DOF DALTON OLMSTED FUGLEVAND

To: Steve Teel, Department of Ecology

From: Tasya Gray, Taylor Way and Alexander Avenue Fill Area (TWAAFA) Agreed Order Potentially Liable Parties Group Project Coordinator

Date: March 5, 2021

Subject: TWAAFA Existing Groundwater Monitoring Network Evaluation and Recommendations Memorandum

This memorandum provides information regarding current conditions of wells identified for use in the Taylor Way and Alexander Avenue Fill (TWAAFA) Site Groundwater Monitoring Plan (Plan), as required under section 5.1 of the Final Data Gaps Work Plan (DGWP) (DOF, 2020). Some wells have not been used or sampled in years and it is unknown if they are suitable for sampling groundwater at this time or should be abandoned.

DOF personnel visited the TWAAFA site on January 14 and February 3, 2021 to inspect each well identified in the Plan. Table 1 presents a summary of information collected about each well. Appendix A presents photographs of each well, or of the location of a well if the well could not be located. Methods and findings are described in more detail below.

The well inspection followed methods outlined in the Plan. The inspection involved an all-inclusive visual inspection of each well to determine if it has been damaged or tampered with, and to verify the physical condition of the well at the ground surface as well as the internal well casing. Borehole integrity was assessed by measuring the total well depth to estimate sediment build up in the bottom of the well if that procedure had not been confirmed to have been completed in the last five years.

Inspection Summary

The following wells on the former CleanCare property were located and monument condition was assessed but borehole integrity could not be confirmed. DOF was not allowed to perform intrusive work or use decontamination chemicals at the former CleanCare property, due to pending access agreement status.

- CCW-1A, CCW-1C, CCW-2A, CCW-2B, CCW-2C, CCW-3A, CCW-3B, CCW-3C, CCW-5B, CCW-5C, and CCW-8B.

The following wells were identified as having been abandoned:

- CTMW-6, PZ-6, and PZ-10 – Well/piezometers were abandoned in 2019 due to new construction of office building in this location. These three well/piezometers were only proposed for shallow zone water level elevation monitoring in the Plan. As shown in Figure 1 multiple other shallow zone wells still exist surrounding this area of the

TWAAFA site to allow for accurate mapping of groundwater elevations and therefore reinstallation of these wells for the purpose of water level measurement is not recommended.

- CTMW-23R – Well was abandoned and will be replaced as part of TWAAFA network new well installations.
- CTMW-11R – Well was identified as being abandoned in 2013. Sampling data from the most recent round of sampling performed (June 2013) is summarized in the attached Table 2. All results were low or non-detect for the analytes proposed for monitoring in the Plan. Past results for this well were presented in the DGWP and show similar results. This well was located relatively near the proposed location of replacement well CTMW-23R and other shallow zone wells exist in surrounding areas of the TWAAFA site; therefore, this well is not recommended for replacement.

The following wells were not located during the Monitoring Network Evaluation:

- CCW-1B was part of a cluster with wells CCW-1A and CCW-1C. This area is next to the eastern property fence line, where the other two CCW-1 wells were found. They were both flush mount wells in an unpaved area where the ground was fairly uneven and covered with low vegetation and some shrubs. The area appeared to have been potentially disturbed near the fence where landscaping outside the property appeared more recently installed (Pictures 29 and 30).
- CCW-4C and MW-4 which are historically mapped as being along the southern edge of the CleanCare property, adjacent to Parcel A of the BE property could not be located during the inspection. This area is an unpaved slope, immediately beyond the end of asphalt paving, where the property slopes down to the fence line, as shown in Picture 32. This area was heavy vegetated, but a flush mount well would be unexpected due to the slope (though well logs indicate wells were flush mount). The County has agreed to clear vegetation in this area to facilitate access.
- CCW-6B, CCW-6C, CCW-7B, and CCW-7C which are historically mapped as being near the eastern property line behind two buildings could not be located during the inspection because tall vegetation has filled in the space between the fence line and the buildings (Pictures 27 and 28). This area was inaccessible during the site inspection. Historical records indicate that these were flush mount wells. The County has agreed to clear vegetation in this area to facilitate access.
- MW-1 – Equipment and debris storage was covering location of flush mount well monument (Picture 21).

