							
Ethylbenzene	ND	0.50	ug/L							
Methyl tert-butyl ether	ND	3.0	ug/L							
Methylene chloride	ND	0.50	ug/L							
Styrene	ND	0.50	ug/L							
1,1,2,2-Tetrachloroethane	ND	0.50	ug/L							
Tetrachloroethene	ND	0.50	ug/L							
Toluene	ND	0.50	ug/L							
1,2,4-Trichlorobenzene	ND	0.50	ug/L							
1,1,1-Trichloroethane	ND	0.50	ug/L							
1,1,2-Trichloroethane	ND	0.50	ug/L							
Trichloroethene	ND	0.50	ug/L							
Trichlorofluoromethane	ND	5.0	ug/L							
Trichlorotrifluoroethane	ND	10	ug/L							
Vinyl chloride	ND	0.50	ug/L							
Xylenes (total)	ND	1.5	ug/L							
<i>Surrogate: Bromofluorobenzene</i>	<i>9.19</i>		<i>ug/L</i>	<i>10.0</i>		<i>91.9</i>	<i>70-130</i>			
<i>Surrogate: 1,2-Dichlorobenzene-d4</i>	<i>9.57</i>		<i>ug/L</i>	<i>10.0</i>		<i>95.7</i>	<i>70-130</i>			

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 Project: Source Chemical Monitoring (SCM)
 Project Number: 4910006

Reported:
 01/27/20 08:50

Chlorinated Pesticides and PCBs by EPA Method 508 - Quality Control

Analyte(s)	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Flag
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Batch AL94889 - SVOAs in Water GC

Blank (AL94889-BLK1)

Prepared: 12/21/19 Analyzed: 01/08/20

Endrin	ND	0.10	ug/L							
HCH-gamma (Lindane)	ND	0.20	ug/L							
Heptachlor	ND	0.010	ug/L							
Heptachlor epoxide	ND	0.010	ug/L							
Hexachlorocyclopentadiene	ND	1.0	ug/L							
Hexachlorobenzene	ND	0.50	ug/L							
Methoxychlor	ND	10	ug/L							
PCB-1016	ND	0.50	ug/L							
PCB-1221	ND	0.50	ug/L							
PCB-1232	ND	0.50	ug/L							
PCB-1242	ND	0.50	ug/L							
PCB-1248	ND	0.50	ug/L							
PCB-1254	ND	0.50	ug/L							
PCB-1260	ND	0.50	ug/L							
Total PCBs	ND	0.50	ug/L							
Toxaphene	ND	1.0	ug/L							
Chlordane (tech)	ND	0.10	ug/L							

Surrogate: Dibutylchlorendate 0.459 ug/L 0.538 85.4 70-130

LCS (AL94889-BS1)

Prepared: 12/21/19 Analyzed: 01/08/20

Endrin	0.313	0.10	ug/L	0.280		112	70-130			
HCH-gamma (Lindane)	0.281	0.20	ug/L	0.280		100	70-130			
Heptachlor	0.287	0.010	ug/L	0.280		103	70-130			
Heptachlor epoxide	0.292	0.010	ug/L	0.280		104	70-130			
Hexachlorobenzene	0.239	0.50	ug/L	0.280		85.3	70-130			
Hexachlorocyclopentadiene	0.406	1.0	ug/L	0.560		72.5	15-90			
Methoxychlor	0.286	10	ug/L	0.280		102	70-130			

Surrogate: Dibutylchlorendate 0.514 ug/L 0.538 95.6 70-130



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 Project Number: 4910006

Reported:
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Chlorinated Pesticides and PCBs by EPA Method 508 - Quality Control

Analyte(s)	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Flag
Batch AL94889 - SVOAs in Water GC										
LCS Dup (AL94889-BSD1)				Prepared: 12/21/19 Analyzed: 01/08/20						
Endrin	0.235	0.10	ug/L	0.280		84.1	70-130	28.4	25	QL-04
HCH-gamma (Lindane)	0.210	0.20	ug/L	0.280		74.9	70-130	29.1	25	QL-04
Heptachlor	0.223	0.010	ug/L	0.280		79.5	70-130	25.4	25	QL-04
Heptachlor epoxide	0.221	0.010	ug/L	0.280		79.0	70-130	27.7	25	QL-04
Hexachlorobenzene	0.216	0.50	ug/L	0.280		77.0	70-130	10.1	25	
Hexachlorocyclopentadiene	0.347	1.0	ug/L	0.560		61.9	15-90	15.7	50	
Methoxychlor	0.223	10	ug/L	0.280		79.8	70-130	24.5	25	
<i>Surrogate: Dibutylchloroendate</i>	<i>0.432</i>		<i>ug/L</i>	<i>0.538</i>		<i>80.3</i>	<i>70-130</i>			

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Reported:
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Nitrogen- and Phosphorus- Pesticides by EPA Method 507 - Quality Control

Analyte(s)	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Flag
Batch AL95078 - SVOAs in Water GC										
Blank (AL95078-BLK1)										
				Prepared: 12/27/19 Analyzed: 01/10/20						
Alachlor	ND	1.0	ug/L							
Atrazine	ND	0.50	ug/L							
Molinate	ND	2.0	ug/L							
Simazine	ND	1.0	ug/L							
Thiobencarb	ND	1.0	ug/L							
<i>Surrogate: 1,3-Dimethyl-2-nitrobenzene</i>	<i>1.85</i>		<i>ug/L</i>	<i>2.00</i>		<i>92.4</i>	<i>70-130</i>			
LCS (AL95078-BS1)										
				Prepared: 12/27/19 Analyzed: 01/10/20						
Alachlor	1.87	1.0	ug/L	2.00		93.5	70-130			
Atrazine	1.86	0.50	ug/L	2.00		92.8	70-130			
Molinate	1.91	2.0	ug/L	2.00		95.3	70-130			
Simazine	1.85	1.0	ug/L	2.00		92.3	70-130			
Thiobencarb	1.83	1.0	ug/L	2.00		91.4	70-130			
<i>Surrogate: 1,3-Dimethyl-2-nitrobenzene</i>	<i>2.19</i>		<i>ug/L</i>	<i>2.00</i>		<i>110</i>	<i>70-130</i>			
LCS Dup (AL95078-BSD1)										
				Prepared: 12/27/19 Analyzed: 01/11/20						
Alachlor	1.65	1.0	ug/L	2.00		82.7	70-130	12.2	30	
Atrazine	1.56	0.50	ug/L	2.00		77.9	70-130	17.5	30	
Molinate	1.52	2.0	ug/L	2.00		76.0	70-130	22.6	30	
Simazine	1.60	1.0	ug/L	2.00		79.8	70-130	14.5	30	
Thiobencarb	1.68	1.0	ug/L	2.00		83.8	70-130	8.62	30	
<i>Surrogate: 1,3-Dimethyl-2-nitrobenzene</i>	<i>1.54</i>		<i>ug/L</i>	<i>2.00</i>		<i>77.0</i>	<i>70-130</i>			
Matrix Spike (AL95078-MS1)										
				Source: 19L3067-01 Prepared: 12/27/19 Analyzed: 01/11/20						
Alachlor	1.64	1.0	ug/L	2.00	ND	81.9	65-135			
Atrazine	1.53	0.50	ug/L	2.00	ND	76.5	65-135			
Molinate	1.47	2.0	ug/L	2.00	ND	73.5	65-135			
Simazine	1.60	1.0	ug/L	2.00	ND	80.0	65-135			
Thiobencarb	1.59	1.0	ug/L	2.00	ND	79.6	65-135			
<i>Surrogate: 1,3-Dimethyl-2-nitrobenzene</i>	<i>1.52</i>		<i>ug/L</i>	<i>2.00</i>		<i>76.2</i>	<i>70-130</i>			

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Organic Analytes by EPA Method 504.1 - Quality Control

Analyte(s)	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Flag
Batch AL95152 - EPA 504.1										
Blank (AL95152-BLK1)				Prepared: 12/27/19 Analyzed: 12/28/19						
1,2-Dibromo-3-chloropropane	ND	0.010	ug/L							
1,2-Dibromoethane (EDB)	ND	0.020	ug/L							
LCS (AL95152-BS1)				Prepared: 12/27/19 Analyzed: 12/28/19						
1,2-Dibromo-3-chloropropane	0.254	0.010	ug/L	0.250		102	70-130			
1,2-Dibromoethane (EDB)	0.257	0.020	ug/L	0.250		103	70-130			
LCS Dup (AL95152-BSD1)				Prepared: 12/27/19 Analyzed: 12/28/19						
1,2-Dibromo-3-chloropropane	0.260	0.010	ug/L	0.250		104	70-130	2.32	25	
1,2-Dibromoethane (EDB)	0.265	0.020	ug/L	0.250		106	70-130	2.78	25	
Matrix Spike (AL95152-MS1)				Source: 19L2822-01		Prepared: 12/27/19 Analyzed: 12/28/19				
1,2-Dibromo-3-chloropropane	0.270	0.010	ug/L	0.250	ND	108	65-135			
1,2-Dibromoethane (EDB)	0.275	0.020	ug/L	0.250	ND	110	65-135			
Matrix Spike Dup (AL95152-MSD1)				Source: 19L2822-01		Prepared: 12/27/19 Analyzed: 12/28/19				
1,2-Dibromo-3-chloropropane	0.258	0.010	ug/L	0.250	ND	103	65-135	4.57	25	
1,2-Dibromoethane (EDB)	0.269	0.020	ug/L	0.250	ND	107	65-135	2.24	25	

