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January 16, 2024

Mr. Frank Winslow, LHG
Washington State Department of Ecology
1250 West Alder Street
Union Gap, Washington 98903

Re: Groundwater Assessment Work Plan
Former Brookdale Golf Course
1802 Brookdale Road East
Tacoma, Washington

TRC Project Number: 430733.0

Dear Mr. Winslow:

TRC Environmental Corporation (TRC) is pleased to present this Work Plan for continued assessment at the Former Brookdale Golf Course. The Former Brookdale Golf Course is located at 1802 Brookdale Road East in Tacoma, Washington (Site; Figure 1). The Work Plan was prepared on behalf of the owner, Ichijo USA Co., Ltd. (Ichijo).

The work proposed herein is in support of Ichijo's ongoing efforts to comply with the requirements of the Model Toxics Control Act (Revised Code of Washington [RCW] 70A.305) and its implementing regulations (Washington Administrative Code [WAC] 173-340; collectively "MTCA").

The Site is currently enrolled in the Washington State Department of Ecology's (Ecology) Expedited Voluntary Cleanup Program (EVCP) as VCP Site XS0016. Due to the development schedule and pending transactions, it was deemed necessary to expedite Ecology's review process.

Key information about the Site is provided in Table 1, below.

Table 1
Key Information

Ecology Facility Site ID Number	7758
Ecology Cleanup ID Number	14894
VCP Number	XS0016
Project Consultant for the Site	TRC Environmental Corporation 1180 Northwest Maple Street, Suite 310 Issaquah, Washington 98027

Table 1
Key Information

	425-395-0010 Attn: Eric Koltes/Nate Hinsperger
Current Property Owner	Ichijo USA Co., Ltd. 1406 140 th Place NE, Suite 104 Bellevue, Washington 98007 Attn: Kanon Kupferer

PREVIOUS ENVIRONMENTAL WORK

TRC (as both our previous business entity Environmental Partners, Inc.; EPI and TRC) performed a remedial investigation and focused feasibility study for the Site. These activities were documented in EPI's *Remedial Investigation and Focused Feasibility Study* (RI/FFS) dated March 19, 2020, TRC's *Supplemental Remedial Investigation Report* (SRI) dated May 29, 2020, and TRC's *Supplemental Remedial Investigation Report – South of Clover Creek* (SRI) dated August 31, 2022. These documents were previously submitted to Ecology under the VCP.

Cleanup actions were additionally performed at the Site in June through October 2019. These actions were documented in TRC's *Cleanup Action Report*, dated August 31, 2022.

Ecology has issued several opinion letters regarding the sufficiency of the characterization and cleanup of the Site. The most recent opinion letter was dated January 30, 2023. In this letter, Ecology detailed several concerns with the characterization and cleanup of the Site. In TRC's review, the most pressing issue appears to be centered on the sufficiency of the prior groundwater characterization. Particularly, the laboratory reporting limits (RLs) for groundwater samples achieved during the prior work.

In the absence of groundwater impacts, direct contact cleanup levels (CULs) would apply for Site contaminants of concern (COCs) using an empirical evidence approach. Therefore, TRC proposes first performing an additional groundwater assessment using lower RLs to empirically demonstrate that COCs are not present in groundwater. This effort would also serve to narrow the focus of issues that are required to address for Site closure.

Ecology also indicated in recent correspondence following the submittal of this Work Plan that data gaps for dieldrin in surface water and sediment are present at the Site. The data gaps for surface water and sediment are directly related to the achievable laboratory RLs that were available during the performance of the SRI.

TRC proposes using lower RLs for the additional assessment of surface water at the Site.

Because the laboratory RL for dieldrin in sediment is not substantially higher than Ecology's Sediment Management Standards Freshwater Sediment Cleanup Objectives and Cleanup Screening Levels

Chemical Criteria (WAC 173-204-563 Table VI), other lines of evidence will be used to address the data gaps.

As a component of this groundwater assessment, TRC will also assess data gaps in surface water that will be required for Site closure.

As indicated in prior documents, dieldrin is the indicator hazardous compound (IHC) for impacts at the Site. Therefore, the groundwater assessment will focus on the presence or absence of dieldrin.