The following well maintenance issues were identified during the inspection:

- SB-1A, SB-2, SB-2A, SB-3A, TWA-5, and TWA-6 above ground monuments are all in good condition but missing locks.
- The gaskets were missing or deteriorated and at least one bolt stripped on all of the flush mount wells on the Former CleanCare property (CCW-1A, CCW-1C, CCW-2A, CCW-2B, CCW-2C, CCW-5B, CCW-5C, and CCW-8B). These wells were opened during the site

inspection and checked via flashlight, though total depth could not be assessed due to access agreement status. All were found to be capped and no indications of debris was noted inside the monuments. The expandable gasket on the j-plug style caps used on these wells were loose and/or deteriorated on several.

- The concrete surrounding the flush mount monument of well CCW-1A was dislodged and the monument itself was loose, but still had its lid (Picture 29). The well casing inside was capped and appeared in good condition.

Recommendations

This section describes recommendations for maintenance or additional work prior to commencing groundwater sampling at the TWAAFA site.

The following wells are recommended for repair of surface monuments/gaskets/caps/locks:

- Recommend adding padlocks or other security measures to wells SB-1A, SB-2, SB-2A, SB-3A, TWA-5, and TWA-6 on the Port of Tacoma 1205 Alexander Avenue (Hylebos Marsh) property.
- Recommend replacing gaskets and bolts (or re-tapping if stripped) on monuments CCW-1C, CCW-2A, CCW-2B, CCW-2C, CCW-5B, CCW-5C, and CCW-8B (flush mount wells on the Former CleanCare property) and internal j-plug caps.
- Recommend replacing the monument at well CCW-1A on the Former CleanCare property when other well installation tasks in the TWAAFA network occur.
- Proceed with reinstallation of well CTMW-23 R, consistent with the Plan, when other new well installations in the TWAAFA network occur.

The following wells are recommended for additional evaluation.

- Recommend re-inspecting wells CCW-1A, CCW-1C, CCW-2A, CCW-2B, CCW-2C, CCW-3A, CCW-3B, CCW-3C, CCW-5B, CCW-5C, and CCW-8B to measure total depth and assess well condition once intrusive work access is approved by Pierce County.
- Shallow well CCW-1B was not located but the adjacent shallow well CCW-1A and deeper well CCW-1C were located. Recommend proceeding with sampling of the two existing wells in this cluster, and evaluating initial results, before prioritizing reinstallation of a third well in this cluster.
- Recommend inspecting the areas of CCW-6B, CCW-6C, CCW-7B, CCW-7C, CCW-4C and MW-4 once the County has cleared brush for evidence of monuments and use of a GPS programmed with well coordinates to try to locate these wells.
- Recommend working with Port of Tacoma's tenant to clear their materials from the area of MW-1 on the Potter property to access and evaluate this well.

No wells were recommended for abandonment based on current assessment, though additional evaluation of internal casings on wells on the former CleanCare property may alter this recommendation. An additional well was located on the Port of Tacoma 1205 Alexander Avenue (Hylebos Marsh) property. Based on records and measurement of total well depth it was

identified as historical well SB-2, installed in 1991. This well was previously thought to have been potentially abandoned. It is paired next to SB-2A (Picture 2).

Proposed Schedule

DOF proposes to submit an addendum to this memorandum with 45 days of receiving access to perform the remaining inspection tasks proposed in this memorandum. General maintenance tasks outlined in this memorandum could be conducted concurrent to completing the remaining inspection tasks.

Once access to use wells on the former CleanCare property is established, it will also allow for scheduling the soil vapor investigation work required under the Data Gaps Work Plan. The ability to measure water levels at wells and conduct intrusive work is necessary for that task.

A survey of new monitoring wells and any existing wells that do not have adequate data will be performed after installation of new monitoring wells and prior to reporting of the first groundwater elevation measurement event.