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Chlorinated Acids by EPA Method 515.3 - Quality Control

Analyte(s)	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Flag
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Batch AL95164 - Herbicides

Blank (AL95164-BLK1)

Prepared: 12/30/19 Analyzed: 01/02/20

Bentazon	ND	2.0	ug/L							
2,4-D	ND	10	ug/L							
Dalapon	ND	10	ug/L							
Dinoseb	ND	2.0	ug/L							
Pentachlorophenol	ND	0.20	ug/L							
Picloram	ND	1.0	ug/L							
2,4,5-TP (Silvex)	ND	1.0	ug/L							
<i>Surrogate: DCAA</i>	<i>23.0</i>		<i>ug/L</i>	<i>23.0</i>		<i>100</i>	<i>70-130</i>			

Calibration Check (AL95164-CCV1)

Prepared: 12/30/19 Analyzed: 01/03/20

Bentazon	3.17	2.0	ug/L	3.20		99.0	80-120			
2,4-D	10.4	10	ug/L	9.60		109	80-120			
Dalapon	21.4	10	ug/L	20.8		103	80-120			
Dinoseb	3.44	2.0	ug/L	3.20		108	80-120			
Pentachlorophenol	1.28	0.20	ug/L	1.20		106	80-120			
Picloram	1.77	1.0	ug/L	1.60		111	80-120			
2,4,5-TP (Silvex)	1.79	1.0	ug/L	1.60		112	80-120			
<i>Surrogate: DCAA</i>	<i>20.6</i>		<i>ug/L</i>	<i>18.4</i>		<i>112</i>	<i>80-120</i>			

Matrix Spike (AL95164-MS1)

Source: 19L2822-01

Prepared: 12/30/19 Analyzed: 01/03/20

Bentazon	3.23	2.0	ug/L	3.20	ND	101	70-130			
2,4-D	8.83	10	ug/L	9.60	ND	91.9	70-130			
Dalapon	18.5	10	ug/L	20.8	ND	89.0	70-130			
Dinoseb	2.98	2.0	ug/L	3.20	ND	93.0	70-130			
Pentachlorophenol	1.11	0.20	ug/L	1.20	ND	92.2	70-130			
Picloram	1.66	1.0	ug/L	1.60	ND	104	70-130			
2,4,5-TP (Silvex)	1.51	1.0	ug/L	1.60	ND	94.1	70-130			
<i>Surrogate: DCAA</i>	<i>19.4</i>		<i>ug/L</i>	<i>23.0</i>		<i>84.2</i>	<i>70-130</i>			

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Reported:
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Carbamates by EPA Method 531.1 - Quality Control

Analyte(s)	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Flag
Batch AL94610 - HPLC										
Blank (AL94610-BLK1)				Prepared: 12/18/19 Analyzed: 12/19/19						
Carbofuran	ND	5.0	ug/L							
Oxamyl	ND	20	ug/L							
LCS (AL94610-BS1)				Prepared: 12/18/19 Analyzed: 12/19/19						
Carbofuran	23.6	5.0	ug/L	20.0		118	80-120			
Oxamyl	23.8	20	ug/L	20.0		119	80-120			
LCS Dup (AL94610-BSD1)				Prepared: 12/18/19 Analyzed: 12/19/19						
Carbofuran	23.0	5.0	ug/L	20.0		115	80-120	2.34	20	
Oxamyl	23.3	20	ug/L	20.0		116	80-120	2.12	20	
Matrix Spike (AL94610-MS1)		Source: 19L2066-04		Prepared: 12/18/19 Analyzed: 12/23/19						
Carbofuran	17.4	5.0	ug/L	20.0	ND	87.2	65-135			
Oxamyl	18.2	20	ug/L	20.0	ND	91.0	65-135			

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 Project: Source Chemical Monitoring (SCM)
 Project Number: 4910006

Reported:
 01/27/20 08:50

Endothall by EPA Method 548.1 - Quality Control

Analyte(s)	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Flag
Batch AL94745 - EPA 548.1										
Blank (AL94745-BLK1) Prepared: 12/19/19 Analyzed: 12/30/19										
Endothall	ND	45	ug/L							
LCS (AL94745-BS1) Prepared: 12/19/19 Analyzed: 12/30/19										
Endothall	390	45	ug/L	400		97.5	80-120			
LCS Dup (AL94745-BSD1) Prepared: 12/19/19 Analyzed: 12/30/19										
Endothall	450	45	ug/L	400		112	80-120	14.2	30	
Matrix Spike (AL94745-MS1) Source: 19L2717-01 Prepared: 12/19/19 Analyzed: 12/31/19										
Endothall	450	45	ug/L	400	ND	113	80-120			



Alpha Analytical Laboratories, Inc. email: clientservices@alpha-labs.com
 Corporate: 208 Mason Street | Ukiah, CA 95482 | T: 707-468-0401 | F: 707-468-5267 | ELAP# 1551

Petaluma, City of - Drinking Water
 202 N. McDowell Blvd.
 Petaluma, CA 94953

Project Manager: Joel McIntyre
 Project: Source Chemical Monitoring (SCM)
 Project Number: 4910006

Reported:
 01/27/20 08:50

Glyphosate by EPA Method 547 - Quality Control

Analyte(s)	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Flag
Batch AL94991 - HPLC										
Blank (AL94991-BLK1)										
Prepared & Analyzed: 12/23/19										
Glyphosate	ND	25	ug/L							
LCS (AL94991-BS1)										
Prepared & Analyzed: 12/23/19										
Glyphosate	224	25	ug/L	200		112	70-130			
LCS Dup (AL94991-BSD1)										
Prepared & Analyzed: 12/23/19										
Glyphosate	227	25	ug/L	200		114	70-130	1.18	30	

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.



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Petaluma, City of - Drinking Water
 202 N. McDowell Blvd.
 Petaluma, CA 94953

Project Manager: Joel McIntyre
 Project: Source Chemical Monitoring (SCM)
 Project Number: 4910006

Reported:
 01/27/20 08:50

Diquat by EPA Method 549.2 - Quality Control

Analyte(s)	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Flag
Batch AL94773 - EPA 549.2										
Blank (AL94773-BLK1)										
				Prepared: 12/20/19 Analyzed: 12/23/19						
Diquat	ND	4.0	ug/L							
LCS (AL94773-BS1)										
				Prepared: 12/20/19 Analyzed: 12/23/19						
Diquat	25.8	4.0	ug/L	20.0		129	70-130			
LCS Dup (AL94773-BSD1)										
				Prepared: 12/20/19 Analyzed: 12/23/19						
Diquat	22.5	4.0	ug/L	20.0		113	70-130	13.5	25	



Alpha Analytical Laboratories, Inc. email: clientservices@alpha-labs.com
 Corporate: 208 Mason Street | Ukiah, CA 95482 | T: 707-468-0401 | F: 707-468-5267 | ELAP# 1551

Petaluma, City of - Drinking Water
 202 N. McDowell Blvd.
 Petaluma, CA 94953

Project Manager: Joel McIntyre
 Project: Source Chemical Monitoring (SCM)
 Project Number: 4910006

Reported:
 01/27/20 08:50

Semivolatile Organic Compounds by EPA Method 525.3 - Quality Control

Analyte(s)	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Flag
Batch AL95046 - EPA 525.2										
Blank (AL95046-BLK1)				Prepared: 12/26/19 Analyzed: 01/23/20						
Benzo (a) pyrene	ND	0.10	ug/L							
Di(2-ethylhexyl)adipate	ND	5.0	ug/L							
Di(2-ethylhexyl)phthalate	ND	3.0	ug/L							
<i>Surrogate: Benzo (a) pyrene-d12</i>	5.08		ug/L	5.00		102	70-130			
LCS (AL95046-BS1)				Prepared: 12/26/19 Analyzed: 01/23/20						
Benzo (a) pyrene	0.400	0.10	ug/L	0.400		100	70-130			
Di(2-ethylhexyl)adipate	18.0	5.0	ug/L	20.0		89.8	70-130			
Di(2-ethylhexyl)phthalate	10.5	3.0	ug/L	12.0		87.5	70-130			
<i>Surrogate: Benzo (a) pyrene-d12</i>	4.38		ug/L	5.00		87.6	70-130			
Matrix Spike (AL95046-MS1)				Source: 19L2896-01 Prepared: 12/26/19 Analyzed: 01/23/20						
Benzo (a) pyrene	0.330	0.10	ug/L	0.400	ND	82.5	70-130			
Di(2-ethylhexyl)adipate	18.4	5.0	ug/L	20.0	ND	92.2	70-130			
Di(2-ethylhexyl)phthalate	8.64	3.0	ug/L	12.0	ND	72.0	70-130			
<i>Surrogate: Benzo (a) pyrene-d12</i>	4.24		ug/L	5.00		84.8	70-130			

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.



