REMEDIAL INVESTIGATION REPORT

Site Name:	**Lake Chelan Community Hospital - New Construction**
Site Address:	**106 and 110 South Apple Blossom Drive Chelan, WA 98816**
Ecology Facility Site ID No.:	**66314**
Voluntary Cleanup Program Project No.:	**CE0509**
Order No.:	**N/A**
Consent Decree No.:	**N/A**

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Signature:

Date: **Pre-Final Draft 11/22/2022**

TABLE OF CONTENTS

Update table of contents once report is completed by right-clicking and selecting "update field" and then "update entire table".

LIST OF FIGURES

LIST OF TABLES

APPENDICES

ACRONYMS AND ABBREVIATIONS

Acronyms & Abbreviations	Definitions
ARAR	Applicable or Relevant and Appropriate Requirements
bgs	below ground surface
COC	Contaminant/Chemical of Concern
CSID	Cleanup Site Identification number
CSM	Conceptual Site Model
CUL	clean-up levels
Ecology	Washington State Department of Ecology
FOC	Fraction of Organic Carbon
FSID	Facility Site identification number
MTCA	Model Toxics Control Act
PID	Photoionization detector
PSD	particle size distribution
QAPP	Quality Assurance Project Plan
RCW	Revised Code of Washington
SAP	Sampling and Analysis Plan
TEE	Terrestrial Ecological Evaluation
TLCP	
TPH	total petroleum hydrocarbon
VCP	Voluntary Cleanup Program
WAC	Washington State Administrative Code

EXECUTIVE SUMMARY

This remediation investigation report has been prepared to meet the requirements of the Model Toxics Control Cleanup Act (MTCA) administered by Ecology under chapter 173-340 of the Washington Administrative Code (WAC). This remediation investigation describes how the regulatory requirements are to be met for this site and set forth the requirements that the cleanup must meet.

This report documents cleanup remediation activities conducted at the new Lake Chelan Community Hospital (LCCH) located within the City of Chelan, WA. Bouten Construction Company began the new hospital construction in 2021. In 2009, this site was identified by Ecology with lead and arsenic contamination harmful to humans in 2009 as over MDL levels requiring cleanup / mitigation measures for the site to be developed under the Voluntary Compliance Program.

A Soil Management Plan (SMP) for construction at the new hospital site was completed by GeoEngineers in 2019. The SMP by GeoEngineers recommended capping as the most cost-effective solution for remediation of the contaminants. This SMP was used by LCCH and contractors as guidance for handling and managing known and assumed contaminated soil at the site. Per this SMP, all soil at the site was to be considered contaminated with lead, arsenic and/or pesticides unless contaminants testing indicated samples below regulatory levels. Contaminated soil must be characterized, managed, handled, capped and or disposed of in accordance with all applicable regulations.

The types of soil remediation chosen for construction of the hospital are as follows:

- Clearing /grubbing top soils and dispose these materials at East Wenatchee Landfill.
- Scraping off top 1-foot of topsoil and mounding in lower southern part of the site and geotextile material capping with 1-foot of clean imported topsoil.
- BMP for clean imported backfill at all utility trenches
- New hospital building floor concrete foundation, slabs, and hardscape surfaces for concrete or asphalt paving will be considered as utilizing BMP for capping the contaminated soils below them.
- All landscape open field/grassy areas are to be capped with geotextile material and 1-foot of clean imported soil.
- All stormwater swales, retention / infiltration basins shall be capped and lined with geotextile material and 1-foot of clean imported soil. To control contaminant migration off site or to groundwater, stormwater shall not be discharged through contaminated soil. If soil sampling indicates contaminated soil extends to depths below a stormwater feature, then contaminated soil was to be removed and replaced with clean, non-contaminated imported fill to control stormwater infiltration through contaminated soil.
- If contamination below storm water features was too deep an alternative to removing contaminated soils was developed with Ecology approval for testing buried soils for leachability using Toxicity Characteristic Leaching Procedure (TCLP) methods. This methodology was used to determine if the potential for contaminating groundwater below or down gradient from the site existed. If TCLP

testing of samples from below stormwater features showed no ability to leach further contamination into groundwater, then soils there could remain in place without further remediation. The testing results showed all TCLP samples tested were below the leachability regulatory levels for arsenic and lead, and so no further removal of soils below the storm water features would be required to protect groundwater contamination below the site.

1. INTRODUCTION

The purpose of this report is to characterize the nature and extent of contamination and document cleanup remediation activities conducted at the new Chelan Community Hospital site during the construction schedule beginning in the spring of 2021 and ending during the fall of 2022. The site was originally developed as an orchard in the early 20th century and pesticides were used to deal with insect larvae damage on fruit. Initially the use of arsenic and lead were used as pesticides in the 1930s before DDT was used later for controlling insect damage to fruit production.

This site along with many others in Central Washington were identified as having lead and arsenic contamination harmful to human exposure along with DDT. Initial testing in 2009 for DDT showed concentrations lower the MCL requirements, but arsenic and lead level testing were identified as being over the MDL levels thus requiring either cleanup or mitigation measures by Washington State Department of Ecology for the site to be developed under the Voluntary Compliance Program to minimize exposure to humans.

1.1. GENERAL SITE INFORMATION

- Site Name: Lake Chelan Community Hospital New Construction

  Address: 110 South Apple Blossom Drive, Chelan WA 98816

  Facility Site Identification number (FSID): 66314

  Voluntary Cleanup Program (VCP): CE0509

- Contact information for the following:

  Project Consultant: Construction Special Inspections LLC

  Property Owner: CHELAN COUNTY HOSPITAL DISTRICT NO 2

  Facility Operator

  Person/Entity Who Contracted the Work Performed: Dick Bratton

  Contact information: Dick Bratton Project Management LLC,

  1017 91 Street NE, Bellevue, WA 98804

  Phone: (425) 894-4591; Email Address: dbrattonpmllc@outlook.com

- Location information:

  The property is within Section 18, T27N, Range 23E.and is shown relative to the surrounding Lake Chelan area on the Vicinity Map, **Figure 1**. The site lies near the eastern boundary of the city limits of Chelan and near the intersection of State Highway 97A and Apple Blossom Drive and nearby the Walmart Supercenter. The Lake Chelan Hospital District No. 2 owns both lots at 106 and 110 S. Apple Blossom Drive, Chelan, Washington. The overall neighborhood site layout is shown in **Figure 2**. The property at 110 S. Apple Blossom Drive is currently undergoing development for the new Lake Chelan Community Hospital. This area previously underwent development for constructing the roadway for Apple Blossom Drive and selling these lots. Previously these lots were part of an apple orchard. Currently only the lot for 110 S. Apple Blossom Drive is being developed for constructing the new hospital. In the future 106 S. Apple Blossom Drive will be developed for medical office buildings.

1.2. SITE HISTORY

This site was historically a large apple orchard from the 1900s to 1999. It has a history of being considered in an area where lead, arsenic and DDT were used for orchard fruit trees agriculture to control pests and was suspected of having past pesticide use. Prior to the mid-1940s, lead-arsenate was the most widely used chemical used to control codling moths on fruit trees. Lead and arsenic are known to be very stable in soil and tend to stay near the surface. From the 1940s to 1972, DDT was also widely used as pesticide in local orchards. Because of this historical background, it was suspected that the soil in the developed lots on Apple Blossom Drive in Chelan, WA might be contaminated with lead, arsenic, and DDT.

As the orchard operated on the property during a time when lead-arsenate was a commonly used pesticide, it was recommended that shallow soil samples be collected and analyzed for lead and arsenic along with organophosphates and organochlorines. As part of the development for the site of 131 S Apple Blossom Drive, limited subsurface sampling and testing soil samples were collected and analyzed for total arsenic and lead, organophosphates and organochlorines. Soil sample results for total arsenic and lead were reported with concentrations exceeding MTCA Method A cleanup levels. Soil sample results for organophosphates and organochlorines were either not detected or detected at concentrations less than the MTCA cleanup levels.

The history of adjacent parcels located nearby for the Walmart Supercenter (108 N Apple Blossom) and for the parcel located to the east at 131 S Apple Blossom Drive are identified as being previous fruit orchards which both had pesticide contamination issues. Both parcels were identified as having pesticide contamination problems as outlined in the GeoEngineers report for the ***Construction Soil Management Plan for Lake Chelan Community Hospital.*** *Figure 2* of that Construction Soil Management Plan is a map showing these neighboring parcel locations.

The Walmart site (approximately 18 acres in size) found that lead concentrations exceeded the MTCA Method A soil cleanup level for lead in four samples. Each sample collected at the Walmart site contained total arsenic concentrations that exceeded the MTCA Method A soil cleanup level. Organochlorinated pesticide analysis results indicated 4,4'-DDT at a concentration exceeding the MTCA Method A soil cleanup level for DDT.

1.3. SITE USE

The current site is located within the City Limits of the City of Chelan. The site is currently under construction by Bouten Construction Company to build the new Lake Chelan Community Hospital. The City of Chelan has issued a Building Permit to Lake Chelan Community Hospital District No 2 for this construction to be done on the parcel address of 110 Apple Blossom Drive (county parcel no. 272318627013). The adjacent lot to the north, 106 Apple Blossom Drive (county parcel no. 272318627014), is slated for future construction of medical office buildings.

The Model Toxics Control Act (MTCA) requires potentially liable persons to assume responsibility for cleaning up contaminated sites. For this reason, Ecology does not usually conduct the actual cleanup when a potentially liable person can be identified. Rather, Ecology oversees the cleanup of sites to ensure that investigations, public involvement and actual cleanup and monitoring are done appropriately. Accordingly, for the site to be

developed for hospital and medical buildings, the use a remediation and or cleanup plan of the site is required.

2. FIELD INVESTIGATIONS

2.1. PREVIOUS ENVIRONMENTAL STUDIES AND SITE REGULATORY STATUS

Phase I and II Environmental Site Assessments (ESAs) were conducted by GeoEngineers at the Site in 2009 (GeoEngineers, 2009a and 2009b). The Phase I ESA identified historical agricultural use at the site as a recognized environmental condition because of the likely use of lead arsenate and other pesticides. During Phase II ESA, 13 shallow soil samples were collected and analyzed for total lead, arsenic and organochlorine pesticides. Seven samples were additionally analyzed for organophosphate pesticides. The 2009 chemical analytical results were summarized by GeoEngineers as the following and are presented in **Table 1** below with sampling test locations shown in **Figure 3**.