References

Dalton, Olmsted, & Fuglevand, Inc. (DOF), 2020. *Final Data Gaps Work Plan.* July.

Tables

Table 1
Well Inspection Summary

Property	Well Name	Install Year	Most Recent TD Meaure Date	Inspection Completed (Yes/No)	Notes
Former CleanCare	CCW-1A	1994	NM1	Yes	Monument dislodged but capped. Loose j-plug cap
	CCW-1B	1994	NM2	No	Could not locate well during 2/3/2021 inspection
	CCW-1C	2001	NM1	Yes	Replace gasket/bolts.
	CCW-2A	1994	NM1	Yes	Replace gasket/bolts. Asphalt buckling due to tree roots nearby.
	CCW-2B	1994	NM1	Yes	Replace gasket/bolts. Asphalt buckling due to tree roots nearby.
	CCW-2C	2001	NM1	Yes	Replace gasket/bolts. Loose j-plug cap. Asphalt buckling due to tree roots nearby.
	CCW-3A	1994	NM1	Yes	Good condition.
	CCW-3B	1994	NM1	Yes	Good condition.
	CCW-3C	2001	NM1	Yes	Good condition.
	CCW-4C	2001	NM2	No	Could not locate well during 2/3/2021 inspection due to blackberries
	CCW-5B	2001	NM1	Yes	Replace gasket/bolts.
	CCW-5C	2001	NM1	Yes	Replace gasket/bolts.
	CCW-6B	2001	NM2	No	Could not locate well during 2/3/2021 inspection due to blackberries
	CCW-6C	2001	NM2	No	Could not locate well during 2/3/2021 inspection due to blackberries
	CCW-7B	2001	NM2	No	Could not locate well during 2/3/2021 inspection due to blackberries
	CCW-7C	2001	NM2	No	Could not locate well during 2/3/2021 inspection due to blackberries
	CCW-8B	2001	NM1	Yes	Replace gasket/bolts. Loose j-plug cap
Potter	CTMW-15	1989	12/4/2020	Yes	Little to no sediment accumulation measureable in well in 2020.
	CTMW-20	2000	12/4/2020	Yes	Little to no sediment accumulation measureable in well in 2020.
	MW-1	1986	NM2	No	Tenant equipment/debris covering well on 1/14/2021 and 2/3/2021
BE	MW-4	2004	NM2	No	Could not locate well during 2/3/2021 inspection due to blackberries
	CTMW-1	1987	NM3	Yes	Records incidate LNAPL-containing, internal casing observed to be in good condition.
	CTMW-5	1987	12/4/2020	Yes	Little to no sediment accumulation measureable in well in 2020.
	CTMW-6	1987	NM2	No	Records indicate well abandoned in 2019
	CTMW-7	1987	12/4/2020	Yes	Little to no sediment accumulation measureable in well in 2020.
	CTMW-8	1987	12/4/2020	Yes	Little to no sediment accumulation measureable in well in 2020.
	CTMW-9	1987	12/4/2020	Yes	Little to no sediment accumulation measureable in well in 2020.
	CTMW-10	1987	NM3	Yes	Records incidate LNAPL-containing, internal casing observed to be in good condition.
	CTMW-11R	2007	NM2	No	Records indicate well abandoned in 2013
	CTMW-12	1987	12/4/2020	Yes	Little to no sediment accumulation measureable in well in 2020.
	CTMW-14	1989	12/4/2020	Yes	Little to no sediment accumulation measureable in well in 2020.
	CTMW-17	1991	12/4/2020	Yes	Little to no sediment accumulation measureable in well in 2020.
	CTMW-17D	2001	12/4/2020	Yes	Little to no sediment accumulation measureable in well in 2020.
	CTMW-18	1991	12/4/2020	Yes	Little to no sediment accumulation measureable in well in 2020.
	CTMW-23R		NM2	No	Well was abandoned; plan to re-install
	CTMW-24	2005	12/4/2020	Yes	Little to no sediment accumulation measureable in well in 2020.
	CTMW-24D	2005	12/4/2020	Yes	Little to no sediment accumulation measureable in well in 2020.