Alpha Analytical Laboratories, Inc. email: clientservices@alpha-labs.com
Corporate: 208 Mason Street | Ukiah, CA 95482 | T: 707-468-0401 | F: 707-468-5267 | ELAP# 1551

Petaluma, City of - Drinking Water 202 N. McDowell Blvd. Petaluma, CA 94953	Project Manager: Joel McIntyre Project: Source Chemical Monitoring (SCM) Project Number: 4910006	Reported: 01/27/20 08:50
---	--	-----------------------------

Notes and Definitions

- QD-01 Sample contains analyte above detector calibration range.
- QL-04 The LCS/LCSD RPD for this analyte was outside of established control limits. Batch accepted based on acceptable recovery for both LCS/LCSD.
- QM-02 The RPD and/or percent recovery for this QC spike sample cannot be accurately calculated due to the high concentration of analyte inherent in the sample.
- T-14 Residual chlorine, dissolved oxygen, sulfite, and pH must be analyzed in the field to meet the EPA specified 15 minute hold time.
- ND Analyte NOT DETECTED at or above the reporting limit
- dry Sample results reported on a dry weight basis
- REC Recovery
- RPD Relative Percent Difference

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.



CERES Analytical Laboratory, Inc.

4919 Windplay Dr. Suite 1, El Dorado Hills, CA 95762



January 3, 2020

Ceres ID: 13236

Alpha Analytical Laboratories, Inc.
208 Mason St.
Ukiah, CA 95482

The following report contains the results for the one drinking sample received on December 20, 2019. This sample was analyzed for 2,3,7,8-TCDD by EPA method 1613B. Routine turn-around time was provided for this work.

This work was authorized under Alpha Analytical Laboratories' project # 19L2896.

Continuing Calibration Verification (CCV) Requirements

All associated calibration verification standard(s) (CCV) met the acceptance criteria.

The report consists of a Cover Letter, Sample Inventory (Section I), Data Summary (Section II), Sample Tracking (Section VI), and Qualifiers/Abbreviations (Section VII). Raw Data (Section III), Continuing Calibration (Section IV), and Initial Calibration (Section V) are available in a full report (.pdf format) upon request.

If you have any questions regarding this report, please feel free to contact me at (916)932-5011.

Sincerely,

James M. Hedin
Director of Operations/CEO
jhedin@ceres-lab.com

Section I: Sample Inventory

<u>Ceres Sample ID:</u>	<u>Sample ID</u>	<u>Date Received</u>	<u>Collection Date & Time</u>
13236-001	518 Amber way Well 19L2896-01	12/20/2019	12/18/2019 8:30

Section II: Data Summary



EPA Method 1613B

Quality Assurance Sample Method Blank	QC Batch #: 2109 Matrix: Drinking Water Sample Size: 1.000 L	Date Received: NA Date Extracted: 12/30/2019 ZB-5MS Analysis: 1/2/2019
Project ID: 19L2896		

Analyte	Conc. (pg/L)	MDL	RL	Qual.	Labeled Standards	% R	LCL-UCL (a)	Qualifiers
2,3,7,8-TCDD	DL= 3.93	1.49	5.00		13C-2378-TCDD	102	31-137	
					CRS			
					37Cl4-2378-TCDD	91.0	35-197	
DL - Signifies Non-Detect (ND) at sample specific detection limit. EMPC - Estimated Maximum Possible Concentration due to ion abundance ratio failure. (a) - Lower control limit - Upper control limit								

Analyst: JMH

Reviewed by: BS



EPA Method 1613B

Quality Assurance Sample Ongoing Precision and Recovery Project ID: 19L2896	QC Batch #: 2109 Matrix: Drinking Water Sample Size: 1.000 L	Date Received: NA Date Extracted: 12/30/2019 ZB-5MS Analysis: 1/2/2020
--	---	---

Analyte	Conc. (ng/mL)	Limits (a)	Labeled Standards	% Rec.	Limits (a)
2,3,7,8-TCDD	8.69	7.3-14.6	13C-2378-TCDD	111	25-141
			CRS		
			37Cl4-2378-TCDD	97.6	37-158
(a) Limits based on method acceptance criteria.					

Analyst: JMH

Reviewed by: BS



EPA Method 1613B

Client Sample ID: 518 Amber way Well 19L2896-01		
Project ID: 19L2896	Ceres Sample ID: 13236-001	Date Received: 12/20/2019
Date Collected: 12/18/2019	QC Batch #: 2109	Date Extracted: 12/30/2019
Time Collected: 8:30	Matrix: Drinking Water	ZB-5MS Analysis: 1/2/2020
	Sample Size: 0.996 L	

Analyte	Conc. (pg/L)	MDL	RL	Qual.	Labeled Standards	% R	LCL-UCL (a)	Qualifiers
2,3,7,8-TCDD	DL= 4.08	1.49	5.02		13C-2378-TCDD	83.6	31-137	
					CRS			
					37Cl4-2378-TCDD	71.3	42-164	
DL - Signifies Non-Detect (ND) at sample specific detection limit. EMPC - Estimated Maximum Possible Concentration due to ion abundance ratio failure. (a) - Lower control limit - Upper control limit								

Analyst: JMH

Reviewed by: BS

Section VI: Sample Tracking

SUBCONTRACT ORDER
Alpha Analytical Laboratories, Inc.
19L2896

SENDING LABORATORY:

Alpha Analytical Laboratories, Inc.
208 Mason St.
Ukiah, CA 95482
Phone: (707)468-0401
Fax: (707)468-5267
Project Manager: Robbie C. Phillips

RECEIVING LABORATORY:

Ceres Labs
4919 Windplay Dr.
El Dorado Hills, CA 95762
Phone: (916) 932-5011
Fax: (916) 932-5017
Terms: Net 30

Analysis	Due	Expires	Comments
19L2896-01 518 Amber way Well [Water] Sampled 12/18/19 08:30			

Dioxin 2378 TCDD DW 1613 01/07/20 12:00 12/17/20 08:30

Containers Supplied:

1L Amber- Unpres. (AM) 1L Amber- Unpres. (AN)

Report to State

System Name: _____ Employed by: _____
User ID: _____ Sampler: _____
System Number: _____

S. Speck 12-20-19 Jan 19 1920 12/20/19
Released By Date Received By Date

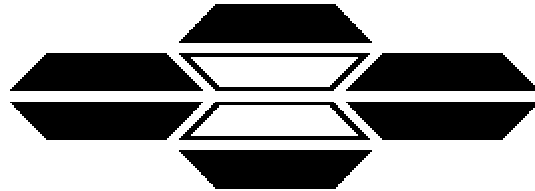
Released By Date Received By Date

Sample Receipt Check List Logged by: _____ (initials)

Ceres ID: 13236	Date/Time: 12/20/19 15:00
Client Project ID: 19L2896	Received Temp: 2-1 °C Acceptable: <input checked="" type="checkbox"/> Y / <input type="checkbox"/> N
Chain of Custody Relinquished by signed?	<input checked="" type="checkbox"/> Y / <input type="checkbox"/> N
Chain of Custody Received by signed?	<input checked="" type="checkbox"/> Y / <input type="checkbox"/> N
Custody Seals? Present?	Y / N
Intact?	Y / N
NA:	<input checked="" type="checkbox"/> N / <input type="checkbox"/> Y
Unlabeled / Illegible Samples	<input type="checkbox"/> Y / <input checked="" type="checkbox"/> N
Proper Containers:	<input checked="" type="checkbox"/> Y / <input type="checkbox"/> N
Preservation Acceptable (Chemical or <u>Temperature</u>)?	<input checked="" type="checkbox"/> Y / <input type="checkbox"/> N
Drinking Water, Sodium Thiosulfate present? Residual Cl?	Y / <input checked="" type="checkbox"/> N / NA Y / <input checked="" type="checkbox"/> N
Aqueous sample pH: 7	
List COC discrepancies:	<i>[Signature]</i> <i>12/20/19</i>
List Damaged Samples:	<i>[Signature]</i> <i>12/20/19</i>

Section VII: Qualifiers/Abbreviations

J	Concentration found below the lower quantitation limit but greater than zero.
B	Analyte present in the associated Method Blank.
E	Concentration found exceeds the Calibration range of the HRGC/HRMS.
D	This analyte concentration was calculated from a dilution.
X	The concentration found is the estimated maximum possible concentration due to chlorinated diphenyl ethers present in the sample.
H	Recovery limits exceeded. See cover letter.
*	Results taken from dilution.
I	Interference. See cover letter.
Conc.	Concentration Found
DL	Calculated Detection Limit
ND	Non-Detect
% Rec.	Percent Recovery



ASBESTOS TEM LABORATORIES, INC.

**EPA 600/4-83 Drinking Water
Transmission Electron Microscopy
Analytical Report**

Laboratory Job #367625

600 Bancroft Way, Ste. A
Berkeley, CA 94710
(510) 704-8930
FAX (510) 704-8429



ASBESTOS TEM LABORATORIES, INC

Certified by
CA DPH ELAP
Lab No. 1866

Dec/23/2019

Stephen F. McWeeney
Alpha Analytical Laboratories, Inc.
208 Mason Street
Ukiah, CA 95482

RE: LABORATORY JOB # 367625
Transmission electron microscopy analytical results for 1 water sample(s).
Job Site:
Job No.: 19L2896

Enclosed please find results for the TEM analysis of one or more water samples. The analytical procedures were performed according to EPA Method 100.2 for the analysis of asbestos in drinking water.

