Environmental Management Plan
Revision 1

Chapel Hill Police Department
Brownfields Project No. 23022-19-068

828 Martin Luther King Jr., Blvd.
Chapel Hill, North Carolina

H&H Job No. TCH-009
Original Date: October 8, 2019
Revision Date:October 15, 2019

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CONTENTS

Figures

Tables

Appendices

NORTH CAROLINA BROWNFIELDS PROGRAM
ENVIRONMENTAL MANAGEMENT PLAN

This form is to be used to prepare an Environmental Management Plan (EMP) for projects in the North Carolina Brownfields Program at the direction of a Brownfields project manager.

The EMP is a typical requirement of a Brownfields Agreement (BFA). Its purpose is to clarify actions to be taken during the demolition and construction at Brownfields properties in an effort to avoid delays in the event of the discovery of new contamination sources or other environmental conditions. The EMP provides a means to document redevelopment plans and environmental data for each applicable environmental medium to inform regulatory-compliant decision-making at the site. As much detail as possible should be included in the EMP, including contingency planning for unknowns. Consult your project manager if you have questions.

Prospective Developers and/or their consultants must complete and submit this form and all pertinent attachments, see checklist below, to their Brownfields project manager prior to any earthmoving or other development-related activities that have the potential to disturb soil at the Brownfields Property, including demolition. For the resultant EMP to be valid for use, it must be completed, reviewed by the program, signed by all parties working on the project, and approved by the Brownfields project manager. Failure to comply with the requirements of the EMP could jeopardize project eligibility, or in the event of a completed agreement, be cause for a reopener

So that the EMP provides value in protecting brownfields eligibility and public health, the preparer shall ensure that the following steps have been completed prior to submitting the EMP for review. **Any EMP prepared without completing these steps is premature.**

- ☒ Site sampling and assessment that meets Brownfields' objectives is complete and has been reviewed and approved by the Brownfields Project Manager.

- ☒ Specific redevelopment plans, even if conceptual, have been developed for the project, submitted and reviewed by the Brownfields Project Manager.

Please submit, along with the completed EMP form, the following attachments, as relevant and applicable to the proposed redevelopment:

☐ A set of redevelopment plans, including architectural/engineering plans, if available; if not conceptual plans may suffice if updated when detailed plans are drafted.

☒ A figure overlaying redevelopment plans on a map of the extent of contamination for each media.

☐ Site grading plans that include a cut and fill analysis.

☐ A figure showing the proposed location and depth of impacted soil that would remain on site after construction grading.

☐ Any necessary permits for redevelopment (i.e. demolition, etc.).

☐ A detailed construction schedule that includes timing and phases of construction.

☒ Tabulated data summaries for each impacted media (i.e. soil, groundwater, soil gas, etc.) applicable to the proposed redevelopment.

☒ Figures with the sampling locations and contamination extents for each impacted media applicable to the proposed redevelopment.

☐ A full final grade sampling and analysis plan, if the redevelopment plan is final.

☐ If known, information about each proposed potential borrow soil source, such as aerial photos, historic site maps, historic Sanborn maps, a site history, necessary for brownfields approval.

☐ Information and, analytical data if required, for quarries, or other borrow sources, detailing the type of material proposed for importation to the Brownfields Property.

☐ A work plan for the sampling and analysis of soil to be brought onto the Brownfields Property. Refer to Issue Resolution 15 in Brownfields Program Guidelines.

☐ A map of the Brownfields Property showing the location of soils proposed for export and sampling data from those areas.

☐ If a Vapor Mitigation System is required by the Brownfields Program, the Vapor Intrusion Mitigation System (VIMS) plan will be signed and sealed by a NC Professional Engineer. The VIMS Plan may also be submitted under separate cover.

GENERAL INFORMATION

Date: 10/8/2019 **Revision Date (if applicable)**: 10/15/2019

Brownfields Assigned Project Name: Chapel Hill Police Department

Brownfields Project Number: 23022-19-068

Brownfields Property Address: 828 Martin Luther King Jr., Blvd., Chapel Hill, Orange County, North Carolina (Figure 2).

Brownfields Property Area (acres): The Brownfields property is approximately 10.24 acres and consists of one parcel. The property is generally divided into an elevated portion in the north and a lower portion in the south that are separated by a steep embankment. The elevated portion is developed with an approximately 21,100 square foot (sq ft) two-story building that is currently occupied by the Town of Chapel Hill Police Department. The lower portion is vegetated with the exception of an approximately 800 linear feet segment of Bolin Creek Trail which is a local greenway trail. Bolin Creek is located along the southern site boundary. This Environmental Management Plan has been prepared to address the following activities in the southern portion of the site: 1) construction activities for the proposed expansion of the Bolin Creek Trail, and 2) interim remedial activities to remove areas of erosional coal combustion products (CCPs) near portions of the Bolin Creek Trail.

Is Brownfields Property Subject to RCRA Permit?.....☐ **Yes** ☒ **No**
If yes enter Permit No.: Click or tap here to enter text.
Is Brownfields Property Subject to a Solid Waste Permit.....☐ **Yes** ☒ **No**
If yes, enter Permit No.: Click or tap here to enter text.