After completion of the groundwater assessment proposed herein, TRC will submit a full response to comments for the January 30, 2023 Ecology opinion letter for discussion towards closure.

OBJECTIVES

The general objective of the work presented herein is to perform groundwater assessment at the Site for purposes of empirical demonstration that current soil conditions are protective of groundwater for dieldrin. Additional assessment of surface water will be performed to address data gaps required for Site closure.

The specific objective are as follows:

- Installation and development of up to ten new monitoring wells;
- Establish piezometric conditions;
- Sampling and analysis of the newly installed wells;
- Sampling and analysis of surface water;
- Report preparation; and
- Response to Ecology.

METHODOLOGY

Well Installation

TRC will install ten monitoring wells at the Site. The monitoring wells will be installed in locations that are representative of groundwater conditions across the Site. The rationale of the well locations includes the following:

- Wells will be installed near the southwestern property boundary that is the portion of the Site nearest to group A/B water supply wells and wellhead protection zones.

- Wells will be installed at tees and greens where concentrations of dieldrin in soil were observed to be the highest during the remedial investigation (RI). Table 2 (below) summarizes the highest concentrations of dieldrin in soil identified during the RI and the rationale for proposed monitoring well locations.

Table 2
Rationale for Proposed Monitoring Well Locations

Area	Tee/Green	Max Dieldrin (mg/kg)	Sample	Proposed MWs*	Ecology Suggested MW	Location Rationale
1	T1	0.51	PG-2-NW	2	1	Aerial coverage
	G2	20				
	G9	4.2				
2	G1	2.0				
	G18	1.9				
3	T2	2.3	Tee-4-D	0	0	
	T4	5.1				
	G1	0.68				
4	T11	2.9	Green 8	1	1	Aerial coverage
	G8	6.0				
5	T18	1.8	Green 17	0	1	Aerial coverage
	G10	0.72				
	G17	9.0				
6	T3G	0.4	Green 2-SW	1	0	Aerial coverage
	2	4.7				
7	T8	9.2	Tee 8-B	0	1	Aerial coverage
	G7	1.4				
8	T12	1.8	Green 11	1	1	Aerial coverage
	G11	5.4				
9	T17	6.7	Tee 17-D	1	1	Aerial coverage
	G16	1.5				
10	G3	1.4	Green 3	1	1	Aerial coverage
11	G12	1.3	Green 15-S	1	1	Aerial coverage
	G15	5.9				
12	T7	0.096				
	G6	0.93				
13	T13	4.2	Green 14-N	1	1	Aerial coverage, water wells**
	T15	0.12				
	T16	0.061				
	G14	6.8				

Table 2
Rationale for Proposed Monitoring Well Locations

Area	Tee/Green	Max Dieldrin (mg/kg)	Sample	Proposed MWs*	Ecology Suggested MW	Location Rationale
14	T5	1.4				
	G4	5.1				
	G5	7.2				
15	T14	1.3	Tee 14-N	2	1	Areal coverage, water wells**
	G13	0.016				

Notes:

(mg/kg) Milligrams per kilogram.

* Proposed monitoring wells on Figure 2.

** Area is in closer proximity to Group A/B water supply wells and wellhead protection zones.

Dieldrin > 5 mg/kg

Dieldrin 1-5 mg/kg

Drilling Methods

Wells will be installed and completed using hollow-stem auger (HSA) drilling and sampling methods by a Washington state-licensed well driller.

During drilling at each location soil samples will be collected at 5-foot vertical intervals. At least two soil samples will be retained from each boring (20 total) and placed directly into laboratory-supplied glass sample containers. All soil samples will be submitted for total organic carbon using SW-846 Method 9060.

Soil conditions encountered during drilling at each location will be logged using the Unified Soil Classification System (USCS) with visual-manual procedures (ASTM Method 2488D). Soil conditions and field screening results will be recorded on boring and well completion logs.

Each monitoring well will be installed to a total depth of 20 feet and will include 0.010 pre-pack screen ranging from ten to 15 feet in length. Each well will be completed at the surface with a flush-mounted, traffic-rated monument and sealed with a locking watertight plug. The wells will be constructed in accordance with the "Minimum Standards for Construction and Maintenance of Wells" (WAC 173-160) under the supervision of a Washington-licensed well driller and an experienced environmental professional from TRC. Final well design and construction may be adjusted based on field observations during drilling.