Prior to analysis, samples are checked for damage, disruption of any chain-of-custody seals, and completeness of accompanying paperwork. If no problems are found, samples are then logged-in, each given a unique laboratory number, and a hard copy containing all pertinent information is generated. This, and all other relevant paper work are kept with each sample throughout the analytical procedures to assure proper analysis.

Preparation of water samples is performed within a HEPA filtered, Class 100 air, laminar flow clean bench environment. Prior to filtration, water sample containers are ultrasonicated, and the exterior surfaces cleaned. An aliquot of water is drawn from the sample container and drawn through a special filtration apparatus and collected onto a mixed cellulose ester (MCE) or polycarbonate (PC) filter. The filters are removed from the apparatus and dried. A portion of each sample filter is sectioned, placed onto a glass microscope slide, and carbon coated. The filters are further sectioned and placed carbon side up onto 200-mesh copper TEM sample grids in a solvent bath until all filter material is dissolved. The TEM grids are removed and placed into labeled grid storage boxes.

TEM analysis is performed on a Philips EM-300 or CM-12 transmission electron microscope operating at 80 or 100 kV. Initially, the grid is scanned at low and medium magnification to insure proper sample loading, and coherence of the carbon support film. Then TEM grid openings are analyzed at a magnification of 10,000X. All fibers >10 um in length and exhibiting an aspect ratio >3:1 are analyzed. Scanning continues until either 100 asbestiform fibers >10um in length are counted, or an analytical sensitivity of 0.2 million fibers per liter (MFL) is achieved. Analyzed fibers are subjected to detailed morphological and selected area diffraction (SAED) analysis. Fibers indicated as asbestos, or potentially asbestos, are further analyzed by energy dispersive X-ray (EDX) analysis as needed. The number of asbestos fibers detected, and other analytical parameters, are then used to calculate the concentration of asbestos in MFL. The results are entered into a standard report format and reviewed by the analyst and the laboratory manager before release to the client.

Sincerely Yours,

Laboratory Manager
ASBESTOS TEM LABORATORIES, INC.

Disclaimer - These results relate only to the samples tested as received and must not be reproduced, except in full, with the approval of the laboratory. Incorrect or illegible information supplied by the customer may adversely affect the validity of test results. This report must not be used to claim product endorsement by the California Waterboards ELAP or any other agency of the State of California or U.S. Government.

TRANSMISSION ELECTRON MICROSCOPY ANALYTICAL REPORT

Contact:	Stephen F. McWeeney	Report No.:	367625
Address:	Alpha Analytical Laboratories, Inc. 208 Mason Street Ukiah, CA 95482	Date:	<u>Dec-23-19</u>
Job Site / No.	19L2896	Total Samples Analyzed:	<u>1</u>
		Sample Collector:	

CLIENT SAMPLE #	SAMPLE LOCATION/DESCRIPTION
19L2896-01	518 Amber Way Well (Water)
Laboratory Sample #	
1288-01615-001	

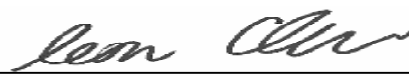
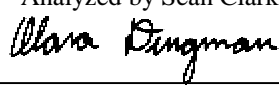
WATER SAMPLE DATA			
Date/Time Collected	<u>Dec-18-19 / 8:30 am</u>	Volume Submitted (ml)	<u>1000</u>
Date/Time Lab Received	<u>Dec-19-19 / 11:22 am</u>	Volume Filtered (ml)	<u>15</u>
Date/Time Filtered	<u>Dec-19-19 / 2:28 pm</u>	Filter & Pore Size	<u>MCE 0.22um</u>
Date/Time Analyzed	<u>Dec-22-19 / 12:40 pm</u>	UV/Ozone Treated:	<u>NO</u>

<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th colspan="4">IDENTIFIED STRUCTURES (>10um)</th> </tr> <tr> <th colspan="2">ASBESTOS</th> <th colspan="2">OTHER</th> </tr> <tr> <th>CHRYS</th> <th>AMPH</th> <th>AMBIG</th> <th>NON-ASB</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">NSD</td> <td style="text-align: center;">NSD</td> <td style="text-align: center;">NSD</td> <td style="text-align: center;">NSD</td> </tr> </tbody> </table>	IDENTIFIED STRUCTURES (>10um)				ASBESTOS		OTHER		CHRYS	AMPH	AMBIG	NON-ASB	NSD	NSD	NSD	NSD	<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th colspan="3">CALCULATED ASBESTOS STRUCTURE CONCENTRATION (>10um)</th> </tr> <tr> <th>CHRYS</th> <th>AMPH</th> <th>TOTAL</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">< 0.2 MFL</td> <td style="text-align: center;">< 0.2 MFL</td> <td style="text-align: center;">< 0.2 MFL</td> </tr> </tbody> </table>	CALCULATED ASBESTOS STRUCTURE CONCENTRATION (>10um)			CHRYS	AMPH	TOTAL	< 0.2 MFL	< 0.2 MFL	< 0.2 MFL
IDENTIFIED STRUCTURES (>10um)																										
ASBESTOS		OTHER																								
CHRYS	AMPH	AMBIG	NON-ASB																							
NSD	NSD	NSD	NSD																							
CALCULATED ASBESTOS STRUCTURE CONCENTRATION (>10um)																										
CHRYS	AMPH	TOTAL																								
< 0.2 MFL	< 0.2 MFL	< 0.2 MFL																								
COMMENTS <div style="border: 1px solid black; padding: 5px; min-height: 50px;"> No Asbestos Detected. </div>	<div style="border: 1px solid black; padding: 5px; min-height: 50px;"> Filter Loading: <u>MODERATE</u> SAED Photo ID Nos. </div>																									

TEM / ANALYTICAL PARAMETERS			
Grid Openings Scanned at 10,000X	<u>13</u>	Analytical Sensitivity	<u>0.2 MFL</u>
Grid Opening Area (mm ²)	<u>0.0097</u>	95% UCL	<u>0.67 MFL</u>
Scan Area (mm ²)	<u>0.1261</u>	95% LCL	<u>0 MFL</u>
WATER SAMPLE LAB BLANK RESULTS			
Lab ID#	<u>H2O-BLK=944</u>	Analytical Sensitivity	<u>0.01 MFL</u>
Grid Openings Scanned at 10,000X	<u>8</u>	Asbestos Structure Concentration	<u><0.01 MFL</u>
Volume Filtered (ml)	<u>300</u>		

NOTATION KEY

Chrys. - Chrysotile Asbestos 1 um = 1 micron = 0.001 mm
 Amph. - Amphibole Asbestos MFL = Millions of Fibers per Liter
 NSD - No Structures Detected UCL = Upper Confidence Level
 1 mm = 1 millimeter LCL = Lower Confidence Level


 Analyzed by Sean Clark

 Reviewed by Alana Dingman

367625

SUBCONTRACT ORDER
Alpha Analytical Laboratories, Inc.
19L2896

SENDING LABORATORY:

Alpha Analytical Laboratories, Inc.
208 Mason St.
Ukiah, CA 95482
Phone: (707)468-0401
Fax: (707)468-5267
Project Manager: Stephen F. Mcweeney

RECEIVING LABORATORY:

Asbestos TEM Laboratories, Inc.
600 Bancroft Way, Suite A
Berkeley, CA 94710
Phone: (510) 704-8930
Fax: (510) 704-8429
Terms: Net 30

Analysis	Date	Expires	Comments
----------	------	---------	----------

19L2896-01 518 Amber way Well [Water] Sampled 12/18/19 08:30

Asbestos-DW SUB	01/07/20 12:00	12/20/19 08:30	
-----------------	----------------	----------------	--

Containers Supplied:
1L Amber-Ungro. (AK) 1L Amber-Ungro. (AL)

Report to State

System Name: _____ Employee by: _____

User ID: _____ Sampler: _____

System Number: _____

EMAIL: SPEARS78@GMAIL.COM

	12/18/19	MTZ	01/19/19 11:22:01
Released By	Date	Received By	Date

Released By	Date	Received By	Date
-------------	------	-------------	------



BSK Associates Laboratory Fresno
 1414 Stanislaus St
 Fresno, CA 93706
 559-497-2888 (Main)
 559-485-6935 (FAX)

A9L2563

1/08/2020

Invoice: AD00023

David Pingatore
 Alpha Analytical Laboratories Inc - Ukiah
 208 Mason Street
 Ukiah, CA 95482

RE: Report for A9L2563 EPA 537 - non EDT

Dear David Pingatore,

Thank you for using BSK Associates for your analytical testing needs. In the following pages, you will find the test results for the samples submitted to our laboratory on 12/23/2019. The results have been approved for release by our Laboratory Director as indicated by the authorizing signature below.

The samples were analyzed for the test(s) indicated on the Chain of Custody (see attached) and the results relate only to the samples analyzed. BSK certifies that the testing was performed in accordance with the quality system requirements specified in the 2009 TNI Standard. Any deviations from this standard or from the method requirements for each test procedure performed will be annotated alongside the analytical result or noted in the Case Narrative. Unless otherwise noted, the sample results are reported on an "as received" basis.

This certificate of analysis shall not be reproduced except in full, without written approval of the laboratory.

If additional clarification of any information is required, please contact your Project Manager, Michelle Croft, at 559-497-2888.

Thank you again for using BSK Associates. We value your business and appreciate your loyalty.