Table 1
Well Inspection Summary

Property	Well Name	Install Year	Most Recent TD Meaure Date	Inspection Completed (Yes/No)	Notes
BE (cont.)	CTMW-25D	2005	12/4/2020	Yes	Little to no sediment accumulation measureable in well in 2020.
	PZ-1	1994	NM3	Yes	Records incidate LNAPL-containing, internal casing observed to be in good condition.
	PZ-5	1994	NM3	Yes	Records incidate LNAPL-containing, internal casing observed to be in good condition.
	PZ-6	1999	NM2	No	Records indicate well abandoned in 2019.
	PZ-7	2001	1/14/2021	Yes	Little to no sediment accumulation measureable in well in 2021.
	PZ-8	2001	1/14/2021	Yes	Little to no sediment accumulation measureable in well in 2021.
	PZ-9	2001	1/14/2021	Yes	Little to no sediment accumulation measureable in well in 2021.
	PZ-10	2002	NM2	No	Records indicate well abandoned in 2019
PoT-Hyebos Marsh	SB-1A	1991	12/11/2019	Yes	Little to no sediment accumulation measureable in well in 2019. Well capped but unsecured.
	SB-2A	1991	12/11/2019	Yes	Little to no sediment accumulation measureable in well in 2019. Well capped but unsecured.
	SB-2	1991	1/14/2021	Yes	Little to no sediment accumulation measureable in well in 2021. Well capped but unsecured.
	SB-3A	1991	12/11/2019	Yes	Little to no sediment accumulation measureable in well in 2019. Well capped but unsecured.
	TWA-5	2019	12/10/2019	Yes	Little to no sediment accumulation measureable in well in 2019. Well capped but unsecured.
	TWA-6	2019	12/10/2019	Yes	Little to no sediment accumulation measureable in well in 2019. Well capped but unsecured.
PoT - 1514 Taylor	TWA-1			NA	to be installed
	TWA-2			NA	to be installed
	TWA-3			NA	to be installed
	TWA-10			NA	to be installed
BE	TWA-4			NA	to be installed
BE	TWA-7			NA	to be installed
BE	TWA-8			NA	to be installed

Notes:
indicates a deep well
BE = Burlington Environmental
ft = feet
bgs = below ground surface
btoc = below top of casing
NA = not applicable
PoT = Port of Tacoma
NM1 = not measured due to access restriction
NM2 = not measured because well was not located
NM3 = not measured because well reported to contain LNAPL and will only be used for water levels
TD = total depth
Water level only = monitoring plan requires water level measurement only, no sampling

Table 2
Results of Last Sampling Event - Well CTMW-11R (June 2013)