The locations of all new monitoring wells will be surveyed to establish horizontal location and vertical elevation by a Washington-licensed surveyor. Horizontal locations will be accurate to 0.1 foot and vertical elevations will be accurate to 0.01 foot.

Well Development

After completion, each well will be developed to remove fine materials accumulated within the well during drilling and to set the filter pack. The wells will then be allowed to equilibrate for at least 48 hours prior to groundwater sampling.

The new wells will be developed using a combination of over pumping and surging. Well development will be completed by continuous pumping at a steady rate using a submersible pump or waterra® tubing.

Because dieldrin exhibits both a low aqueous solubility and an elevated log octanol water-partitioning coefficient, soil particles in groundwater will skew the data and will not be representative of groundwater conditions. Therefore, well development will only be considered completed when less than 5 nephelometric turbidity units (NTU) have been achieved. Accordingly, well development will be terminated when the turbidity of the discharge water decreases to less than 5 NTU.

Groundwater Sampling and Analysis

TRC will conduct groundwater sampling from the 10 newly installed monitoring wells following completion of the well development described above. The sampling event will be performed to assess current groundwater conditions at the Site following the previously documented remedial actions and to demonstrate compliance with the MTCA Method B CUL for dieldrin in groundwater.

Methodology

Prior to sampling, TRC personnel will collect piezometric groundwater level data in all wells using an electronic water level meter. The depth to water will be measured to the nearest 0.01 foot, relative to a surveyed point on the north side of the PVC well casing.

Groundwater sampling will be performed using standard low-flow sampling techniques. Prior to sample collection, each well was purged until field measurements of pH, dissolved oxygen (DO), oxidation-reduction potential (ORP), temperature, and conductivity stabilized to within 10 percent of the prior measurement. A turbidity value of less than 5 NTU will be achieved prior to collecting the groundwater samples. Purging will be performed using a peristaltic pump and disposable tubing at each well.

The groundwater samples will be collected directly from the tubing into laboratory-supplied sample containers at a flow rate of less than 100 milliliters per minute. Immediately upon collection, each sample container was appropriately labeled and placed into a chilled cooler pending submittal to the analytical laboratory.

Groundwater samples will be placed into a cooler with ice and submitted to Friedman and Bruya, Inc. in Seattle, Washington, under standard chain-of-custody protocol. Each groundwater sample will be submitted for analysis of dieldrin using U.S. Environmental Protection Agency (EPA) Method 8081.

Surface Water Sampling

Surface water conditions will be assessed in Clover Creek and the North Fork Clover Creek tributary for the presence of dieldrin. TRC will collect a total of five surface water samples during the groundwater assessment. Proposed surface water sample locations are depicted on Figure 2.

Two surface water samples will be collected from the North Fork Clover Creek tributary. Two surface water samples will be collected from Clover Creek and one surface water sample will be collected from the pond located adjacent to the east of Clover Creek.

Surface water samples will only be collected during dry conditions to ensure that the collected samples are representative of current surface water conditions and are not impacted by surface runoff during a precipitation event.

Each surface water sample will be submitted for analysis of dieldrin using EPA Method 8081.

Cleanup Levels and Laboratory Reporting Limits

Groundwater and surface water CULs for dieldrin were evaluated in accordance with MTCA and take into consideration exposure pathways and receptors based on current and likely future uses of the Site. Based on current and expected future use of the Site, exposure pathways for human and ecological receptors were considered for the development of applicable CULs. The CUL for the applicable IHC are presented in Table 3 below.

Table 3
Established Groundwater and Surface Water CULs
and Laboratory Reporting Limits

Compound	MTCA Method B Groundwater Cleanup Level^{a,b}	Laboratory Reporting Limit^c (µg/L)
Dieldrin	0.0055	0.0050

Notes:

(µg/L)

a

Micrograms per liter.

MTCA Method A Groundwater Cleanup Level (Table 740-1). Where no MTCA Method A Cleanup Level established, MTCA Method B Groundwater Cleanup Levels (from CLARC) used.

b

MTCA Method B Groundwater Cleanup Level used for Surface Water Cleanup Level as requested in Ecology's August 24, 2020, Opinion Letter.

c

Friedman and Bruya, Inc. Laboratory Reporting Limit for dieldrin in water.