Sincerely,



Heather S. White, Project Manager



Accredited in Accordance with NELAP
 ORELAP #4021-009



Case Narrative

Project and Report Details Invoice Details

Client: Alpha Analytical Laboratories Inc - Ukiah
Report To: David Pingatore
Project #: 19L2896
Received: 12/23/2019 - 11:32
Report Due: 1/08/2020
Invoice To: Alpha Analytical Laboratories Inc - Ukia
Invoice Attn: Amanda-Invoicing
Project PO#: -

Sample Receipt Conditions

Cooler: Default Cooler Initial receipt at BSK-FAL
Temperature on Receipt °C: 13.9

Detailed Narrative

Chain of Custody Notes

Date: 12/23/2019
Initials: TRL
Note: Notified Sean Foley, received sample A9L2563-01 out of the temperature range required. Requested to proceed with analysis. Sample is not for compliance.

Chain of Custody Notes

Date: 1/6/2020
Initials: TRL
Note: Sample A9L2563-01 and A9L2563-02 surrogate recovered low. Notified Sean Foley and ok to report with a qualifier.

Data Qualifiers

The following qualifiers have been applied to one or more analytical results:

- J Estimated value
SC02 Sample received above recommended temperature.
SC1.1 Sample was received above the mandated temperature.
SC1.4 Sample was received without chemical preservation.
SR.x Surrogate recovery exceeds lower control limit as confirmed by re-analysis. Associated results should be considered biased low.

Report Distribution

Table with 3 columns: Recipient(s), Report Format, CC. Row 1: All Lab Results, MCL.RPT, Iquinn@alpha-labs.com;sspeaks@alpha-labs.com;speaks78@gmail.com;david@alpha-labs.com

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.



Certificate of Analysis

Sample ID: A9L2563-01
Sampled By: Client
Sample Description: 19L2896-01 // Amber Way Well

Sample Date - Time: 12/18/19 - 08:30
Matrix: Water
Sample Type: Grab

Sample Qualifiers: SC02

BSK Associates Laboratory Fresno
Organics

Analyte	Method	Result	MDL	RL	Units	RL Mult	MCL	Batch	Prepared	Analyzed	Qual
Perfluorinated Compounds by LC-MS/MS											Analysis Qualifier(s): SC1.1, SC1.4
11-Chloroeicosafuoro-3-oxaundecanesulfonic acid	EPA 537.1	ND	0.00087	0.0030	ug/L	0.87		A919303	12/27/19	12/29/19	
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	EPA 537.1	ND	0.00087	0.0030	ug/L	0.87		A919303	12/27/19	12/29/19	
9-Chlorohexadecafluoro-3-oxanone-1-sulfonic acid	EPA 537.1	ND	0.00087	0.0030	ug/L	0.87		A919303	12/27/19	12/29/19	
Hexafluoropropylene oxide dimer acid (HFPO-DA)	EPA 537.1	ND	0.00087	0.0030	ug/L	0.87		A919303	12/27/19	12/29/19	
NEtFOSAA	EPA 537.1	ND	0.00087	0.0030	ug/L	0.87		A919303	12/27/19	12/29/19	
NMeFOSAA	EPA 537.1	ND	0.00087	0.0030	ug/L	0.87		A919303	12/27/19	12/29/19	
Perfluoro-1-butanefulfonic acid (PFBS)	EPA 537.1	ND	0.00087	0.0030	ug/L	0.87		A919303	12/27/19	12/29/19	
Perfluoro-1-hexanesulfonic acid (PFHxS)	EPA 537.1	ND	0.00087	0.0030	ug/L	0.87		A919303	12/27/19	12/29/19	
Perfluoro-1-octanesulfonic acid (PFOS)	EPA 537.1	ND	0.00087	0.0030	ug/L	0.87		A919303	12/27/19	12/29/19	
Perfluorododecanoic acid (PFDoA)	EPA 537.1	ND	0.00087	0.0030	ug/L	0.87		A919303	12/27/19	12/29/19	
Perfluoro-n-decanoic acid (PFDA)	EPA 537.1	ND	0.00087	0.0030	ug/L	0.87		A919303	12/27/19	12/29/19	
Perfluoro-n-heptanoic acid (PFHpA)	EPA 537.1	ND	0.00087	0.0030	ug/L	0.87		A919303	12/27/19	12/29/19	
Perfluoro-n-hexanoic acid (PFHxA)	EPA 537.1	ND	0.00087	0.0030	ug/L	0.87		A919303	12/27/19	12/29/19	
Perfluoro-n-nonanoic acid (PFNA)	EPA 537.1	ND	0.00087	0.0030	ug/L	0.87		A919303	12/27/19	12/29/19	
Perfluoro-n-octanoic acid (PFOA)	EPA 537.1	ND	0.00087	0.0030	ug/L	0.87		A919303	12/27/19	12/29/19	
Perfluorotetradecanoic acid (PFTeDA)	EPA 537.1	ND	0.00087	0.0030	ug/L	0.87		A919303	12/27/19	12/29/19	
Perfluorotridecanoic acid (PFTrDA)	EPA 537.1	ND	0.00087	0.0030	ug/L	0.87		A919303	12/27/19	12/29/19	
Perfluoroundecanoic acid (PFUnA)	EPA 537.1	ND	0.00087	0.0030	ug/L	0.87		A919303	12/27/19	12/29/19	
Surrogate: d5-NEtFOSAA	EPA 537.1	55 %									Acceptable range: 70-130 % Qualifiers - SR.x
Surrogate: Perfluoro-n-(1,2-13C2)decanoic acid	EPA 537.1	108 %									Acceptable range: 70-130 %
Surrogate: Perfluoro-n-(1,2-13C2)hexanoic acid	EPA 537.1	107 %									Acceptable range: 70-130 %
Surrogate: Tetrafluoro(heptafluoropropoxy)13C3-PA (M3HFPO-DA)	EPA 537.1	98 %									Acceptable range: 70-130 %

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

BSK Associates Laboratory Fresno
Organics Quality Control Report

Analyte	Result	MDL	RL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Date Analyzed	Qual
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EPA 537.1 - Quality Control

Batch: A919303

Prepared: 12/27/2019

Prep Method: EPA 537.1

Analyst: JMM

Blank (A919303-BLK1)

11-Chloroeicosafuoro-3-oxaundecanesulfonic acid	ND	0.0010	0.0030	ug/L							12/29/19	
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	ND	0.0010	0.0030	ug/L							12/29/19	
9-Chlorohexadecafluoro-3-oxanone-1-sulfonic acid	ND	0.0010	0.0030	ug/L							12/29/19	
Hexafluoropropylene oxide dimer acid (HFPO-DA)	ND	0.0010	0.0030	ug/L							12/29/19	
NEtFOSAA	ND	0.0010	0.0030	ug/L							12/29/19	
NMeFOSAA	ND	0.0010	0.0030	ug/L							12/29/19	
Perfluoro-1-butanefluoronic acid (PFBS)	ND	0.0010	0.0030	ug/L							12/29/19	
Perfluoro-1-hexanesulfonic acid (PFHxS)	ND	0.0010	0.0030	ug/L							12/29/19	
Perfluoro-1-octanesulfonic acid (PFOS)	ND	0.0010	0.0030	ug/L							12/29/19	
Perfluorododecanoic acid (PFDoA)	ND	0.0010	0.0030	ug/L							12/29/19	
Perfluoro-n-decanoic acid (PFDA)	ND	0.0010	0.0030	ug/L							12/29/19	
Perfluoro-n-heptanoic acid (PFHpA)	ND	0.0010	0.0030	ug/L							12/29/19	
Perfluoro-n-hexanoic acid (PFHxA)	ND	0.0010	0.0030	ug/L							12/29/19	
Perfluoro-n-nonanoic acid (PFNA)	ND	0.0010	0.0030	ug/L							12/29/19	
Perfluoro-n-octanoic acid (PFOA)	ND	0.0010	0.0030	ug/L							12/29/19	
Perfluorotetradecanoic acid (PFTeDA)	ND	0.0010	0.0030	ug/L							12/29/19	
Perfluorotridecanoic acid (PFTrDA)	ND	0.0010	0.0030	ug/L							12/29/19	
Perfluoroundecanoic acid (PFUnA)	ND	0.0010	0.0030	ug/L							12/29/19	
Surrogate: d5-NEtFOSAA	0.16				0.16		100	70-130			12/29/19	
Surrogate: Perfluoro-n-(1,2-13C2)decanoic acid	0.16				0.16		101	70-130			12/29/19	
Surrogate: Perfluoro-n-(1,2-13C2)hexanoic acid	0.16				0.16		98	70-130			12/29/19	
Surrogate: Tetrafluoro(heptafluoropropoxy)13C3-PA	0.14				0.16		91	70-130			12/29/19	

Blank Spike (A919303-BS1)