■ Total arsenic exceeded the Washington State Model Toxics Control Act (MTCA) Method A cleanup level in 11 samples.

■ Total lead exceeded the MTCA Method A cleanup level in seven samples.

■ 4,4'-DDE (an organochlorine pesticide) exceeded the MTCA Method B cleanup level in one sample, and

■ Organophosphate pesticides were not detected at concentrations greater than the laboratory reporting limit.

TABLE I. CONTAMINANT CLEANUP LEVELS AND BACKGROUND CONCENTRATIONS

Contaminant	MTCA Method A Cleanup Level Unrestricted Land Use (mg/kg)	Background Concentrations[1] (mg/kg)
Metals		
Arsenic	5	7.61
Lead	250	13.1
Organochlorine Pesticides		
4,4'-DDT	3	NE
4,4'DDD	4.2[2]	NE
4,4'DDE	2.9[2]	NE

Notes: [1]Source: Ecology 1994; [2]MTCA Method B Cancer Cleanup Level
mg/kg = milligrams per kilogram; NE = Not Established; DDT = dichlorodiphenyltrichloroethane;
DDD = dichlorodiphenyldichloroethane; DDE = dichlorodiphenyldichloroethylene

From the limited analytical data obtained during the 2009 Phase II ESA conducted by GeoEngineers, the vertical limits of contaminated soil Site were not defined. Most of the Phase II samples were collected at depths between 0 and 1 foot below ground surface (bgs) with the deepest sample collected at about 3 feet bgs. Sampling and testing would be needed at depths beneath the 2009 sample depths to confirm the vertical extent of contaminated soil at the Site. Groundwater at the Site was never previously assessed.

A Soil Management Plan (SMP) for the construction of the Lake Chelan Community Hospital at this Site was completed by GeoEngineers in September 2019. The SMP by GeoEngineers recommended capping as the most cost-effective solution for remediation of the contaminants at the site. This SMP will be used by LCCH and their contractors as

guidance for handling and managing known and assumed contaminated soil at the Site and to provide an approach for responding to new environmental conditions that might be encountered during construction activities.

Following the Contaminated Soil Management plan outline from the established SMP by Geo-Engineers, for soil handling purposes, Site soil is considered contaminated with lead, arsenic and/or pesticides unless additional soil samples are collected to document that contaminants are not present at levels of regulatory concern. Contaminated soil must be characterized, managed, handled, and disposed of in accordance with applicable federal, state and local regulations. LCCH plans to address the contaminated soil in a similar manner as the neighboring properties by keeping the contaminated soil onsite and capping it with structures, paved parking and landscaping. Off-site soil disposal will only occur if on-site capping is not an option for some portion of the soil based on the soil properties (physical and chemical) or if there is excess soil that cannot be used as fill.

2.2. SITE CHARACTERIZATION

The cleanup remedy selection option of capping was selected for remediation of the site. For the capping remediation construction activities, site soil was to be considered contaminated, regardless of the origination location or depth, until appropriate soil samples have been collected and analyzed to profile the soil as non-regulated. Bouten Construction performed the construction as the General Contractor and developed the sampling and monitoring plan for the project site in consultation with Ecology. Soil samples were taken by Construction Special Inspections (CSI) and test analysis was performed on these samples by Eurofin Cascade Analytical, Inc. CSI handled all samples to securely preserve their integrity and follow EPA “Chain of Custody” requirements for the samples to be delivered to Cascade Analytical for detailed analysis.

The layout of the new hospital site is shown in **Figure 4 – Overall Stormwater Plan**.

Elements of types of soil remediation chosen for utilizing over the entire area of the lot site at 110 S. Apple Blossom Drive for the construction of the hospital are as follows:

- Clearing and grubbing the top soils of all tree roots and deleterious materials and haul-off and dispose of these materials at the Landfill in East Wenatchee.

- Scraping off the top 1-foot of topsoil and mounding in the lower southern part of the site and capping with geotextile material and 1-foot of clean imported topsoil.

- BMP for clean imported backfill at all utility trenches

- The new concrete hospital building floor foundation and floor slabs, all sidewalks and hardscape surfaces for concrete or asphalt paving will be considered as utilizing BMP for capping the remaining contaminated soils below them. Contaminated soil left or placed beneath structures or pavement should meet the structural specifications, including compaction requirements, for soil placed in those locations and depths. If imported structural fill is placed above contaminated soil, a geotextile separation fabric is to be placed between the imported and site materials to separate the contaminated soil from the non-contaminated imported soil.

- All landscape areas that are open field or grassy areas are to be capped with geotextile material and 1-foot of clean imported soil.

- All stormwater swales and retention / infiltration basins shall be capped and lined with geotextile material and 1-foot of clean imported soil. To control contaminant migration off

site or to groundwater, stormwater shall not be discharged through contaminated soil. Contaminated soil shall be removed from the features that are designed to infiltrate stormwater into the subsurface (such as drywells, swales and infiltration basins). The contaminated soil removed from the stormwater features will be placed in other capped areas of the Site following the considerations outlined above. Soil samples should be collected to confirm that the contaminated soil has been removed to at least concentrations less than the MTCA cleanup levels. If soil sampling indicates the contaminated soil extends to depths below a given planned stormwater feature, then the contaminated soil should be removed and replaced with clean, non-contaminated imported fill to control stormwater infiltration through contaminated soil.

2.2.1. SAMPLING

Soil samples were collected to profile soil for off-site disposal and to confirm that contaminated soil had been removed or mitigated from planned stormwater features. Site soil was to be considered contaminated, regardless of the origination location or depth, until appropriate soil samples had been collected and analyzed to profile the soil as non-regulated. Based on the site history and initial limited testing from the 2009 Phase I and II Environmental Site Assessments, contaminants of concern included arsenic and lead. These previous assessments found that the **levels for organochlorine pesticides did not exceed the MCL requirements** and so further sampling and testing for that would not be done.

Bouten Construction along with Construction Special Inspections and LCCH project management staff worked with Ecology to develop a sampling and monitoring plan for determining the extents and methods of cleanup remediation following the guidelines established by the Soil Management Plan. Soil sample locations were then recommended by the Bouten Construction project manager and approved by the LCCH project manager, Dick Bratton. Soil samples were taken by Construction Special Inspections with supervisory assistance on locations and depths by Bouten. All soil samples were then transported by CSI to the lab for testing following the requirements for chain of custody and handling.

Figure 5 shows the testing locations numbering for soil samples taken below the features of the new stormwater infiltration basins, swales and drywells. The numbering shown in **Figure 5** was used as the suffix numbers for the EIM database with the preceding number being the facility Voluntary Cleanup Program Project No.: CE0509. Following the suffix numbers is the designation elevation for the depth of the samples beneath the finish construction grade elevation of the bottom of the storm water infiltration feature.

Soil sample location numbers are: **VCCE0509-1 through VCCE0509-31**

Following these numbers for location are the elevation sampled resulting as described above in examples such as: **VCCE0509-1-0.5 or VCCE0509-31-3.5**

The initial strategy for features where storm water could infiltrate into subsurface soils (such as drywells, swales and infiltration basins /galleries) was to excavate, test, and remove all contaminated soils (found to be above the regulatory MCL levels) below these stormwater features as recommended by the 2019 Soil Management Plan from GeoEngineers.

However, after continued sampling and testing at depths approaching 7 to 13 feet

below existing grade elevations found many of these features having extensive amounts of soil materials to be removed that were above the MCL regulatory limits in areas below storm water infiltration areas, it was decided to consult with Ecology to see if other possible more cost-effective options were available for remediation.

With further consultation with Ecology in August of 2021, it was proposed by Ecology that if leachability TLCP testing of soils at depths below stormwater features showed no ability to leach out the regulated contaminants, it would be acceptable to Ecology to not require further contaminated soil removal below the stormwater features. This of course could be allowed only if ground water levels were deep enough to realize potential groundwater contamination was extremely unlikely. TLCP tests involve a simulation of leaching through a landfill and can provide a rating that can prove if the waste is dangerous to the environment or not.

Using the Washington State Department of Water Resources information database on wells within the local area, it was determined that historical and existing groundwater levels below the site ranged at a minimum of 75 to 100 feet deep. (See study findings presented in Section 2.2.3 Site Hydrogeology.) **At this depth to groundwater, the Ecology staff made the determination from the Toxicity Characteristic Leaching Procedure (TCLP) test results that the likelihood of groundwater becoming contaminated from stormwater conveyance infiltration would be extremely unlikely.**

The sampling data presented in **Figures 6, 7, and 8** show the different depths and locations sampled below the areas of concern for the stormwater infiltration features.

Sampling proceeded to gather soil samples at finish grade elevations (- 0.5 ft deep) below these storm water features, and again at -3.5 ft below these features. As the overall subgrade for these stormwater features was being dug out deeper to remove the soil materials below them, the excavation samples test results at -3.5 deep (and some as 7 to 13 ft below existing grade elevations) were found to still be over the contaminant regulatory limits. It was then decided to consult further with Ecology staff to see if a more cost-effective strategy to deal with the contaminated soils beneath the stormwater infiltration features was available.

Upon initial review of existing water wells information from Ecology's Water Resources online database, it was understood by Ecology that existing groundwater levels in the area may range from 70 to 100 feet deep. Ecology staff then recommended that with those depths to groundwater, if leachability TLCP characteristics of existing soils in the stormwater features were below the regulatory limits then it would make sense to change strategies and instead let the remaining soils below these stormwater features remain.

The TLCP testing results showed leachability of the soils beneath the stormwater features below the regulatory limit requirements and very unlikely that remaining regulatory contaminants could migrate into groundwaters below the new hospital site.

2.2.2. SITE GEOLOGY

A custom USDA Soils Report was downloaded from USDA's web soil survey website and is included in Appendix D. The following summary of the soils in the Lake Chelan Community Hospital site are as follows:

The vast majority of soils on the site are the classification category CIA -Chelan gravely sandy loam, pumiceous with slopes 0 to 3 percent, with the other categories

on site as exactly similar in soil types but with higher slopes up to 15 percent. The description for this classification of Chelan soils are terraced landform areas with parent material of volcanic ash, pumice and loess over basal till. The typical profile being as follows:

H1 - 0 to 6 inches: gravelly sandy loam

H2 – 6 to 18 inches: gravelly sandy loam

H3 – 18 to 35 inches: gravelly sandy loam

H4 – 35 to 60 inches: very gravelly sandy loam.