Reporting

All work performed will be documented by TRC. Documentation will include a summary of the groundwater assessment activities, including digital monitoring well boring logs, documentation of the performed groundwater sampling, a summary of the findings of the groundwater assessment, and laboratory reports documenting the analytical results from the groundwater assessment.

Following the completion of the groundwater assessment, TRC will submit a full response to comments for the January 30, 2023 Ecology opinion letter for discussion towards closure.

If warranted, TRC will also prepare an amended CAR for the Site compliant with the requirements of MTCA following Ecology's general guidance for such reports. This report will ultimately be required to support an NFA determination. The CAR that summarizes the previously completed remedial actions will, in addition, summarize the findings of this groundwater assessment and document that Site conditions meet the requirements of MTCA.

Schedule

TRC will schedule the proposed scope of work immediately upon receipt of written acceptance of this Work Plan from Ecology described herein. The monitoring well installation is tentatively scheduled to be completed in February 2024, pending Ecology's acceptance.

TRC's response to comments and documentation summarizing the results and findings of the groundwater assessment will be submitted within 4 weeks of receipt of all laboratory data.

Sincerely,



NATHANIEL DAVID HINSPERGER

Prepared by:
Nate Hinsperger, L.G.
Senior Geologist



ERIC MICHAEL KOLTES

Reviewed and Approved by:
Eric Koltes, L.G.
Principal Geologist

cc: Kanon Kupferer; Ichijo USA Co., Ltd.

ENCLOSURES

Tables (embedded)

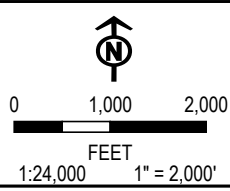
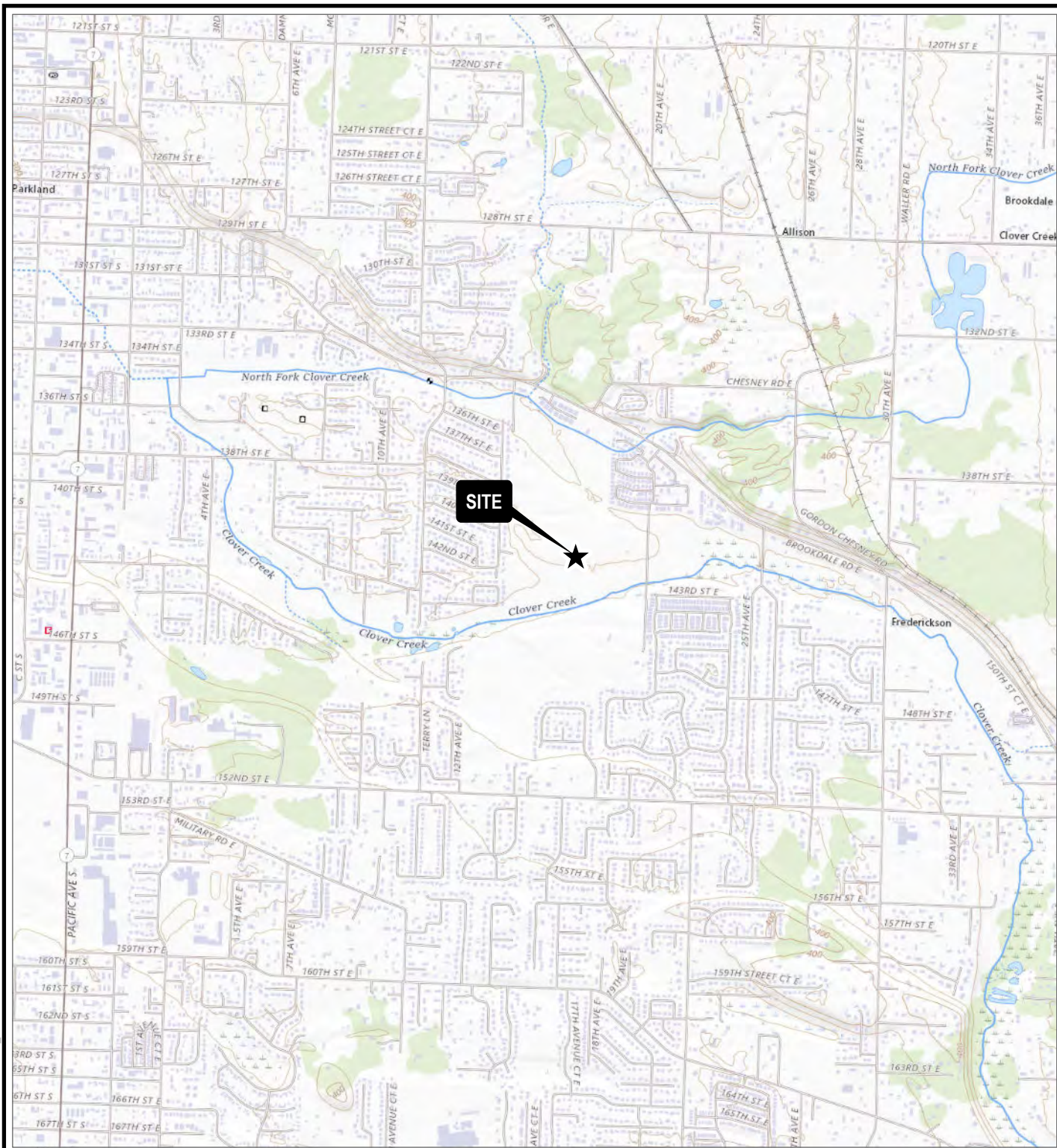
Table 1	Key Information
Table 2	Rationale for Proposed Monitoring Well Locations
Table 3	Established Groundwater and Surface Water Cleanup Levels and Laboratory Reporting Limits