11-Chloroeicosafuoro-3-oxaundecanesulfonic acid	0.0027	0.0010	0.0030	ug/L	0.0030		89	70-130			12/29/19	J
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	0.0030	0.0010	0.0030	ug/L	0.0030		102	70-130			12/29/19	
9-Chlorohexadecafluoro-3-oxanone-1-sulfonic acid	0.0027	0.0010	0.0030	ug/L	0.0030		89	70-130			12/29/19	J
Hexafluoropropylene oxide dimer acid (HFPO-DA)	0.0028	0.0010	0.0030	ug/L	0.0030		94	70-130			12/29/19	J
NEtFOSAA	0.0023	0.0010	0.0030	ug/L	0.0030		78	70-130			12/29/19	J
NMeFOSAA	0.0029	0.0010	0.0030	ug/L	0.0030		96	70-130			12/29/19	J
Perfluoro-1-butanefluoronic acid (PFBS)	0.0029	0.0010	0.0030	ug/L	0.0030		96	70-130			12/29/19	J
Perfluoro-1-hexanesulfonic acid (PFHxS)	0.0026	0.0010	0.0030	ug/L	0.0030		86	70-130			12/29/19	J
Perfluoro-1-octanesulfonic acid (PFOS)	0.0031	0.0010	0.0030	ug/L	0.0030		103	70-130			12/29/19	
Perfluorododecanoic acid (PFDoA)	0.0026	0.0010	0.0030	ug/L	0.0030		87	70-130			12/29/19	J
Perfluoro-n-decanoic acid (PFDA)	0.0029	0.0010	0.0030	ug/L	0.0030		97	70-130			12/29/19	J
Perfluoro-n-heptanoic acid (PFHpA)	0.0035	0.0010	0.0030	ug/L	0.0030		118	70-130			12/29/19	
Perfluoro-n-hexanoic acid (PFHxA)	0.0031	0.0010	0.0030	ug/L	0.0030		105	70-130			12/29/19	
Perfluoro-n-nonanoic acid (PFNA)	0.0030	0.0010	0.0030	ug/L	0.0030		101	70-130			12/29/19	
Perfluoro-n-octanoic acid (PFOA)	0.0032	0.0010	0.0030	ug/L	0.0030		105	70-130			12/29/19	
Perfluorotetradecanoic acid (PFTeDA)	0.0029	0.0010	0.0030	ug/L	0.0030		96	70-130			12/29/19	J
Perfluorotridecanoic acid (PFTrDA)	0.0026	0.0010	0.0030	ug/L	0.0030		86	70-130			12/29/19	J

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A9L2563 MCL FINAL 01 08 2020 1102 01082020 1103

BSK Associates Laboratory Fresno
Organics Quality Control Report

Analyte	Result	MDL	RL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Date Analyzed	Qual
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EPA 537.1 - Quality Control

Batch: A919303

Prepared: 12/27/2019

Prep Method: EPA 537.1

Analyst: JMM

Blank Spike (A919303-BS1)

Perfluoroundecanoic acid (PFUnA)	0.0028	0.0010	0.0030	ug/L	0.0030		95	70-130			12/29/19	J
Surrogate: d5-NEtFOSAA	0.13				0.16		81	70-130			12/29/19	
Surrogate: Perfluoro-n-(1,2-13C2)decanoic acid	0.16				0.16		97	70-130			12/29/19	
Surrogate: Perfluoro-n-(1,2-13C2)hexanoic acid	0.16				0.16		99	70-130			12/29/19	
Surrogate: Tetrafluoro(heptafluoropropoxy)13C3-PA	0.15				0.16		95	70-130			12/29/19	

Matrix Spike (A919303-MS1), Source: S9L0282-01

11-Chloroheicosafuoro-3-oxaundecanesulfonic acid	0.0085	0.0010	0.0030	ug/L	0.0091	ND	93	70-130			12/29/19	
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	0.0086	0.0010	0.0030	ug/L	0.0091	ND	95	70-130			12/29/19	
9-Chlorohexadecafluoro-3-oxanone-1-sulfonic acid	0.0084	0.0010	0.0030	ug/L	0.0091	ND	92	70-130			12/29/19	
Hexafluoropropylene oxide dimer acid (HFPO-DA)	0.0079	0.0010	0.0030	ug/L	0.0092	ND	87	70-130			12/29/19	
NEtFOSAA	0.0095	0.0010	0.0030	ug/L	0.0092	ND	104	70-130			12/29/19	
NMeFOSAA	0.0086	0.0010	0.0030	ug/L	0.0092	ND	94	70-130			12/29/19	
Perfluoro-1-butanefluoro-3-sulfonic acid (PFBS)	0.0087	0.0010	0.0030	ug/L	0.0092	ND	95	70-130			12/29/19	
Perfluoro-1-hexanesulfonic acid (PFHxA)	0.0084	0.0010	0.0030	ug/L	0.0092	ND	92	70-130			12/29/19	
Perfluoro-1-octanesulfonic acid (PFOS)	0.0090	0.0010	0.0030	ug/L	0.0092	ND	98	70-130			12/29/19	
Perfluorododecanoic acid (PFDoA)	0.0085	0.0010	0.0030	ug/L	0.0092	ND	93	70-130			12/29/19	
Perfluoro-n-decanoic acid (PFDA)	0.0079	0.0010	0.0030	ug/L	0.0092	ND	86	70-130			12/29/19	
Perfluoro-n-heptanoic acid (PFHpA)	0.010	0.0010	0.0030	ug/L	0.0092	ND	110	70-130			12/29/19	
Perfluoro-n-hexanoic acid (PFHxA)	0.0089	0.0010	0.0030	ug/L	0.0092	ND	97	70-130			12/29/19	
Perfluoro-n-nonanoic acid (PFNA)	0.0083	0.0010	0.0030	ug/L	0.0092	ND	90	70-130			12/29/19	
Perfluoro-n-octanoic acid (PFOA)	0.0094	0.0010	0.0030	ug/L	0.0092	ND	102	70-130			12/29/19	
Perfluorotetradecanoic acid (PFTeDA)	0.0087	0.0010	0.0030	ug/L	0.0092	ND	95	70-130			12/29/19	
Perfluorotridecanoic acid (PFTrDA)	0.0084	0.0010	0.0030	ug/L	0.0092	ND	91	70-130			12/29/19	
Perfluoroundecanoic acid (PFUnA)	0.0084	0.0010	0.0030	ug/L	0.0092	ND	92	70-130			12/29/19	
Surrogate: d5-NEtFOSAA	0.15				0.15		104	70-130			12/29/19	
Surrogate: Perfluoro-n-(1,2-13C2)decanoic acid	0.14				0.15		93	70-130			12/29/19	
Surrogate: Perfluoro-n-(1,2-13C2)hexanoic acid	0.14				0.15		96	70-130			12/29/19	
Surrogate: Tetrafluoro(heptafluoropropoxy)13C3-PA	0.13				0.15		88	70-130			12/29/19	

Matrix Spike Dup (A919303-MSD1), Source: S9L0282-01

11-Chloroheicosafuoro-3-oxaundecanesulfonic acid	0.0085	0.0010	0.0030	ug/L	0.0092	ND	93	70-130	0	30	12/29/19	
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	0.0094	0.0010	0.0030	ug/L	0.0092	ND	103	70-130	8	30	12/29/19	
9-Chlorohexadecafluoro-3-oxanone-1-sulfonic acid	0.0086	0.0010	0.0030	ug/L	0.0092	ND	94	70-130	3	30	12/29/19	
Hexafluoropropylene oxide dimer acid (HFPO-DA)	0.0090	0.0010	0.0030	ug/L	0.0092	ND	98	70-130	12	30	12/29/19	
NEtFOSAA	0.0085	0.0010	0.0030	ug/L	0.0092	ND	92	70-130	12	30	12/29/19	
NMeFOSAA	0.0087	0.0010	0.0030	ug/L	0.0092	ND	94	70-130	1	30	12/29/19	
Perfluoro-1-butanefluoro-3-sulfonic acid (PFBS)	0.0092	0.0010	0.0030	ug/L	0.0092	ND	100	70-130	6	30	12/29/19	
Perfluoro-1-hexanesulfonic acid (PFHxA)	0.0085	0.0010	0.0030	ug/L	0.0092	ND	92	70-130	1	30	12/29/19	

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A9L2563 MCL FINAL 01 08 2020 1102 01082020 1103



**BSK Associates Laboratory Fresno
Organics Quality Control Report**

Analyte	Result	MDL	RL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Date Analyzed	Qual
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EPA 537.1 - Quality Control

Batch: A919303

Prepared: 12/27/2019

Prep Method: EPA 537.1

Analyst: JMM

Matrix Spike Dup (A919303-MSD1), Source: S9L0282-01

Perfluoro-1-octanesulfonic acid (PFOS)	0.0091	0.0010	0.0030	ug/L	0.0092	ND	99	70-130	2	30	12/29/19	
Perfluorododecanoic acid (PFDoA)	0.0090	0.0010	0.0030	ug/L	0.0092	ND	98	70-130	5	30	12/29/19	
Perfluoro-n-decanoic acid (PFDA)	0.0090	0.0010	0.0030	ug/L	0.0092	ND	98	70-130	13	30	12/29/19	
Perfluoro-n-heptanoic acid (PFHpA)	0.011	0.0010	0.0030	ug/L	0.0092	ND	119	70-130	8	30	12/29/19	
Perfluoro-n-hexanoic acid (PFHxA)	0.0099	0.0010	0.0030	ug/L	0.0092	ND	107	70-130	11	30	12/29/19	
Perfluoro-n-nonanoic acid (PFNA)	0.0093	0.0010	0.0030	ug/L	0.0092	ND	101	70-130	11	30	12/29/19	
Perfluoro-n-octanoic acid (PFOA)	0.0095	0.0010	0.0030	ug/L	0.0092	ND	104	70-130	2	30	12/29/19	
Perfluorotetradecanoic acid (PFTeDA)	0.0093	0.0010	0.0030	ug/L	0.0092	ND	102	70-130	7	30	12/29/19	
Perfluorotridecanoic acid (PFTrDA)	0.0082	0.0010	0.0030	ug/L	0.0092	ND	90	70-130	1	30	12/29/19	
Perfluoroundecanoic acid (PFUnA)	0.0090	0.0010	0.0030	ug/L	0.0092	ND	98	70-130	7	30	12/29/19	
Surrogate: d5-NEtFOSAA	0.14				0.15		93	70-130			12/29/19	
Surrogate: Perfluoro-n-(1,2-13C2)decanoic acid	0.15				0.15		101	70-130			12/29/19	
Surrogate: Perfluoro-n-(1,2-13C2)hexanoic acid	0.16				0.15		109	70-130			12/29/19	
Surrogate: Tetrafluoro(heptafluoropropoxy)13C3-PA	0.15				0.15		103	70-130			12/29/19	