Properties and qualities:

Slope: 0 to 3 percent

Depth to restrictive feature: More than 80 inches

Drainage class: Well drained

Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.57 to 1.98 inches/hour)

Depth to water table: More than 80 inches

S**alinity**: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)

Frequency of flooding: None

Frequency of ponding: None

Interpretive groups:

Hydrologic Soil Group: B

Soils in Group B have moderately low runoff potential when thoroughly wet. Water transmission through the soil is unimpeded. Group B soils typically have between 10 percent and 20 percent clay and 50 percent to 90 percent sand and have loamy sand or sandy loam textures

Hydric soil rating: No

Observations on site during construction closely resemble the soil survey above for depths up to 3 feet with numerous moderate to large boulders encountered at deeper excavations. Overall, the construction site observations indicate native soils infiltrate water well as indicated in the soils report above.

2.2.3. SITE HYDROGEOLOGY

Using WA State Department of Ecology Water Resources information on wells and groundwater information, a study of the Local Area Wells within the area of the new Lake Chelan Community Hospital site shows information in **Table.** The study identifies all nearby wells within 2,500 feet and indicates groundwater depths encountered when drilling range from 105 ft to 600 ft deep. The following **Figure - Existing Water Well Locations** shows all water wells within the local vicinity of the new Lake Chelan Community Hospital.

Although static water levels for these wells are shallower and range 41 ft to 220 ft, it is not a indicator of geologic water strata but the piezometric height of water in the well that can be from higher ground that the aquifer connects to from the well. Thus,

it can be concluded from this well study that depths to water in the geologic strata around the new Lake Chelan Community Hospital site are deeper and not less than approximately 100 feet.

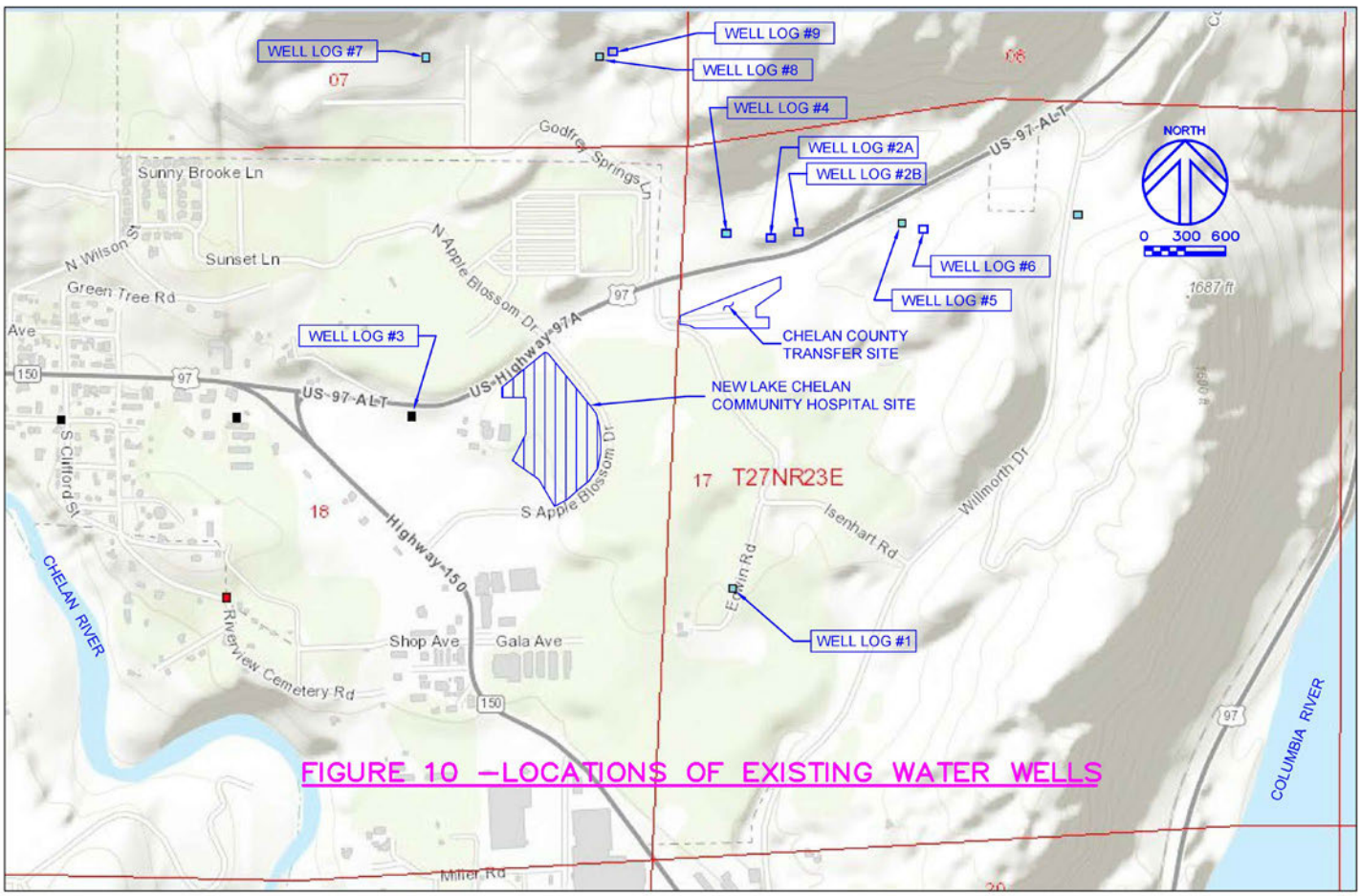

FIGURE 10 –LOCATIONS OF EXISTING WATER WELLS

Groundwater in this area flows towards the Chelan River on the east side of the City of Chelan which is a little over a 1/2 mile away at its closest point. The only water well that is downhill and hydraulically down gradient from the study site is directly west about 970 feet away and has its depth to groundwater about 600 feet deep with its static water level of 105 ft. With this well location having its ground elevation =1238 ft, then the static water depth of 105 ft below = 1133 ft elevation. Comparing this well's static water elevation to the grade elevations of the new Lake Chelan Community Hospital site grade elevations that range from about 1277 feet to 1284 feet. Then, using 1277 feet grade and subtracting it from the static water elevation in the well of 1133 feet the approximate elevation of aquifer water below the site (if connected hydraulically) would be about **144 feet deep**.

Uphill, the closest well is 1,290 ft away and its depth to water is 105 ft with a static water depth of 51 feet. The grade elevation of this well is about 1,275 feet. Then, subtracting the static water depth of 105 feet its water level is about 1,170 feet. Comparing the lowest grade of the new hospital site of 1277 feet to 1170 feet is a possible depth to water of about 107 feet. When comparing it to the well west (mentioned earlier in this analysis) of the new hospital site one can tabulate that possible water levels below the new hospital site may **range from 107 to 144 feet deep.**

TABLE 2: Groundwater Review of Nearby Water Wells and Depths to Water

Well Log #	Well I.D. #	Owner Name (when drilled)	1/4, 1/4, Section, Township, Range	Address	Depth of Well (ft)	Depth to Water Encountered (ft)	Static Water Level Depth (ft)	Aproximate Distance to Lake Chelan Community Hospital Site (ft) (Direction)
1	140155	Gary Hask	NW-SW / S-17 / T-27-N / R-23-E	42 ISENHART RD CHELAN, WA	110	105	51	1,290 ft - SE
2A	137834	Chelan Concrete / Steve Pauli	NW-NW / S-17 / T-27-N / R-23-E	23300 US-97 ALT, Chelan, WA	420	395	70	1570 ft - NE
2B	145566	Steve Pauli	NW-NW / S-17 / T-27-N / R-23-E	23300 US-97 ALT, Chelan, WA	256	240	60	1,700 ft - NE
3	137847	Chelan County Transfer Station	SW-NE / S-18 / T-27-N / R-23-E	23285 US HWY 97A CHELAN, WA	604	600	105	960 ft - W
4	137827	Chelan Co Dept of Public Works	NW-NW / S-17 / T-27-N / R-23-E	23290 US HWY 97A CHELAN, WA	299	284	124	1545 ft - NE
5	140120	Gary Sterner	NE-NW / S-17 / T-27-N / R-23-E	US HWY 97A, CHELAN, WA	180	165	41	2,090 ft - N
6	140121	Gary Sterner	NE-NW / S-17 / T-27-N / R-23-E	CHELAN, WA	200	185	110	2,485 ft - NE
7	409019	Harold & Kara Schell	SW-SE / S-07 / T-27-N / R-23-E	452 GODFREY SPRINGS LN CHELAN, WA	330	315	134	2,300 ft - N
8	016176	William Clark	SE-SE / S-07 / T-27-N / R-23-E	280 Godfrey Springs Ln, Chelan, WA	438	437	123	2,165 ft - NE
9	053724	William Clark	SE-SE / S-07 / T-27-N / R-23-E	280 Godfrey Springs Ln, Chelan, WA	340	225	220	2,050 ft -N

2.3. SAMPLING/ANALYTICAL RESULTS

2.3.1. QUALITY ANALYSES

- All of the soil sample chemical analysis completed for the arsenic and lead contaminants regulatory testing were performed by Eurofin Cascade Analytical in their Wenatchee and Seattle lab offices and their lab accreditations have being checked and verified for the analyses being performed.
- The sample numbers and analyses performed using the location and description numbering were verified by CSI and Eurofin Cascade Analytical labs to have followed the chain-of-custody requirements. The timing and condition of samples upon receipt at the laboratory undertaking the analysis, and how long they were in transit were checked by the laboratories and verified by CSI. Sample preservation and holding times were verified by the labs to have been met.
- Verification and documentation by Eurofin Cascade Analytical labs was completed showing that field and laboratory duplicates, matrix spikes, and laboratory control samples were run at the property frequency, and that control limits were met.
- Eurofin Cascade Analytical labs verified in their reporting documentation that required detection limits had been achieved.
- The locations of the samples and corresponding numbering was checked by Construction Special Inspections, Dave Schettler P.E.. This location numbering system along with the EIM database requirements for were then followed and

checked to be entered properly into Ecology's EIM database.