Figures

Figure 1	General Vicinity Map
Figure 2	Site Representation Showing Proposed Monitoring Well Locations

Figures

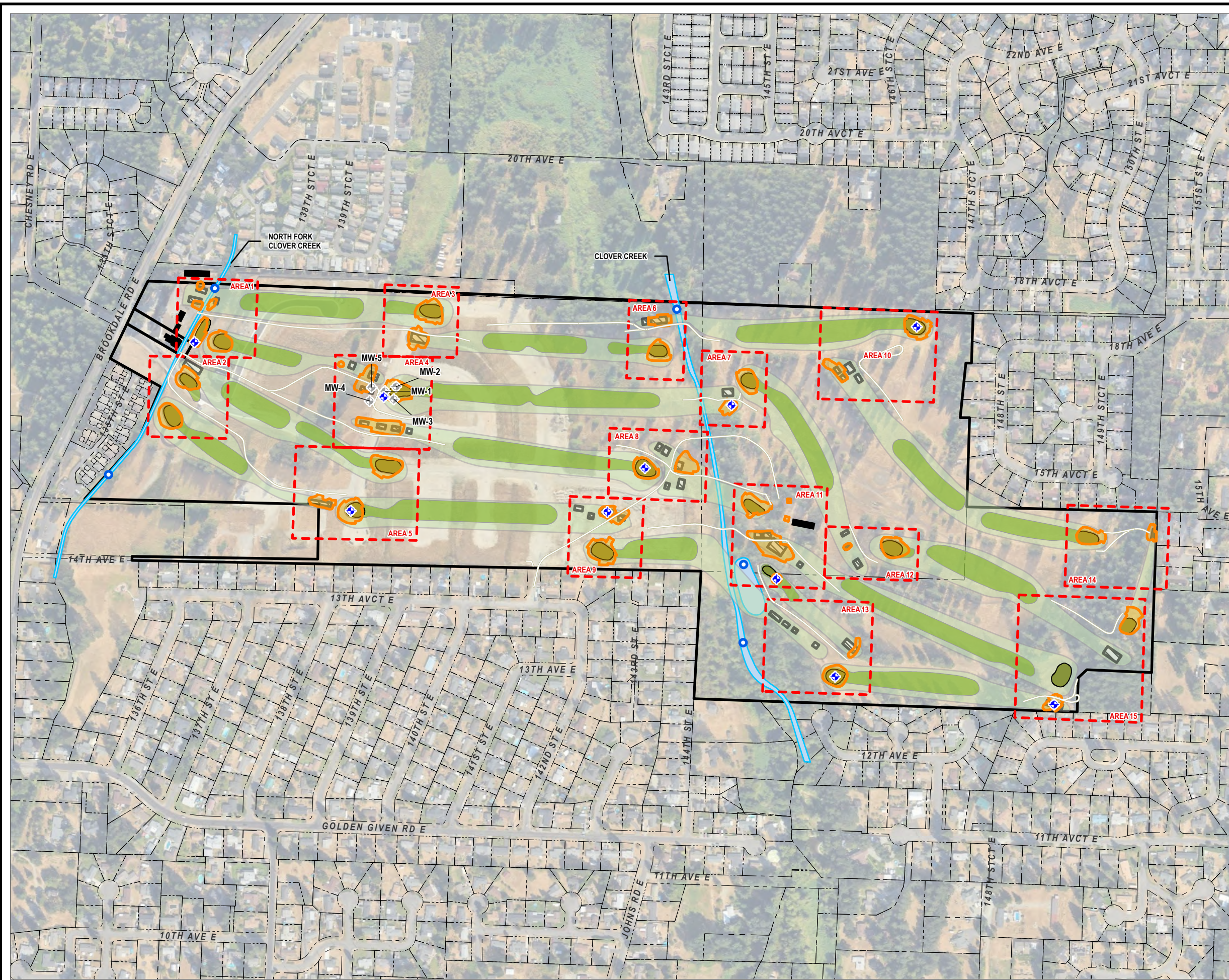
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PROJECT: FORMER BROOKDALE GOLF COURSE 1802 BROOKDALE ROAD EAST TACOMA, WASHINGTON	
TITLE: GENERAL VICINITY MAP GROUNDWATER ASSESSMENT WORK PLAN	
DRAWN BY: S. RAY	PROJ. NO.: 430733.0000.0000
CHECKED BY: N. HINSPERGER	FIGURE 1
APPROVED BY: N. HINSPERGER	
DATE: JANUARY 2024	
 1180 NW MAPLE STREET, SUITE 310 ISSAQUAH, WA 98027 PHONE: 425.395.0010	
FILE: ADDITIONAL GROUNDWATER CHARACTERIZATION WORK PLAN 2023	