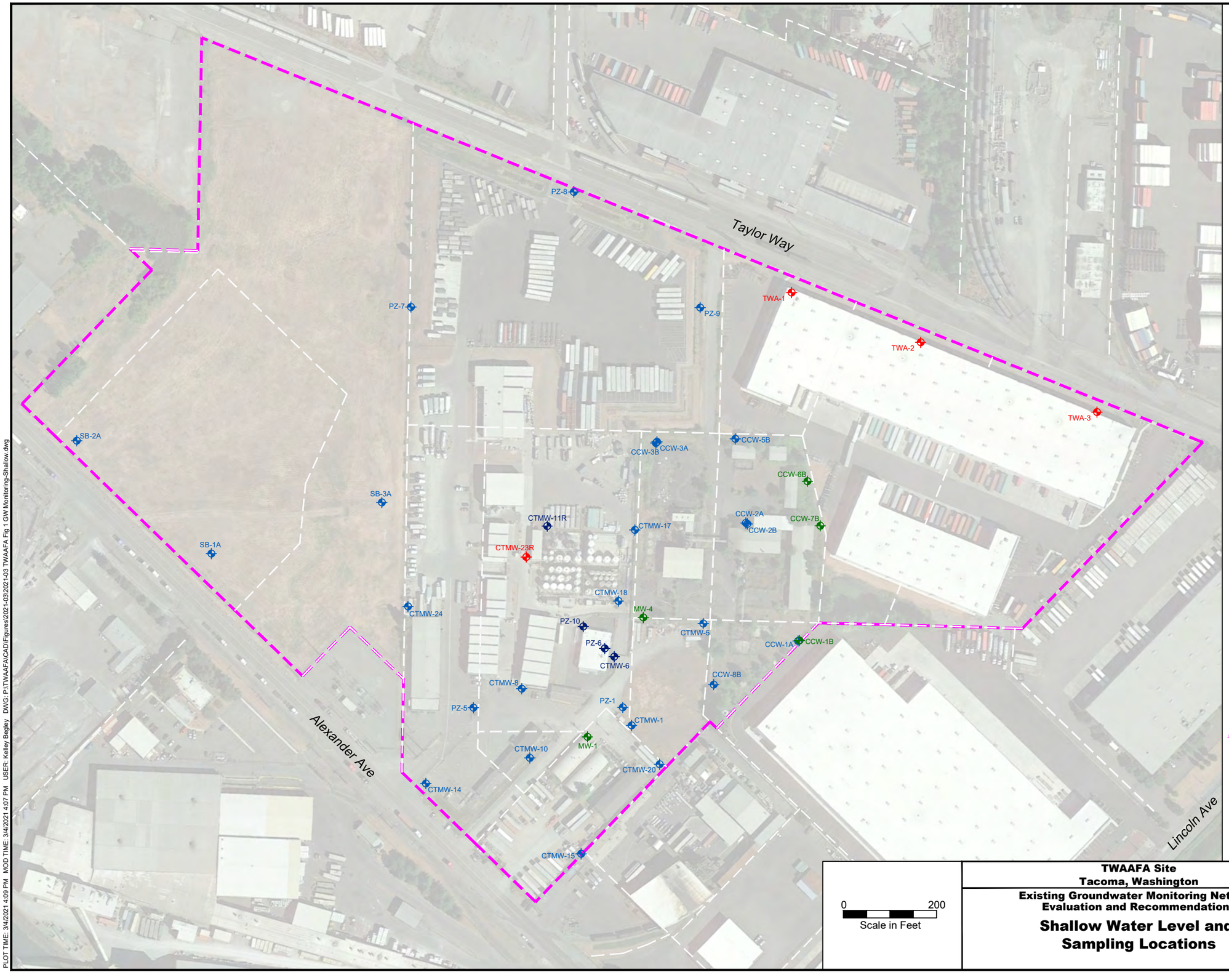
Group	Analyte	Concentration	units
TPH	Diesel	< 250 U	µg/l
	Lube Oil	< 500 U	µg/l
Inorganics	Dissolved Arsenic	0.0055	mg/l
	Total Arsenic	0.0059	mg/l
	Dissolved Cadmium	< 0.000005 U	mg/l
	Total Cadmium	< 0.000006 J U	mg/l
	Dissolved Chromium	< 0.00013 J U	mg/l
	Total Chromium	< 0.00015 J U	mg/l
	Dissolved Copper	< 0.00024 U	mg/l
	Total Copper	0.00063	mg/l
	Dissolved Lead	< 0.000011 J U	mg/l
	Total Lead	0.000067	mg/l
	Dissolved Nickel	0.0016	mg/l
	Total Nickel	0.0017	mg/l
	Dissolved Zinc	< 0.0003 J U	mg/l
	Total Zinc	< 0.0003 J U	mg/l
	Dissolved Mercury	< 0.00002 U	mg/l
	Total Mercury	< 0.00002 U	mg/l
VOCs	1,1,1,2-Tetrachloroethane	< 0.11 U	µg/l
	1,1,1-Tri-chloroethane	< 0.075 U	µg/l
	1,1,2,2,-Tetrachloroethane	< 0.0062 U J	µg/l
	1,1,2-Tri-chloroethane	< 0.14 U	µg/l
	1,1-Dichloro-ethane	< 0.077 U	µg/l
	1,1-Dichloro-ethene	< 0.0059 U	µg/l
	1,2,3-Trichloropropane	< 0.20 U	µg/l
	1,2-Dichloro-ethane	< 0.0058 U	µg/l
	1,2-Dichloropropane	< 0.095 U	µg/l
	2-Butanone	< 1.9 U	µg/l
	2-chloroethylvinylether	< 0.16 U	µg/l
	2-Hexanone	< 2.7 U	µg/l
	4-Methyl-2-pentanone	< 2.6 U	µg/l
	Acetone	3.5 J	µg/l
	Acetonitrile	< 4.5 U J	µg/l
	Acrolein	< 1.2 U	µg/l
	Acrylonitrile	< 0.28 U	µg/l
	Allyl chloride	< 0.094 U	µg/l
	Benzene	< 0.062 U	µg/l
	Bromodichloromethane	< 0.091 U	µg/l
	Bromoform	< 0.16 U	µg/l
	Bromomethane	< 0.10 U	µg/l
	Carbon disulfide	< 0.15 J U	µg/l
	Carbon tetrachloride	< 0.0072 U	µg/l
	Chlorobenzene	< 0.11 U	µg/l