- A tabulation illustrating a comprehensive sample analysis inventory showing the soil sample locations, ground depths taken, descriptions of locations, and numbering of samples was performed by Bouten Construction and checked and verified by Construction Special Inspections for this report as **Table 3.** The Unrestricted Land Use MTCA clean up levels for arsenic (5 mg/kg) and lead (250 mg/kg) regulatory contaminants was used for checking the soil samples below all of the stormwater feature locations as outlined in **Table 1**.

  When it became apparent that trying to achieve the removal and capping of the amount of soils below the stormwater features was prohibitively expensive the strategy shifted to check the leachability (TCLP) of the soils below for the site below storm water features. The TCLP regulatory levels of arsenic and lead that can leach out from contaminated soils so as to protect groundwater below the site was stated by Ecology – Jeff Newshander as being 1 mg/L.

  EPA Title 40 Chapter 1, Subchapter1- Solid Wastes, Part 261, Subpart C – Characteristic of Hazardous Waste indicates in its Table 1 the maximum Concentration of Contaminants for the Toxicity Characteristic Regulatory Level of Arsenic as being 5.0 mg/L (per EPA HW No D004) and for Lead as being 5.0 mg/L (per EPA HW No D008). The stricter regulatory level per Ecology recommendation as being 1.0 mg/L for both arsenic and lead is then conservative of being only 20% of the EPA's regulatory levels. Even so, the TCLP test results from all 3 sample locations tested showed the contaminant levels below the 1 mg/L requirement set by WA Ecology for both arsenic and lead as shown in **Table 1** of this report.

2.3.2. RESULTS

The Sampling Location and Contamination Testing Results are displayed in **Table 3**.

Although overall it can be seen that with increased depth the levels of the contaminants generally decrease with the testing done per the EPA 6010D method for detection of arsenic and lead. The XRF on-site testing done by Ecology (Jeff Neuschwander) on 9/8/2021 may have been problematic and in error since that the results of these two locations shows much larger increase in both arsenic and lead.

The Toxicity Characteristic Leaching Procedure (TCLP) test results for the three locations tested all showed the potential for leaching contaminants as being very low in that all 3 tests had results less than 1 mg/L. This indicates that the likelihood of arsenic and lead contamination ever reaching groundwater below the site as highly unlikely. When considering the hydrogeology of the site and existing water wells in the local area with levels of groundwater over 100 feet deep it makes it clear that groundwater contamination with the leachability aspect of the soils is almost impossible.

Use this section and additional sub-sections, where appropriate and necessary, to present and discuss data by, for example, potential source area, site operational area, by COC group, or geological/hydrogeological unit. Use the CSM and sampling

strategy to guide this decision. Describe and relate field and laboratory data with your previous understanding of potential source areas, groundwater flow, and observations made during the site investigation. Present and consider:

- The nature, magnitude, and extent of COC and other key parameters including regulatory classifications if applicable.
- Evidence for transfer/interactions between different media – leaching, groundwater plume migration, etc.
- Provide detail on the likely fate and transport of all the main COC or COC groups identified beneath and potentially down-gradient of the site,
- Relate this to the previous phase CSM (historical land use, for example).

Tabulate and/or append key data. Annotate site plans and/or geological cross-sections to illustrate the chemical character, magnitude and extent of soil and groundwater contamination.

3. CONCEPTUAL SITE MODEL

The new Lake Chelan Community Hospital layout illustrated in **Figure 8** shows the location of the hardscaped areas such as buildings, sidewalks, concrete cubing and asphalt along with the topsoil cap and unmitigated areas for future project development. The mounding of 1-foot of existing contaminated topsoil from the site contaminated soils so as to remain on site are located in the area south of the hospital building. This mounding area along with all landscaped areas were then covered with geotextile and then covered with 12-inches of clean imported topsoil. All other areas have been remediated so as to have hardscape materials to prevent exposure to potential contaminated soil below.

4. PROPOSED CLEANUP STANDARDS

The proposed cleanup levels are described in the Terrestrial Ecological Evaluation that was submitted to Ecology on Aug. 11, 2022 and attached as an Appendix.

Figures 5, 6 and 7 show the Conceptual Grading and Drainage Plan by GeoEngineers Showing Test Locations for Phase I ESA and Phase II ESA Explorations along With Soil Sampling Locations. The Chemical Analytical Results are displayed in Table 3. The findings of the Hydogeological review of this site in Section

4.1. CONTAMINANT-SPECIFIC STANDARDS

The Washington State Model Toxics Control Act (MTCA) Method A cleanup levels for contaminants as identified per WAC 173-340-703 was utilized to determine selection of indicator hazardous substances at the site for arsenic and lead.

For Toxicity Characteristic Leaching Procedure (TCLP) methods the cleanup levels are compared to EPA Title 40 Chapter 1, Subchapter1- Solid Wastes, Part 261, Subpart C – Characteristic of Hazardous Waste indicates in its Table 1 the maximum Concentration of Contaminants for the Toxicity Characteristic Regulatory Level of Arsenic as being 5.0 mg/L (per EPA HW No D004) and for Lead as being 5.0 mg/L (per EPA HW No D008).

4.2. SOIL CLEANUP STANDARDS

The soil cleanup standards for the new hospital land use of the site require that all contaminated surface soils be mitigated. The capping remediation methodology was selected for the cleanup mitigation measures. The method and procedures used to establish cleanup levels was based on WAC 173-340-360. The Department of Ecology with Publication 21-09-006 has established acceptable Model Remedies for Former Orchard Properties.

Section 121(d) of the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA) requires that on-site remedial actions attain or waive federal environmental for all applicable or relevant and appropriate requirements (ARARs), or more stringent state environmental ARARs, upon completion of the remedial action.

The Model Toxics Control Act (MTCA) Cleanup Regulation (chapter 173-340 WAC) establishes the approach for remediation and mitigation cleanup requirements for contaminants. The basis for the cleanup level uses professional judgement in how to limit further contamination and identifies how best to accomplish that by limiting stormwater features at the site from infiltrating through contaminated soils under these features.

Although testing to identify areas where additional removal of contaminated soils beneath these storm water features showed that the extent of the contamination of soils reached levels deeper than expected. A more cost effective measure was then used to establish the possibility of whether the soils beneath these features had the potential to leach the regulatory contaminants into soils further beneath and into groundwater below the site. This technique of analyzing leachability, TLCP testing, uses EPA Title 40 Chapter 1, Subchapter1- Solid Wastes, Part 261, Subpart C – Characteristic of Hazardous Waste and establishes in its Table 1 the maximum Concentration of Contaminants for the Toxicity Characteristic Regulatory Level of Arsenic as being 5.0 mg/L (per EPA HW No D004) and for Lead as being 5.0 mg/L (per EPA HW No D008). WA state Department of Ecology regulatory levels requirements for the TCLP testing for arsenic and lead are 1.0 mg/L for both contaminants.

5. SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

5.1. SUMMARY AND CONCLUSIONS

The overall result of the construction work has followed closely the Elements of types of Soil Remediation chosen for utilizing over the entire area of the construction site as outlined in the Soil Management Plan and identified in Section 2.2 Site Characterization of this report. As a result, the lead and arsenic contaminated soils are contained with the site utilizing the capping remediation methodology to prevent exposure to humans from exposure to soils beneath the capped areas and to prevent dust from those soils from contaminating air as people use the site for the new hospital. A restrictive covenant will be filed to restrict future improvements or redevelopment of the site to prevent future human exposure to these contaminates.

This section must bring together all the above findings in a concise and clear way so that the reader is able to understand the findings of the site investigation. The findings should include a discussion on the phase partitioning for COCs at the Site.

Summarize the updated CSM again here and use technical diagrams to illustrate this. The text should clearly state the main identified contamination source areas, all remaining COCs, the expected fate and transport of these along identified migration pathways, exposure pathways, and the potential receptors that are relevant to the site.

5.2. RECOMMENDATIONS

If the information gathered during the RI is not sufficient to define the Site, further action will be required to investigate the data gaps identified. This may need to be supported by the collection of additional site data.

This section must include a summary of what action is proposed and outline the objectives of the next phase of work. Provide some detail on the scope of further work, which may include:

- Additional investigations that may be needed to better understand the nature, magnitude, and extent of relevant source zones, pathway, and/or receptor characteristics. Include the locations of proposed investigative sampling points to facilitate further decision making.
- Additional investigation needed to evaluate feasibility of potential remedial alternatives.
- Outline proposal for ongoing groundwater monitoring to confirm the findings of the site investigation, including the monitoring locations, frequency, COC, and other parameters to be determined, etc.
- At sites where there is an existing groundwater monitoring program, comment on whether amendments to the number or location of monitoring points, frequency of monitoring, or the analytical schedule are necessary.

Outline a possible interim action or remedial action. This may be expanded on if further Site investigation is necessary. The final cleanup action must meet the minimum requirements outlined in 173-340-360(2) WAC.

6. REFERENCES

The style of cited references should be consistent throughout the document.

The following is list of resources to assist in conducting a remedial investigation and in preparing your report. This list is not exhaustive and should not be interpreted as a sole source of Applicable State and Federal Laws (ARARs) and guidance documents.