BASE MAP: USGS COLOR TOPO IMAGERY
DATA SOURCES: TRC

Coordinate System: NAD 1983 StatePlane Washington South FIPS 4602 Feet; Map Rotation: 90
-- Saved By: SRAY on 1/12/2024, 08:40:38 AM; File Path: T:\PROJECTS\Tichiplo\430733_Brookdale\2-4\PRX\Additional Groundwater Characterization Work Plan 2023.aprx; Layout Name: Fig 2 - Site Rep



- PROPOSED MONITORING WELL LOCATION
- DECOMMISSIONED MONITORING WELL LOCATION
- PROPOSED SURFACE WATER SAMPLE LOCATION
- GOLF COURSE CART PATH
- APPROXIMATE LIMITS OF REMEDIAL EXCAVATION
- APPROXIMATE SUBJECT PROPERTY BOUNDARY
- BUILDING
- FORMER GOLF COURSE GREEN
- FORMER GOLF COURSE FAIRWAY
- FORMER GOLF COURSE HOLE
- FORMER GOLF COURSE TEE BOX
- PARCEL BOUNDARY
- REMEDIAL AREA
- WATER FEATURE

BASE MAP: GOOGLE EARTH AND THEIR DATA PARTNERS.
DATA SOURCES: TRC, PIERCE COUNTY GIS OPENDATA PORTAL



1:5,400

1" = 450'

0 225 450
FEET

PROJECT: **FORMER BROOKDALE GOLF COURSE**
1802 BROOKDALE ROAD EAST
TACOMA, WASHINGTON

TITLE: **SITE REPRESENTATION SHOWING**
PROPOSED MONITORING WELL LOCATIONS
GROUNDWATER ASSESSMENT WORK PLAN

DRAWN BY: S. RAY PROJ. NO.: 430733.0000.0000

CHECKED BY: N. HINSPERGER

APPROVED BY: N. HINSPERGER

DATE: JANUARY 2024

FIGURE 2



1180 NW MAPLE STREET, SUITE 310
ISSAQUAH, WA 98027
PHONE: 425.395.0010

FILE: Additional Groundwater Characterization Work Plan 2023.aprx