Table 2
Results of Last Sampling Event - Well CTMW-11R (June 2013)

Group	Analyte	Concentration		units
VOCs (cont.)	Chloroethane	< 0.16	U	µg/l
	Chloroform	< 0.072	U	µg/l
	Chloromethane	< 0.068	U	µg/l
	cis-1,2-Dichloroethylene	0.10	J	µg/l
	cis-1,3-Dichloropropene	< 0.18	U	µg/l
	Dibromochloromethane	< 0.14	U	µg/l
	Dichloro-difluoro-methane	< 0.13	U	µg/l
	Ethyl methacrylate	< 0.15	U	µg/l
	Ethylbenzene	< 0.050	U	µg/l
	Isobutyl alcohol	< 6.9	U J	µg/l
	m, p-Xylene	< 0.11	U	µg/l
	Methacrylonitrile	< 0.32	U	µg/l
	Methyl iodide	< 0.12	U	µg/l
	Methylene bromide	< 0.15	U	µg/l
	Methylene chloride	< 0.10	U	µg/l
	o-Xylene	< 0.074	U	µg/l
	Tetrachloro-ethene	< 0.099	U	µg/l
	Toluene	< 0.054	U	µg/l
	trans-1,2-Dichloroethene	< 0.072	U	µg/l
	trans-1,3-Dichloropropene	< 0.068	U	µg/l
	trans-1,4-Dichloro-2-butene	< 0.35	U	µg/l
	Trichloro-ethene	< 0.10	U	µg/l
	Trichlorofluoromethane	< 0.12	U	µg/l
	Vinyl acetate	< 0.43	U	µg/l
	Vinyl chloride	0.025		µg/l

Notes:
U = not detected above reporting limit shown to left
J = qualified as estimated value
ug/L = microgram/liter
TPH = total petroleum hydrocarbons
VOC = volatile organic compound

Figures



Legend

- TWA-1 — Wells to be installed
- CTMW-17 — Groundwater Well/Piezometer
- CTMW-11R — Abandoned Groundwater Well/Piezometer
- Well not located during site inspection
- TWAAFA Site Boundary
- Parcel Boundary