- Lombard, S. and C. Kirchmer, 2004. *Guidelines for Preparing Quality Assurance Project Plans for Environmental Studies*. Washington State Department of Ecology, Olympia, Washington. 48 pages + appendices. Publication No. 04-03-030. http://www.ecy.wa.gov/biblio/0403030.html

- Ecology, revised 2013. *Model Toxics Control Act Regulation and Statute*. Washington State Department of Ecology, Olympia, Washington. 324 pages. Publication No. 94-06. http://www.ecy.wa.gov/biblio/9406.html

FIGURES

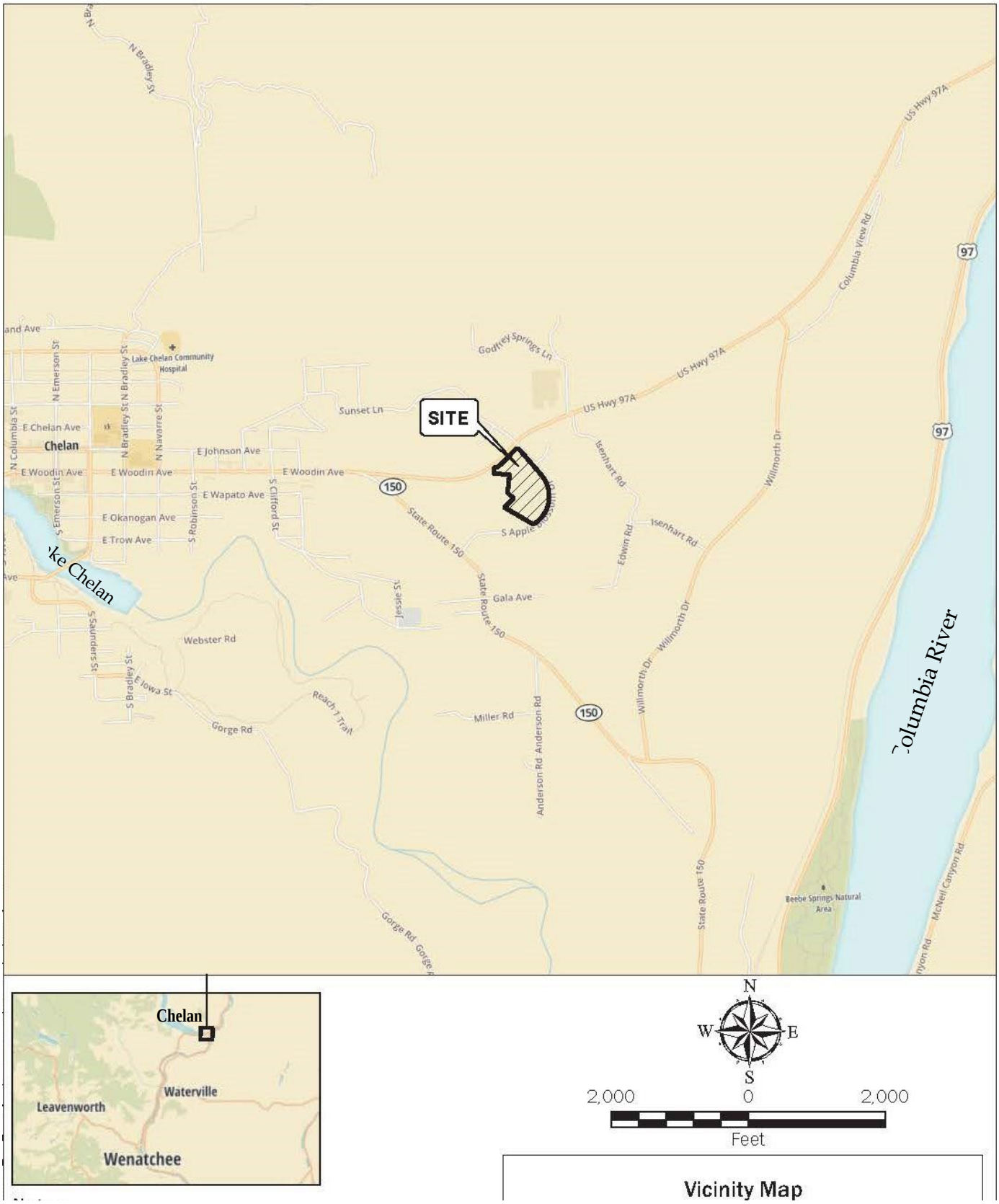

FIGURE 1 – Vicinity Map