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

Certificate of Analysis

Notes:

- The Chain of Custody document and Sample Integrity Sheet are part of the analytical report.
- Any remaining sample(s) for testing will be disposed of according to BSK's sample retention policy unless other arrangements are made in advance.
- All positive results for EPA Methods 504.1 and 524.2 require the analysis of a Field Reagent Blank (FRB) to confirm that the results are not a contamination error from field sampling steps. If Field Reagent Blanks were not submitted with the samples, this method requirement has not been performed.
- Samples collected by BSK Analytical Laboratories were collected in accordance with the BSK Sampling and Collection Standard Operating Procedures.
- J-value is equivalent to DNQ (Detected, not quantified) which is a trace value. A trace value is an analyte detected between the MDL and the laboratory reporting limit. This result is of an unknown data quality and is only qualitative (estimated). Baseline noise, calibration curve extrapolation below the lowest calibrator, method blank detections, and integration artifacts can all produce apparent DNQ values, which contribute to the un-reliability of these values.
- (1) - Residual chlorine and pH analysis have a 15 minute holding time for both drinking and waste water samples as defined by the EPA and 40 CFR 136. Waste water and ground water (monitoring well) samples must be field filtered to meet the 15 minute holding time for dissolved metals.
- Field tests are outside the scope of laboratory accreditation and there is no certification available for field testing.
- Summations of analytes (i.e. Total Trihalomethanes) may appear to add individual amounts incorrectly, due to rounding of analyte values occurring before or after the total value is calculated, as well as rounding of the total value.
- RL Multiplier is the factor used to adjust the reporting limit (RL) due to variations in sample preparation procedures and dilutions required for matrix interferences.
- Due to the subjective nature of the Threshold Odor Method, all characterizations of the detected odor are the opinion of the panel of analysts. The characterizations can be found in Standard Methods 2170B Figure 2170:1.
- The MCLs provided in this report (if applicable) represent the primary MCLs for that analyte.
- (2) - Formerly known as Bis(2-Chloroisopropyl) ether.

Definitions

mg/L:	Milligrams/Liter (ppm)	MDL:	Method Detection Limit	MDA95:	Min. Detected Activity
mg/Kg:	Milligrams/Kilogram (ppm)	RL:	Reporting Limit: DL x Dilution	MPN:	Most Probable Number
µg/L:	Micrograms/Liter (ppb)	ND:	None Detected below MRL/MDL	CFU:	Colony Forming Unit
µg/Kg:	Micrograms/Kilogram (ppb)	pCi/L:	PicoCuries per Liter	Absent:	Less than 1 CFU/100mLs
%:	Percent	RL Mult:	RL Multiplier	Present:	1 or more CFU/100mLs
NR:	Non-Reportable	MCL:	Maximum Contaminant Limit	U:	The analyte was not detected at or above the reported sample quantitation limit.

Please see the individual Subcontract Lab's report for applicable certifications.

BSK is not accredited under the NELAP program for the following parameters:

****NA****

Certificate of Analysis

Certifications: Please refer to our website for a copy of our Accredited Fields of Testing under each certification.

Fresno

State of California - ELAP	1180	State of Hawaii	4021
Los Angeles CSD	9254479	NELAP certified	4021-012
State of Nevada	CA000792020-2	State of Oregon - NELAP	4021-012
EPA - UCMR4	CA00079	State of Washington	C997-19d

Sacramento

State of California - ELAP	2435
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San Bernardino

State of California - ELAP	2993	Los Angeles CSD	9254478
NELAP certified	4119-004	State of Oregon - NELAP	4119-004

Vancouver

NELAP certified	WA100008-012	State of Oregon - NELAP	WA100008-012
State of Washington	C824-19		

13.9#153
Notice BAW,
ENTAC

SUBCONTRACT ORDER
Alpha Analytical Laboratories, Inc.
19L2896

3.2 °C whial

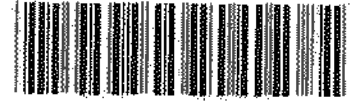
SENDING LABORATORY:

Alpha Analytical Laboratories, Inc.
208 Mason St.
Ukiah, CA 95482
Phone: (707)468-0401
Fax: (707)468-5267
Project Manager: Stephen F. McWeeney

RECEIVING LABORATORY:

BSK
1414 Stanislaus
Fresno, CA 93706
Phone: 559-497-2888
Fax: (559) 485-6935
Terms: Net 30

A9L2563 Alpha0401 12/23/2019



Analysis Due Expires Comments

19L2896-01 518 Amber way Well [Water] Sampled 12/18/19 08:30

537.1 Perfluorochemicals x 18 w/GenX 01/07/20 12:00 01/15/20 08:30

Containers Supplied:

250mL Poly Unpres (AH) 250mL Poly Unpres (AI) 250mL Poly Unpres (AJ)

19L2896-03 Field/Trip Blank [Water] Sampled 12/18/19 08:45

537.3 Perfluorochemicals x 18 w/GenX 01/07/20 12:00 01/15/20 08:45

Containers Supplied:

250mL Poly Unpres (A)

Report to State

System Name: _____ Employed by: _____

User ID: _____ Sampler: _____

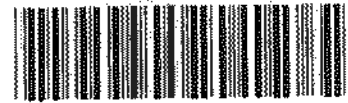
System Number: _____

HQC

Received out of temp. Requested to
reanalyze preserved. Sample is not compliant.
Checked off. Notified
Scan files 7/11/2019

Released By: [Signature] Date: 12/18/19 Received By: [Signature] Date: 12-18-19 17:00
Released By: [Signature] Date: 12-18-19 23:11 Received By: [Signature] Date: 12-18-19 23:11

received: Kallide Kylectubate 12/23/19 11:32



Sample Integrity

BSK Bottles: Yes **No** Page 1 of 1

COC Info		Yes <input checked="" type="radio"/> No <input checked="" type="radio"/> NA		Are correct containers and preservatives received for the tests requested?		Yes <input checked="" type="radio"/> No <input checked="" type="radio"/> NA	
Is temperature within range? Chemistry $\leq 6^{\circ}\text{C}$ Micro $< 8^{\circ}\text{C}$		Yes <input checked="" type="radio"/> No <input checked="" type="radio"/> NA		Bubbles Present in VOA (524,2/TCP/TTHM)?		Yes <input checked="" type="radio"/> No <input checked="" type="radio"/> NA	
If samples were taken today, is there evidence that chilling has begun?		Yes <input checked="" type="radio"/> No <input checked="" type="radio"/> NA		TB Received? (Check Method Below)		Yes <input checked="" type="radio"/> No <input checked="" type="radio"/> NA	
Did all bottles arrive unbroken and intact?		Yes <input checked="" type="radio"/> No <input checked="" type="radio"/> NA		Is sufficient amount of sample received?		Yes <input checked="" type="radio"/> No <input checked="" type="radio"/> NA	
Do all bottle labels agree with COC?		Yes <input checked="" type="radio"/> No <input checked="" type="radio"/> NA		Do samples have a hold time <72 hours?		Yes <input checked="" type="radio"/> No <input checked="" type="radio"/> NA	
Was sodium thiosulfate added to CN sample(s) until chlorine was no longer present?		Yes <input checked="" type="radio"/> No <input checked="" type="radio"/> NA		Has PM been notified of discrepancies? PM: <i>elaine</i> By/Time: <i>11:45</i>		Yes <input checked="" type="radio"/> No <input checked="" type="radio"/> NA	
250ml(A) 500ml(B) 1Liter(C) 40ml/VOA(V) 125ml(D)		Checks	Passed?	1	2		
Bacti $\text{Na}_2\text{S}_2\text{O}_3$		—	—				
None (P) White Cap		—	—	2A	1A		
Cr6 (P) <small>LL Green Label/Blue Cap NH4OH/(NH4)2SO4 DW</small>		Cl, pH > 8	P F				
Cr6 (P) <small>Pink Label/Blue Cap NH4OH/(NH4)2SO4 WW</small>		pH 9.3-9.7	P F				
Cr6 (P) <small>Black Label/Blue Cap NH4OH/(NH4)2SO4 7139 ***24 HOUR HOLD TIME***</small>		pH 9.0-9.5	P F				
HNO ₃ (P) Red Cap or HCl (P) Purple Cap/Cl, Blue Label		—	—				
H ₂ SO ₄ (P) or (AG) Yellow Cap/Label		pH < 2	P F				
NaOH (P) Green Cap		Cl, pH > 10	P F				
NaOH + ZnAc (P)		pH > 9	P F				
Dissolved Oxygen 300ml (g)		—	—				
None (AG) 504/505/507 525 532/5321 5151 5270		—	—				
HCl (AG) <small>LL Blue Label O&G, Diesel, TCP</small>		—	—				
Ascorbic, EDTA, KH ₂ Cl (AG) <small>Pink Label 525</small>		—	—				
Na ₂ SO ₃ 250mL (AG) <small>Noon Green Label 515</small>		—	—				
Na ₂ S ₂ O ₃ 1 Liter (Brown P) 545		—	—				
Na ₂ S ₂ O ₃ (AG) <small>Blue Label 548, TTHM, 524</small>		—	—				
Na ₂ S ₂ O ₃ (CG) <small>Blue Label 504, 505, 547</small>		—	—				
Na ₂ S ₂ O ₃ + MCAA (CG) <small>Orange Label 531</small>		pH < 3	P F				
NH ₄ Cl (AG) <small>Purple Label 552</small>		—	—				
EDA (AG) <small>Brown Label DBPs</small>		—	—				
HCL (CG) 524, 2, BTEX, Gas, MTBE 8260/624		—	—				
Buffer pH 4 (CG)		—	—				
H ₃ PO ₄ (CG) <small>Salmon Label</small>		—	—				
Trizma - EPA 537.1		—	—				
Other		—	—				
Asbestos 1L (P) w/ Foil / LL Metals Bottle		—	—				
Bottled Water		—	—				
Clear Glass 125mL / 250mL / 500mL / 1 Liter		—	—				
Solids: Brass / Steel / Plastic Bag		—	—				
Split	Container	Preservative	Date/Time/Initials	Container	Preservative	Date/Time/Initials	
	S P			S P			
Comments	Arrived out of temp. PMH & Unpreserved bottles, PFAS requested.			<input checked="" type="checkbox"/> Indicates Blanks Received 504 ___ 524.2 ___ TCP ___ TTHM ___ 537 ___ 8260/624 ___			