0 200
Scale in Feet

TWAAFA Site
Tacoma, Washington

Existing Groundwater Monitoring Network Evaluation and Recommendations

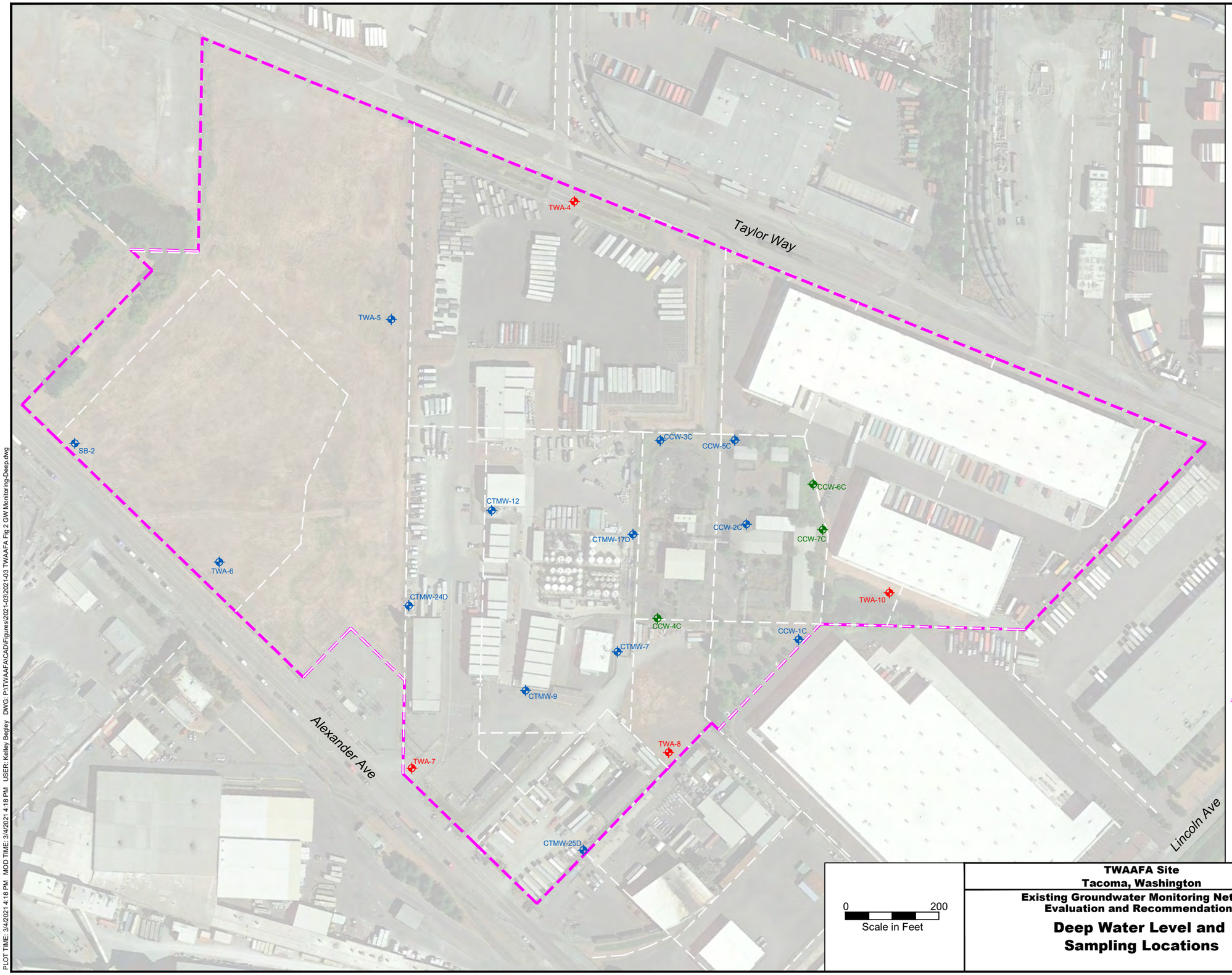
Shallow Water Level and Sampling Locations

DALTON OLMSTED FUGLEVAND

FIGURE 1

03/04/2021

PLOT TIME: 3/4/2021 4:09 PM MOD TIME: 3/4/2021 4:07 PM USER: Kelley Begley DWG: P:\TWAAFA\CAD\Figures\2021-03\2021-03 TWAAFA Fig 1 GW Monitoring-Shallow.dwg



Legend

- TWA-1 — Wells to be installed
- CTMW-17 — Groundwater Well/Piezometer
- Well not located during site inspection
- TWAAFA Site Boundary
- Parcel Boundary

0 200
Scale in Feet

TWAAFA Site
Tacoma, Washington

Existing Groundwater Monitoring Network Evaluation and Recommendations

Deep Water Level and Sampling Locations

DALTON OLMSTED FUGLEVAND

FIGURE 2

03/04/2021

PLOT TIME: 3/4/2021 4:18 PM MOD TIME: 3/4/2021 4:18 PM USER: Kelley Begley DWG: P:\TWAAFA\CAD\Figures\2021-03\2021-03 TWAAFA Fig 2 GW Monitoring-Deep.dwg