FIGURE 2 – Existing Site Aerial Photo Prior to Construction

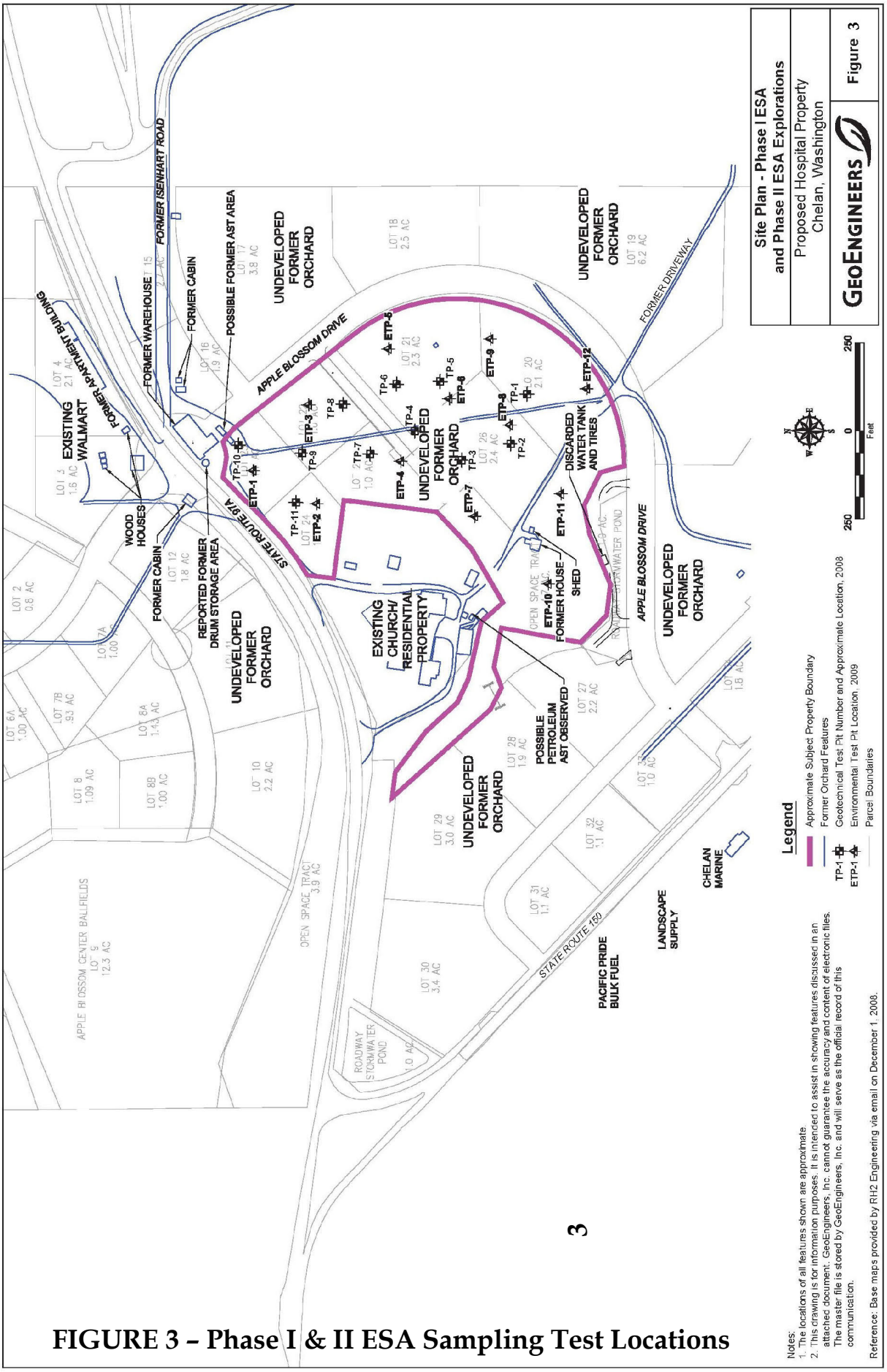

FIGURE 3 – Phase I & II ESA Sampling Test Locations

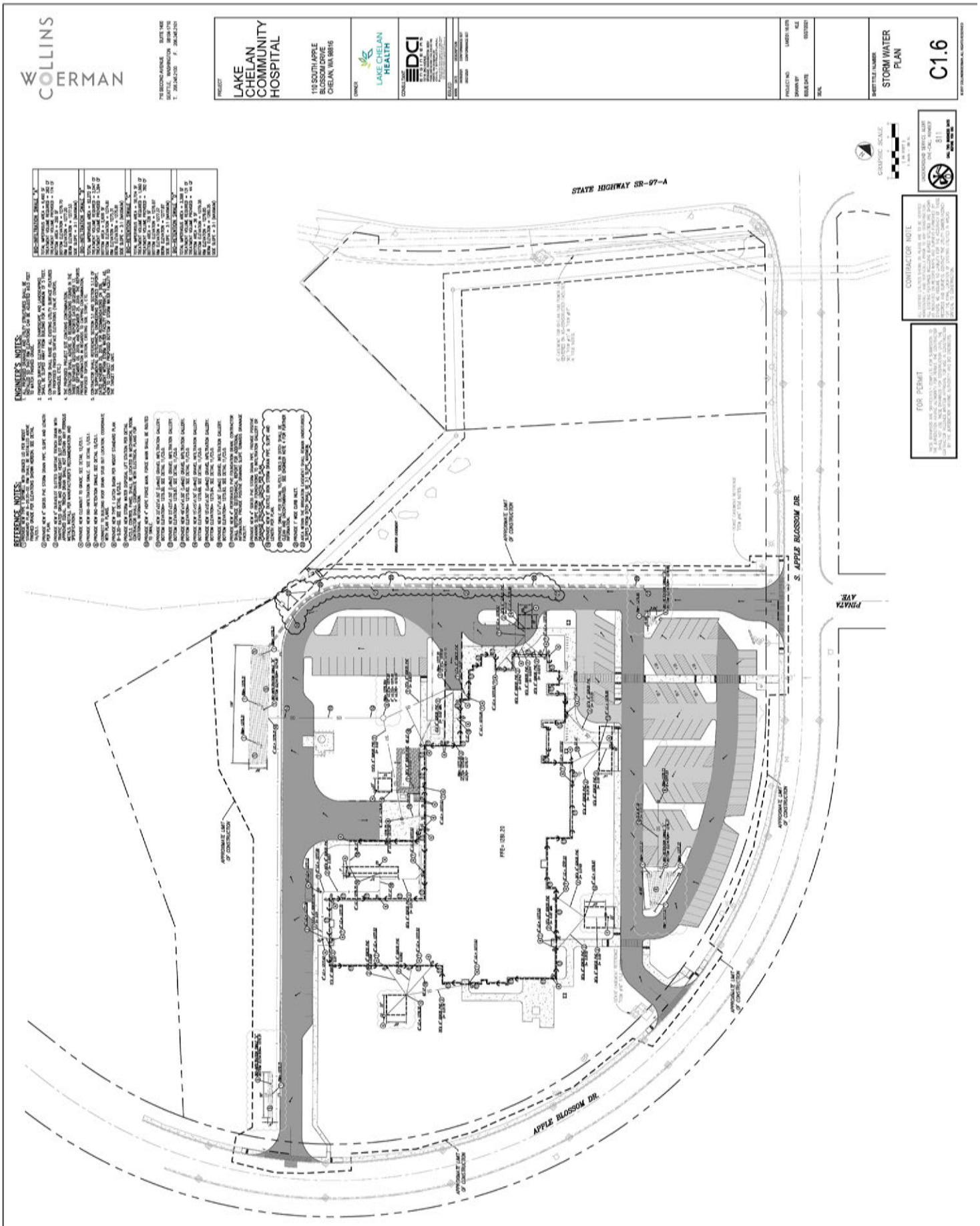

FIGURE 4 – Storm Water Plan

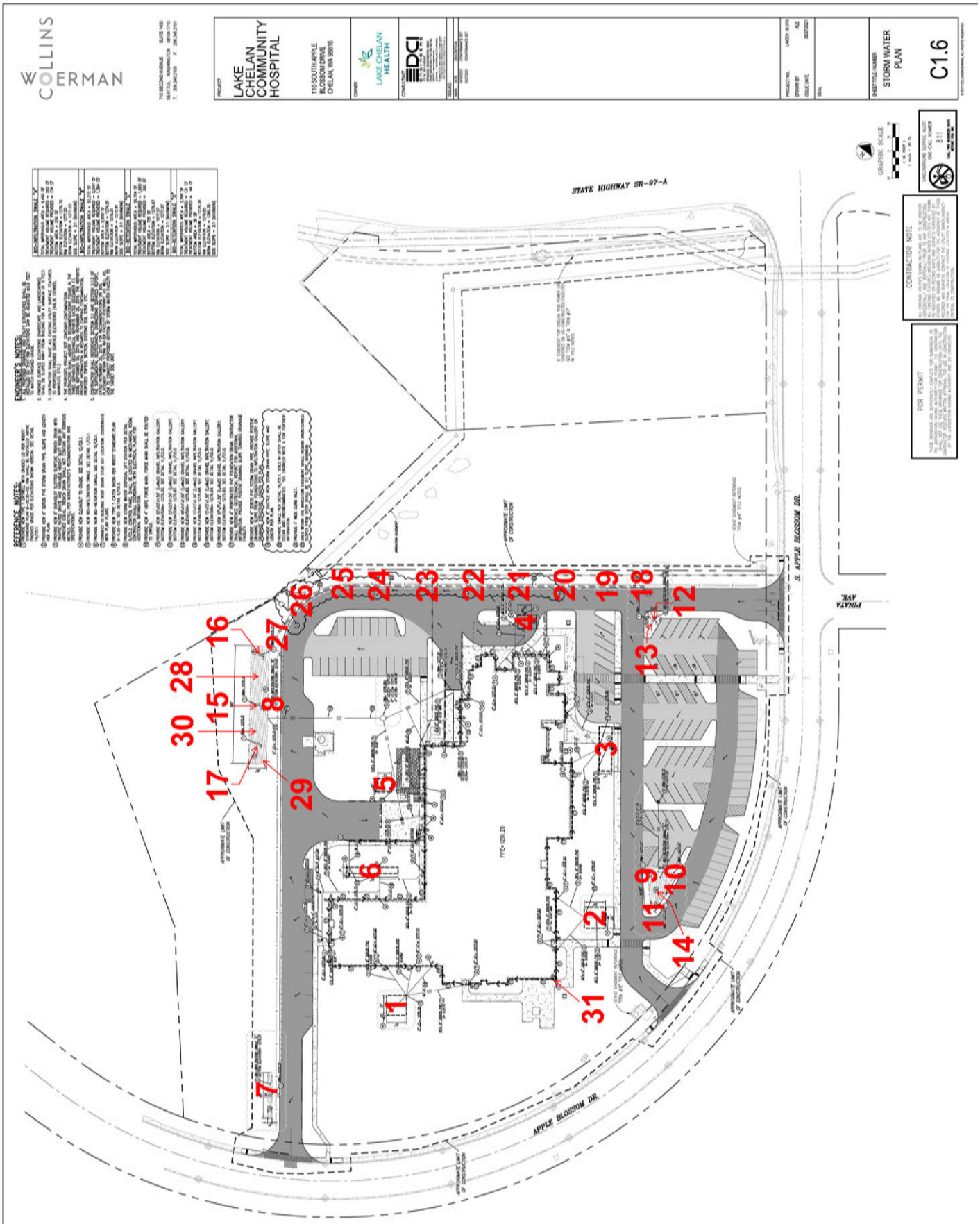

FIGURE 5 – SOIL SAMPLE LOCATIONS FOR ANALYTICAL TESTING

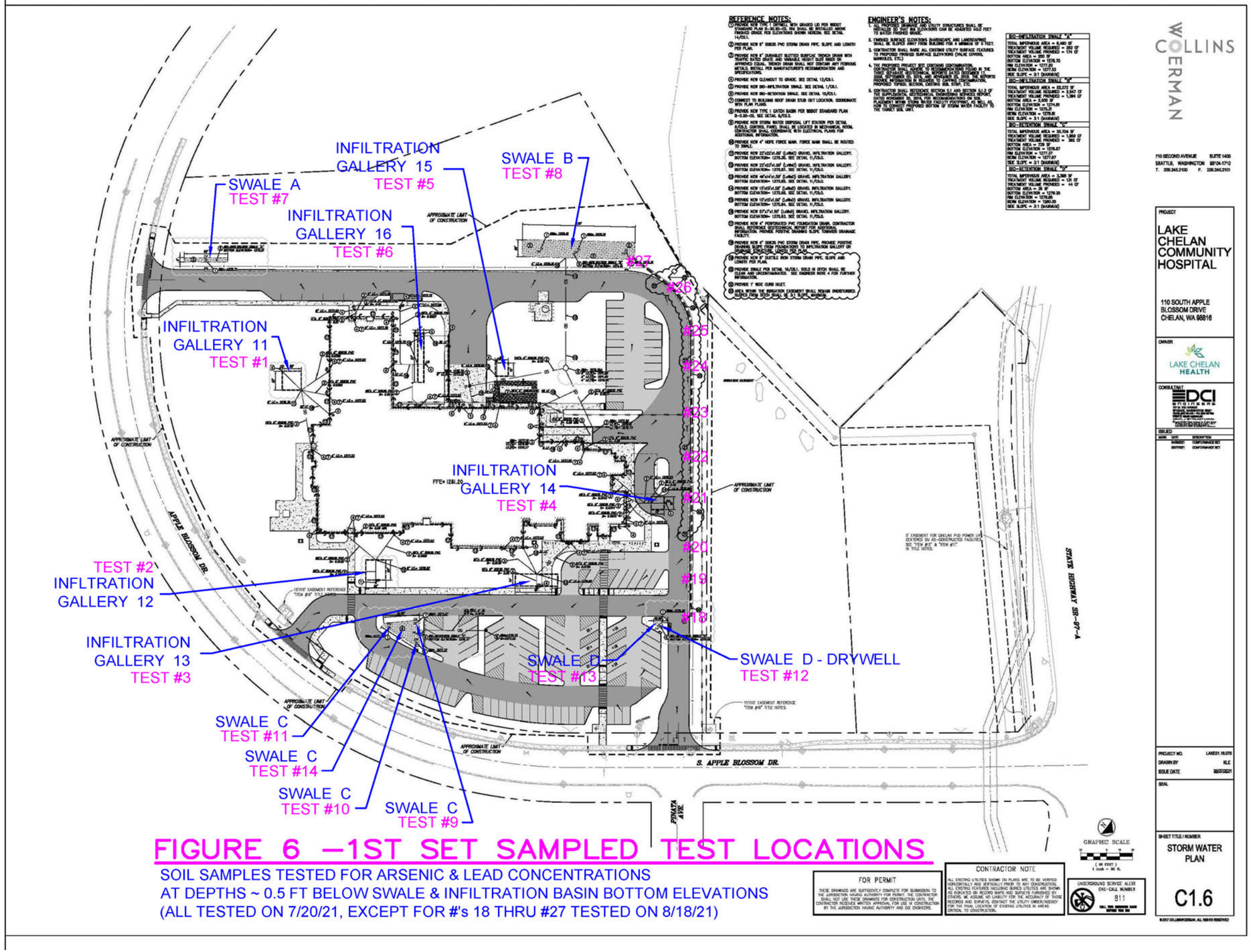

FIGURE 6 –1ST SET SAMPLED TEST LOCATIONS

SOIL SAMPLES TESTED FOR ARSENIC & LEAD CONCENTRATIONS
AT DEPTHS ~ 0.5 FT BELOW SWALE & INFILTRATION BASIN BOTTOM ELEVATIONS
(ALL TESTED ON 7/20/21, EXCEPT FOR #'s 18 THRU #27 TESTED ON 8/18/21)