K. R. H.
12/23/19

Scanned: _____

Lab No. 19C2896

Signature below authorizes work under terms stated on reverse side.

Company Name: City of Petaluma - DW		Project ID: 																	
Mailing Address: 202 North McDowell Blvd Petaluma, CA 94945		Water Quality 																	
Project Contact & Email (Hardcopy or PDF to): Joel McIntyre MCINTYRE@ci.petaluma.ca.us		Project No.: 518 Amber way Well																	
Phone/Fax:		PO#																	
Field Samples - Print Name & Signature Joel McIntyre		Site Contact:																	
Sample Identification	Date	Time	Container							Preservative				Matrix					
			40m Vial	Poly	Glass	Sieve	Other	TCL	HNO3	H2SO4	None	Water	Soil	Other					
518 Amber way Well	12/18	8:30	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Trip Blank	12/18	8:45	X																
Field/Trip Blank	12/18	8:45	X																

Analysis Request										Sample Notes			TAT						
6449 A & B Secondary	64432 Primary Inorganics	64432.1 NO2+NO3 as N	524.2 DDW	Cr6 218.6, Cyanide	504.1	507 DDW / 508 DDW	515.3 DDW / 525.3 Reg 3	531.1 DDW / 547 DDW	548.1 / 549.2 DDW	Dioxin DW 2,3,7,8-TCDD	1,2,3-TCF - sub BSK	Tritium, U DW 200.8	Strontium 90	Radium 226/228	Gross Alpha / Beta	537.1 Reg. X 18 - sub BSK	Asbestos	1 wk	2 wk (standard)

Received by: *[Signature]* Date: 12/18/19 Time: 8:50

Received by: *[Signature]* Date: 12/18/19 Time: 11:35

Received by: *[Signature]* Date: 12/18/19 Time: 12:08

Received by: *[Signature]* Date: _____ Time: _____

Received by: _____ Date: _____ Time: _____

Relinquished by: *[Signature]*

Relinquished by: *[Signature]*

Relinquished by: *[Signature]*

Relinquished by: _____

CDPH Write On EDT Report? Yes No

State System Number: _____

Mileage: _____

Misc. Supplies: _____

19L2896

Alpha Analytical Laboratories North Bay to Ukiah Chain of Custody

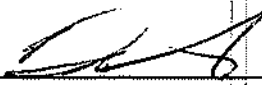



3.2°C which

Client: City of Petaluma	Client Code: NB_CITYPET	Bid:
Project: Water Quality	Project Number: 518 Amber way Well	PO #:

Date Due: 01/07/20 15:00 (10 day TAT)
 Received By: Chris Lanham Date Received: 12/18/19 12:05
 Logged In By: Davide B Furtado Date Logged: 12/18/19 12:10

Samples Received at: _____ deg C All containers received and intact: YES NO

Analysis	Department	Expires	Comments
19L2896-01 518 Amber way Well [Water] Sampled 12/18/19 08:30			
504.1 EDB/DBCP	GC	01/01/20 08:30	
507 DDW Regulated Pesticides	GC	01/01/20 08:30	
508 DDW Regulated Pesticides	GC	12/25/19 08:30	
515.3 DDW Regulated Herbicides	GC	01/01/20 08:30	
525.3 DDW SVOC Reg 3	GCMS SV	01/01/20 08:30	
531.1 DDW Regulated Pesticides	GCMS SV	01/15/20 08:30	
547 DDW Glyphosate	GCMS SV	01/01/20 08:30	
548.1 Endothall	GCMS SV	12/25/19 08:30	
549.2 DDW Diquat	GCMS SV	12/25/19 08:30	
As DW ICP/MS 200.8	Metals	06/15/20 08:30	
Be DW ICP/MS 200.8	Metals	06/15/20 08:30	
Cd DW ICP/MS 200.8	Metals	06/15/20 08:30	
Cyanide DW	Wet Chem	01/01/20 08:30	
Dioxin 2378 TCDD DW 1613	Subcontract	12/17/20 08:30	
Sb DW ICP/MS 200.8	Metals	06/15/20 08:30	
Se DW ICP/MS 200.8	Metals	06/15/20 08:30	
Solids, TDS-SM2540C	Wet Chem	12/25/19 08:30	
Tl DW ICP/MS 200.8	Metals	06/15/20 08:30	
U DW ICP/MS 200.8	Metals	06/15/20 08:30	
19L2896-01 518 Amber way Well [Water] Sampled 12/18/19 08:30			
19L2896-01 518 Amber way Well [Water] Sampled 12/18/19 08:30			
19L2896-03 Field/ Trip Blank [Water] Sampled 12/18/19 08:45			
19L2896-01 518 Amber way Well [Water] Sampled 12/18/19 08:30			

	12/18/19			12-18-19	17:00
Relinquished By	Date	Time	Received By	Date	Time
	12-18-19			12-18-19	23:11
Relinquished By	Date	Time	Received By	Date	Time

19L2896

Alpha Analytical Laboratories North Bay to Ukiah Chain of Custody

Client: City of Petaluma	Client Code: NB_CITYPET	Bid:
Project: Water Quality	Project Number: 518 Amber way Well	PO #:

Containers Supplied: 1L Poly - HNO3 (AD) VOA Vial - Na2S2O3 (J) VOA Vial - Na2S2O3 (K) VOA Vial - Na2S2O3 (L) 1L Amber- Unpres. (AM) 1L Amber- Unpres. (AN) 250mL Brown Poly NaOH (AO) 1L Amber- Unpres. (M) 1L Amber- Unpres. (N) 1L Amber- Unpres. (O) 1L Amber- Unpres. (P) 1L Amber- Unpres. (Q) 125mL Amber - Monochloroacetic Acid (R) 125mL Amber - Monochloroacetic Acid (S) 500mL Brown Poly (T) 1L Amber- Unpres. (U) 1L Amber- Unpres. (V) 1L Amber- Unpres. (W)		
--	--	--

Relinquished By _____ Date _____ Time _____

Received By PH Date 12-18-19 Time 17:00

Relinquished By PH Date 12-18-19 Time 23:11

Received By _____ Date 12-18-19 Time 23:11

Oak Hill Park Site Selection Photos

Appendix B

Oak Hill Park Well Sites – Photo Log



Photo 1
Site 1 Proposed Well behind Maze (looking northwest)



Photo 2
Site 1 Well Site



Photo 3
Site 1 Proposed Well left of Maze (looking east)



Photo 4
Site 1 Well Site (looking northwest) Site 2 on top of slope



Photo 5
Site 1 Proposed Well Site (looking southeast)



Photo 6
Site 2 Well Site (looking south)

Appendix B

Oak Hill Park Well Sites – Photo Log



Photo 7
Site 2 Limited Access Road (looking northwest)



Photo 8
Site 2 and 3 Road Access Proposed Well Site 2 Up on top of slope



Photo 9
Site 3 Well Site Tree Canopy Covered (looking west)
Close proximity of houses



Photo 10
Site 3 Proposed Well Site (looking south) Close proximity of houses



Photo 11
Site 3 Well Site (looking north)



Photo 12
Site 3 Well Site (looking west) Close proximity of houses

Appendix B
Oak Hill Park Well Sites – Photo Log



Photo 13
Site 3 Well Site (looking south) Close proximity of houses