Appendix A

Photo Log

Picture 1 Parking Area along Taylor Way on 1205 Alexander Ave & 1300 Taylor Way Property

Picture 2 Elevated roadway on 1250 Alexander Ave & 1300 Taylor Way Property

Picture 3 Ponding in southeast corner on 1205 Alexander Ave & 1300 Taylor Way Property

Picture 4 Slope and Ponding on east side of 1205 Alexander Ave & 1300 Taylor Way Property

Picture 5 Debris in eastern slope on 1205 Alexander Ave & 1300 Taylor Way Property

Picture 6 Ditch on west side of 1205 Alexander Ave & 1300 Taylor Way Property

Picture 7 Eastern Taylor Way stormwater swale on Burlington Environmental Property

Picture 8 Western Taylor Way stormwater swale on Burlington Environmental Property

Picture 9 Ponded stormwater along eastern property line, adjacent to northern trailer parking lot on Burlington Environmental Property

Picture 10 Office building (right) nearest tank farm on Burlington Environmental Property

Picture 11 Parcel A on Burlington Environmental Property

Picture 12 Quonset buildings in foreground and timber shell structure in background on Potter Property.

Picture 13 Timber shell structure on Potter Property (looking north)

Picture 14 Ponded water and trailer parking on south end of Potter Property

Picture 15 Brush north of building 2 on CleanCare Property

Picture 16 Brush around buildings at northeast corner of CleanCare Property (Building 3 on left)

Picture 17 Abandoned tanks on south end of CleanCare Property

Picture 18 Ponded water and debris in the former tank farm area of the CleanCare Property

Picture 19 Soil mounding along western property line, west of the former tank farm area on the CleanCare Property

Picture 20 Corroded drums in southwest corner of former tank farm area on CleanCare Property

Picture 21 Debris in the former tank farm area of the CleanCare Property

Picture 22 Concrete containment area south of building 2 (left) and abandoned process equipment between buildings 2 and 3 on CleanCare Property

Picture 23 Gravel area south of building 2, former tank farm area in background on CleanCare Property

Picture 24 Abandoned fiberglass tanks inside building 2 on CleanCare Property

Picture 25 Debris inside and outside south end of building 3 on CleanCare Property

Picture 26 Building 5 with large trailer in background, inside the building on CleanCare Property

Picture 27 Debris and vandalism inside building 1 on CleanCare Property.

Picture 28 Debris and vandalism inside building 1 on CleanCare Property

Picture 29 Heating oil tank inside fence on north side of building 1, abandoned process equipment in background with ponded stormwater on CleanCare Property

Picture 30 Ponded stormwater and former processing pipe rack overhead on CleanCare Property

Picture 31 Former process equipment south of building 1 on CleanCare Property

Picture 32 Ponded stormwater southwest of building 1, abandoned tanks in background on CleanCare Property

Picture 33 Former concrete containment area south of building 1 full of stormwater on CleanCare Property

Picture 34 Abandoned totes in building 5 on CleanCare Property

Picture 35 Asphalt depression south of building 1 and north of containment area shown in Picture 34 on Cleancare Property

Picture 36 Ponded stormwater in concrete containment area south of former process area on CleanCare Property, Burlington Environmental tank farm in background

Picture 37 Former process area (containment and abandoned equipment) with ponded stormwater on CleanCare Property

Picture 38 Containment area with stormwater southwest of building 5 on CleanCare Property

Picture 39 Building A (right) and parking area (left) looking north toward Taylor Way on 1514 Taylor Way Property

Picture 40 Building A (left) and building B (right) looking east on 1514 Taylor Way Property

Picture 41 Looking west from 1514 Taylor Way Property toward CleanCare Property, building 3 in background, fencing missing

Picture 42 Stormwater pond at south end of 1514 Taylor Way Property