FIGURE 6

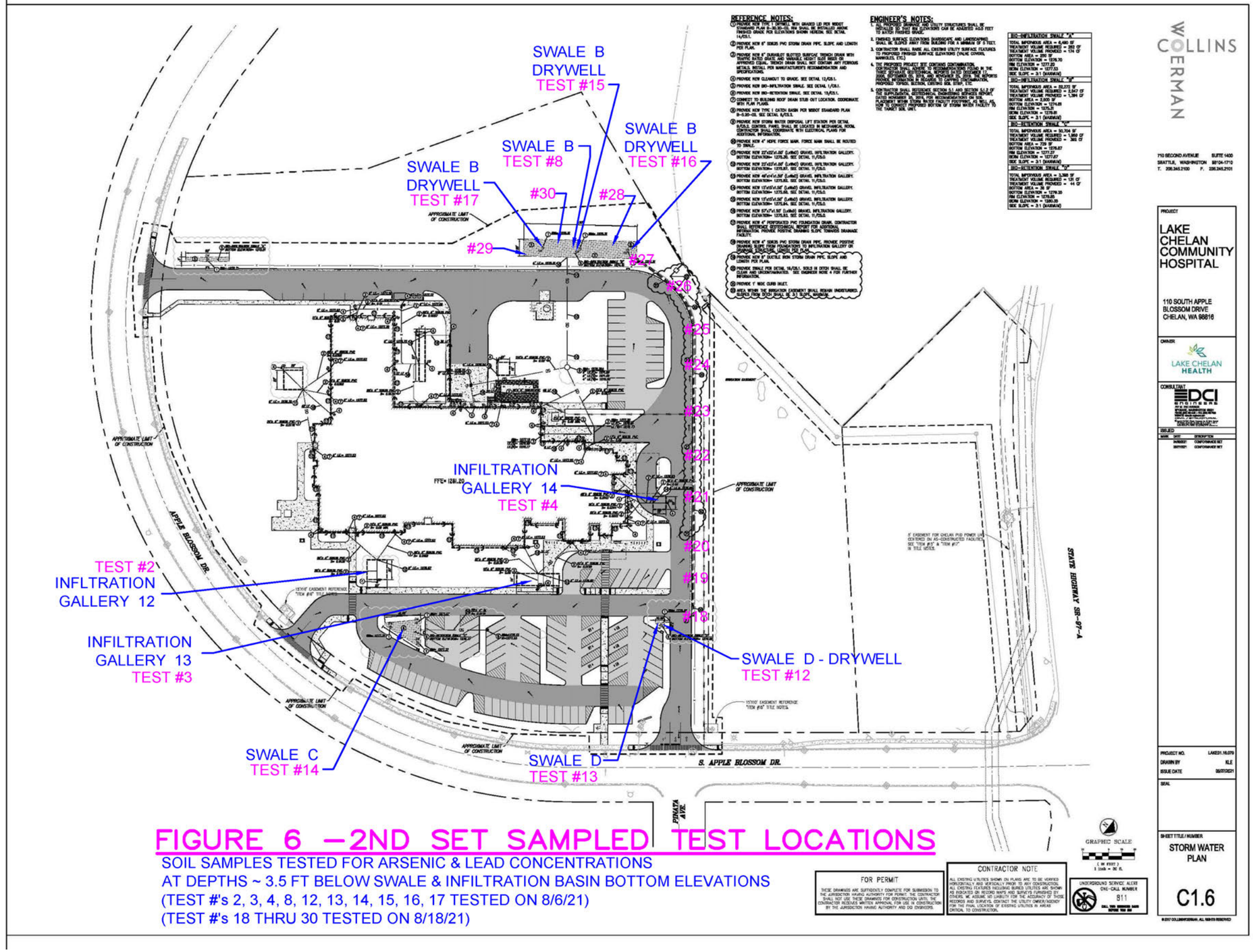

FIGURE 6 –2ND SET SAMPLED TEST LOCATIONS

SOIL SAMPLES TESTED FOR ARSENIC & LEAD CONCENTRATIONS
AT DEPTHS ~ 3.5 FT BELOW SWALE & INFILTRATION BASIN BOTTOM ELEVATIONS
(TEST #'s 2, 3, 4, 8, 12, 13, 14, 15, 16, 17 TESTED ON 8/6/21)
(TEST #'s 18 THRU 30 TESTED ON 8/18/21)

FIGURE 7

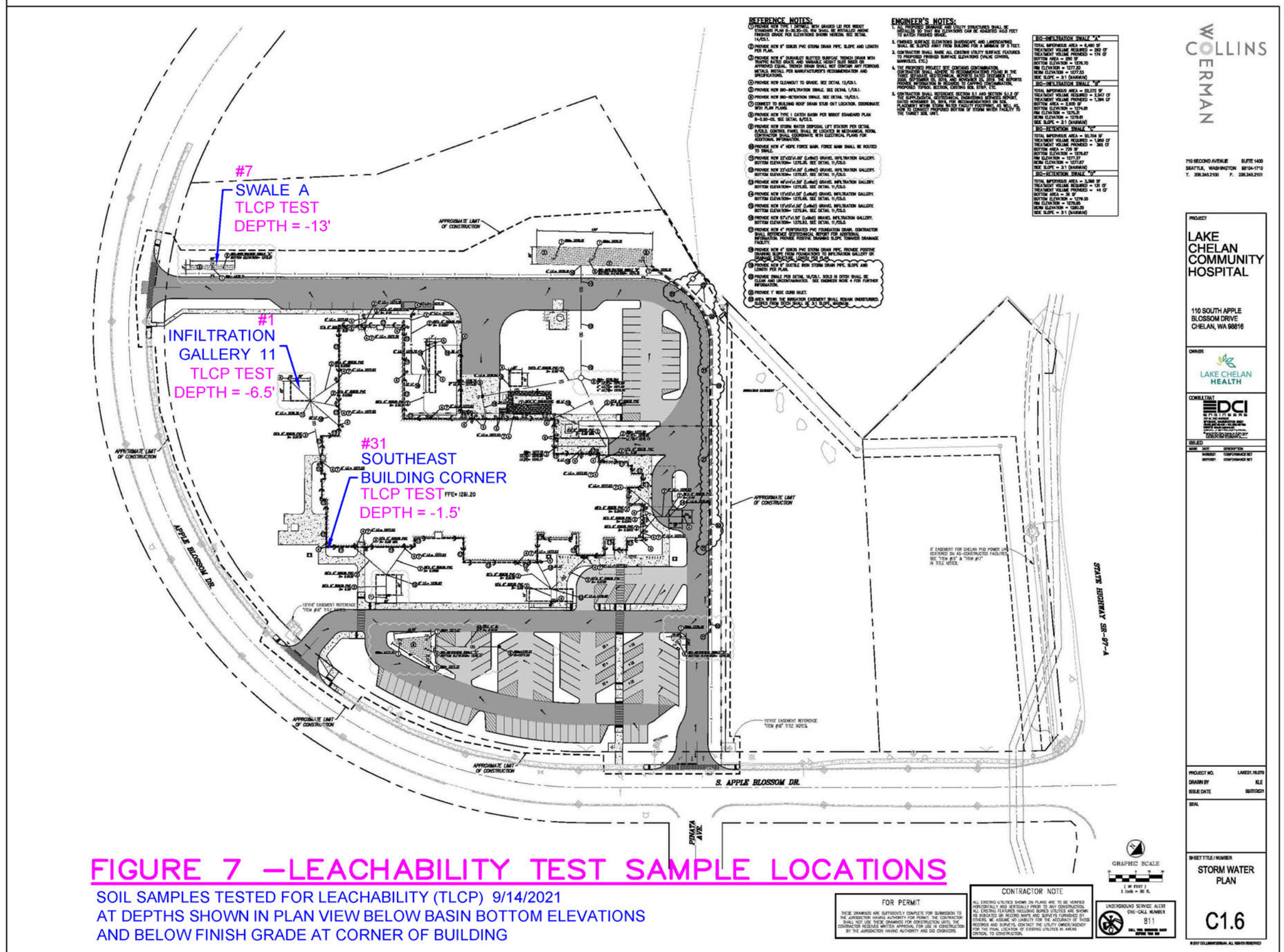

FIGURE 7 –LEACHABILITY TEST SAMPLE LOCATIONS

SOIL SAMPLES TESTED FOR LEACHABILITY (TLCP) 9/14/2021
AT DEPTHS SHOWN IN PLAN VIEW BELOW BASIN BOTTOM ELEVATIONS
AND BELOW FINISH GRADE AT CORNER OF BUILDING

FIGURE 8

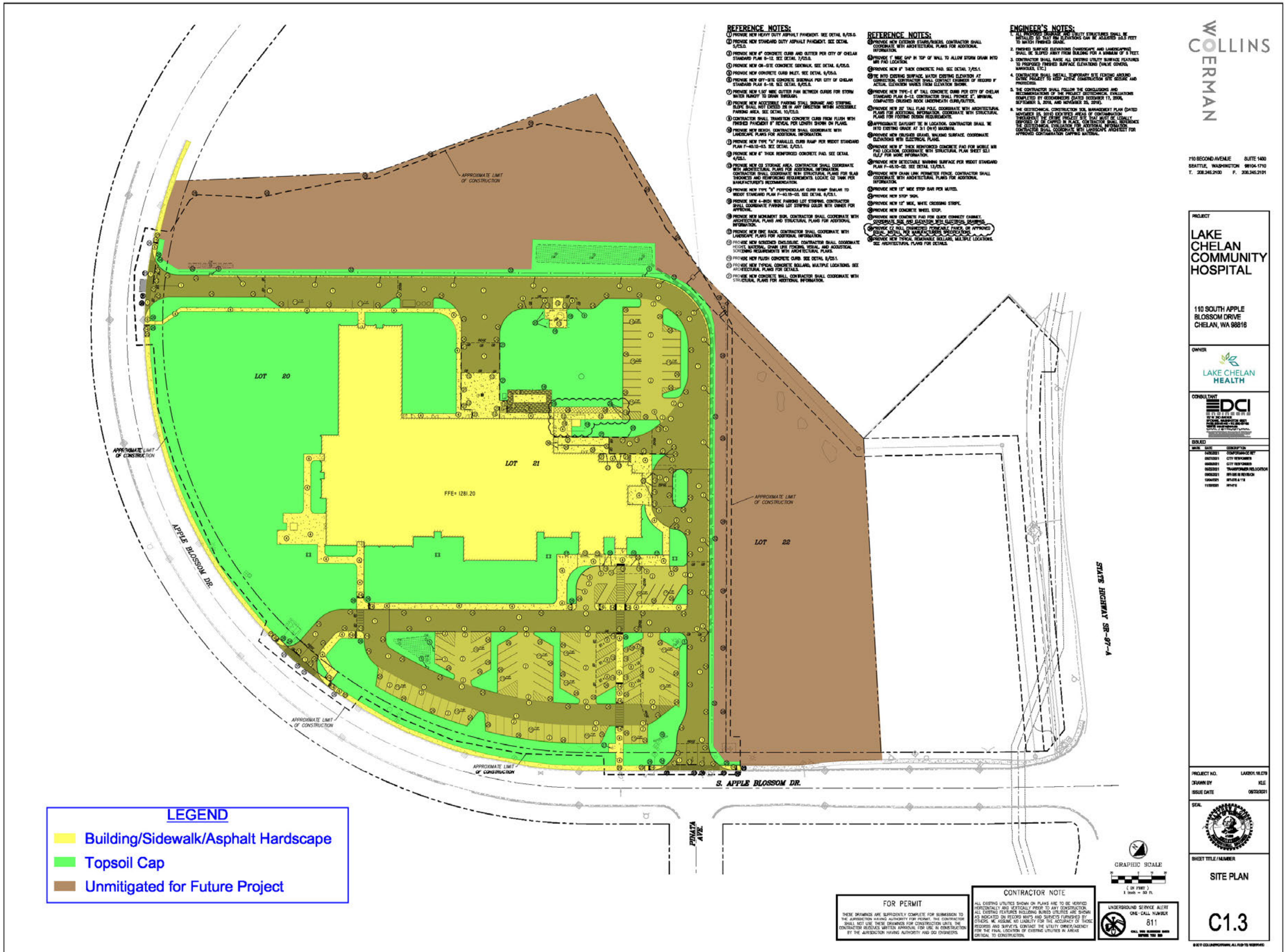
LEGEND
Building/Sidewalk/Asphalt Hardscape
Topsoil Cap
Unmitigated for Future Project
REFERENCE NOTES:
ENGINEER'S NOTES:
COLLINS WOERMAN
LAKE CHELAN COMMUNITY HOSPITAL
110 SOUTH APPLE BLOSSOM DRIVE CHELAN, WA 98816
LAKE CHELAN HEALTH
DCI
LOT 20
LOT 21
LOT 22
FFE= 1281.20
APPLE BLOSSOM DR.
S. APPLE BLOSSOM DR.
STATE HIGHWAY SR-97-A
PINATA AVE.
APPROXIMATE LIMIT OF CONSTRUCTION
FOR PERMIT
CONTRACTOR NOTE
GRAPHIC SCALE
SITE PLAN
C1.3

FIGURE 9

BOULTEN CONSTRUCTION COMPANY

TABLE 3- SAMPLING LOCATIONS AND CONTAMINATION TESTING RESULTS

Lake Chelan Health - LCCH Replacement Hospital: K-711
Dated 11/21/2021

TESTING LOCATION	DESCRIPTION	CONTAMINATES - TEST 1 (EPA 6010D) (AT -0.5' DEEP)		CONTAMINATES - TEST 2 (EPA 6010D) (AT -3.5' DEEP)		CONTAMINATES - TEST 3 (XRF)		CONTAMINATES - TEST 4 (TLCP)		NOTES
		LEAD (<250MG/KG)	ARSENIC (<20MG/KG)	LEAD (<250MG/KG)	ARSENIC (<20MG/KG)	LEAD (< 1MG/L)	ARSENIC (<20MG/KG)	LEAD (< 1MG/L)	ARSENIC (<1MG/KG)	
#1	Gallery 11	585 FAIL	89 FAIL			628 FAIL	96 FAIL	0.65 PASS	0.45 PASS	*Test 3 took place on 9/8 with an XRF device by Jeff Newschwander at approximately -1.5' below contract subgrade, accepted.* *A sample was taken from this location and sent off for TCLP testing. The TCLP sample was taken approximately - 6.5' from current grade at the center of the infiltration gallery with Lead reading at 628mg/kg and Arsenic reading 96mg/kg.*
#2	Gallery 12	545 FAIL	127.5 FAIL	302 FAIL	88 FAIL					*"Just NE Gallery" for 2nd test results per Roy email*
#3	Gallery 13	94 PASS	36.9 FAIL	79 PASS	32.3 FAIL					*"Just NW Gallery" for 2nd test results per Roy email*
#4	Gallery 14	408 FAIL	111.5 FAIL	428 FAIL	101 FAIL					*"West Gallery" for 2nd test results per Roy email*
#5	Gallery 15	170 PASS	79 FAIL							
#6	Gallery 16	89.5 PASS	95.5 FAIL							
#7	Swale A	96.5 PASS	34.55 FAIL			250 FAIL	45 FAIL	0.56 PASS	0.11 PASS	*Test 3 took place on 9/8 with an XRF device by Jeff Newschwander and did not pass. A sample was taken from this location and sent off for TCLP testing. The TCLP sample was taken approximately -3' from current grade one the west side of the excavation with Lead reading at 250mg/kg and Arsenic reading 45mg/kg.*
#8	Swale B	94.5 PASS	37.75 FAIL	246 PASS	73.5 FAIL					*Infiltration location tested.*
#9	Swale C North	5.2 PASS	2.5 PASS							*Drywell locations tested.*
#10	Swale C East	37 PASS	10.6 PASS							*Drywell locations tested.*
#11	Swale C West	13.7 PASS	11.85 PASS							*Drywell locations tested.*
#12	Swale D	20.2 PASS	18.95 PASS							*Drywell locations tested.*
#13	NE Corner Gallery			64.5 PASS	34.5 FAIL					*Swale C Infiltration per Roy email...Swale C Drywells passed, it is assumed that excavating the 3 drywells will get the gallery down to the depth of the drywells and require fill to get back up to the gallery elevation.*
#14	NW Corner Gallery			57 PASS	43.9 FAIL					*Swale D Infiltration per Roy email...Swale D Drywell passed, it is assumed that excavating the 3 drywells will get the gallery down to the depth of the drywells and require fill to get back up to the gallery elevation.*
#15	Swale B - Drywell #2			13.8 PASS	12.3 PASS					*Swale B Center Drywell per Roy Email*

Prepared By: M. McGrath
Checked and Revised By: CSI - Dave Schettler, PE

TABLE 3 (page 1)
Updated: 11/20/2022

BOULTEN CONSTRUCTION COMPANY

TABLE 3- SAMPLING LOCATIONS AND CONTAMINATION TESTING RESULTS

Lake Chelan Health - LCCH Replacement Hospital: K-711
Dated 11/21/2021

TESTING LOCATION	DESCRIPTION	CONTAMINATES - TEST 1 (EPA 6010D) (AT -0.5' DEEP)		CONTAMINATES - TEST 2 (EPA 6010D) (AT -3.5' DEEP)		CONTAMINATES - TEST 3 (XRF)		CONTAMINATES - TEST 4 (TLCP)		NOTES
		LEAD (<250MG/KG)	ARSENIC (<20MG/KG)	LEAD (<250MG/KG)	ARSENIC (<20MG/KG)	LEAD (< 1MG/L)	ARSENIC (<20MG/KG)	LEAD (< 1MG/L)	ARSENIC (<1MG/KG)	
#16	Swale B - Drywell #1			44.4	15.85					*Swale B West Drywell per Roy Email*
				PASS	PASS					
#17	Swale B - Drywell #3			86.5	32.4					*Swale B East Drywell per Roy Email for Test 2. Test 3 took place on 9/8 with an XRF device by Jeff Newschwander at approximately -10'-13' below current grade, accepted.*
				PASS	FAIL					
#18	Road Swale Start of Conveyance Ditch - 0'	520	150.5	750	192					*Tested at subgrade - 0.5' & - 3.5' same day*
		FAIL	FAIL	FAIL	FAIL					
#19	Road Swale Conveyance Ditch - 50'	364	126	100	55.5					*Tested at subgrade - 0.5' & - 3.5' same day*
		FAIL	FAIL	PASS	FAIL					
#20	Road Swale Conveyance Ditch - 100'	935	160	260	114.5					*Tested at subgrade - 0.5' & - 3.5' same day*
		FAIL	FAIL	FAIL	FAIL					
#21	Road Swale Conveyance Ditch - 150'	400	81	374	84					*Tested at subgrade - 0.5' & - 3.5' same day*
		FAIL	FAIL	FAIL	FAIL					
#22	Road Swale Conveyance Ditch - 200'	885	182	212	62.5					*Tested at subgrade - 0.5' & - 3.5' same day*
		FAIL	FAIL	PASS	FAIL					
#23	Road Swale Conveyance Ditch - 250'	384	63.5	95.5	79					*Tested at subgrade - 0.5' & - 3.5' same day*
		FAIL	FAIL	PASS	FAIL					
#24	Road Swale Conveyance Ditch - 300'	256	79	108	68.5					*Tested at subgrade - 0.5' & - 3.5' same day*
		FAIL	FAIL	PASS	FAIL					
#25	Road Swale Conveyance Ditch - 350'	349	107	25.4	17.2					*Tested at subgrade - 0.5' & - 3.5' same day*
		FAIL	FAIL	PASS	PASS					
#26	Road Swale Conveyance Ditch - 400'	328	72.5	14.8	17.6					*Tested at subgrade - 0.5' & - 3.5' same day*
		FAIL	FAIL	PASS	PASS					
#27	Road Swale Conveyance Ditch - 450'	169	65	172	77					*Tested at subgrade - 0.5' & - 3.5' same day*
		PASS	FAIL	PASS	FAIL					
#28	NW Corner at Swale B			282	79.5					
				FAIL	FAIL					
#29	SE Corner at Swale B			36	24.9					
				PASS	FAIL					
#30	SE at Swale B			5.1	26.5					
				PASS	FAIL					
#31	SE Corner of Building							0.00	0.23	*A sample was taken from this location and sent off for TCLP testing. The TCLP sample was taken approximately -1.5' from current grade at the corner of the building with Lead reading at 20mg/kg and Arsenic reading 81-90mg/kg.*
								PASS	PASS	

Prepared By: M. McGrath
Checked and Revised By: CSI - Dave Schettler, PE

Page 2 : 2

TABLE 3 (page 2)
Updated: 11/20/2022

FIGURE 9

APPENDICES

APPENDIX A. - USDA CUSTOM SOILS REPORT FOR LAKE CHELAN COMMUNITY HOSPITAL

APPENDIX B. - LCCH TERRESTRIAL ECOLOGICAL EVALUATION FORM SUBMITTED TO ECOLOGY ON AUG 11, 2022

GUIDANCE FOR APPENDICES

Each appendix should contain a description of content and explain how to interpret the information for use. Not all of the following suggestions will apply to all sites.

Appendix A Exploratory logs (borehole/test pit, etc.)

Appendix B Laboratory Analytical Data and Chain of Custody

Appendix C Limitations - All limitations that apply to the work should be summarized, including references to the originally proposed work plan with project objectives and scope of work. State if these were achieved and the scope of work completed. Where the scope deviated significantly from the originally proposed work plan, this should be summarized herein (if a limitation). State any limits of liability, reliance, etc., that apply.

Appendix D+ Other appended information may include:

- Legal description of the property.
- Chronological listing of past owners and operators.
- Method B or C calculation spreadsheets.
- Surveying data.
- Supporting field and/or laboratory data, if not tabulated/appended or referenced elsewhere (hydraulic testing, hydrographs, other party's data, etc.).
- Sampling and Analysis Plan (SAP)/Quality Assurance Project Plan (QAPP), if not previously submitted with a Work Plan. WAC 173-340-820 describes the elements to be included in a SAP. If deviations were made from the SAP or QAPP discuss those in the text of the report.
- Groundwater and soil vapor monitoring records and data, if not explicitly summarized/referenced elsewhere.
- Details of statistical methods, if used.
- Copies of previous report figures that help provide further context and/or detailed descriptions of previous investigations/interim actions.