COMMUNICATIONS

A copy of this EMP shall be distributed to all the parties below as well as any contractors or site workers that may be exposed to site vapors, soil, groundwater, and/or surface water. Additionally, a copy of the EMP shall be maintained at the Brownfields Property during redevelopment activities. NOTE, THE EMP DOES NOT TAKE THE PLACE OF A SITE-SPECIFIC HEALTH AND SAFETY PLAN.

Prospective Developer (PD): Town of Chapel Hill
Contact Person: John Richardson
Phone Numbers: Office: (919) 969-5075 **Mobile:** (919)-801-8225
Email: jrichardson@townofchapelhill.org

Contractor for PD: S&C Construction, LLC
Contact Person: Clint Roberson
Phone Numbers: Office: (910) 520-6430 **Mobile:** Click or tap here to enter text.
Email: Click or tap here to enter text.

Environmental Consultant: Hart & Hickman, PC
Contact Person: Justin Ballard
Phone Numbers: Office: (919) 847-4241 **Mobile:** (252) 548-9191
Email: jballard@harthickman.com

Brownfields Program Project Manager: Hayley Irick
Phone Numbers: Office: (919) 707-8294 **Mobile:** Click or tap here to enter text.
Email: hayley.irick@ncdenr.gov

Other DEQ Program Contacts (if applicable, i.e., UST Section, Inactive Hazardous Site Branch, Hazardous Waste, Solid Waste):
Amy Axon – Inactive Hazardous Sites Branch (amy.axon@ncdenr.gov; 919-707-8371)

NOTIFICATIONS TO THE BROWNFIELDS PROGRAM

Written advance Notification Times to Brownfields Project Manager: Check each box to accept minimum advance notice periods (in calendar days) for each type of onsite task:

On-site assessment or remedial activities:..... **10 days Prior** ☒

Construction or grading start:..... **10 days Prior** ☒

Discovery of stained soil, odors, USTs, buried drums or waste, landfill, or other signs of previously unknown contamination: ..... **Within 48 hours** ☒

Implementation of emergency actions (e.g. dewatering, flood or soil erosion control measures in area of contamination, ventilation of work zones):..... **Within 48 hours** ☒

Installation of mitigation systems:..... **10 days Prior** ☐

Other notifications as required by local, state or federal agencies to implement redevelopment activities: (as applicable): ..... **Within 30 days** ☒

REDEVELOPMENT PLANS

1) **Type of Redevelopment (check all that apply):**
☒**Residential** ☒**Recreational** ☒**Institutional** ☒**Commercial** ☒**Office** ☒**Retail** ☐**Industrial**
☒**Other specify:**
Open space

2) **Check the following activities that will be conducted prior to commencing earth-moving activities**

at the site:

☒ **Review of historic maps (Sanborn Maps, facility maps)**

☐ **Conducting geophysical surveys to evaluate the location of suspect UST, fuel lines, utility lines, etc.**

☒ **Interviews with employees/former employees/facility managers/neighbors**

3) **Summary of Redevelopment Plans (MANDATORY: attach detailed plans or conceptual plans, if detailed plans are not available. EMP review without such information would be premature)**: **Provide brief summary of redevelopment plans, including demolition, removal of building slabs/pavement, grading plans and planned construction of new structures:**

This EMP covers proposed activities in the lower portion of the Brownfields property along Bolin Creek Trail. The activities include construction of a new segment of Bolin Creek Trail and implementation of interim remedial activities related to the presence of exposed coal combustion products (CCPs) which have migrated over time from certain portions of the embankment separating the upper and lower portions of the Brownfields property. Specifically, trail construction activities will involve limited grading, excavation, and management of soil and CCPs from the southwestern portion of the Brownfields property and from depositional CCP Area I (Figure 3). Interim remedial activities will include excavation and management of CCPs from depositional CCP Areas G, H, and I (Figure 3). In addition, interim remedial activities will also include implementation of cover and migration control measures to minimize the potential for exposed CCPs located within Areas D and F (Figure 3) to mobilize towards Bolin Creek Trail. Further details related to proposed redevelopment activities are documented in an August 21, 2019 Draft General Awareness Training Plan – Bolin Creek Trail Construction Activities and Interim Remedial Measures (General Awareness Training Plan) prepared by Hart & Hickman, PC. A copy of the General Awareness Training Plan is included in Appendix A.

4) **Do plans include demolition of structure(s)?:**

☐ **Yes** ☒ **No** ☐ **Unknown**

☐ **<u>If yes</u>**, please check here to confirm that demolition will be conducted in accordance with applicable legal requirements, including without limitation those related to lead and asbestos abatement that are administered by the Health Hazards Control Unit within the Division of Public Health of the North Carolina Department of Health and Human Services. If available, please provide a copy of your demolition permit.

5) **Are sediment and erosion control measures required by federal, state, or local regulations?**

☒ **Yes** ☐ **No** ☐ **Unknown**

☒ **<u>If yes</u>**, please check here to confirm that demolition will be conducted in accordance with applicable legal requirements. If soil disturbance is necessary to install sediment and erosion control measures, they may not begin until this EMP is approved.

6) **Which category of risk-based screening level is used or is anticipated to be specified in the Brownfields Agreement?** Note: If children frequent the property, residential screening levels shall be cited in the Brownfields Agreement for comparison purposes.

☒ **Residential** ☐ **Non-Residential or Industrial/Commercial**

7) Schedule for Redevelopment (attach construction schedule):

a) Construction start date: 10/16/2019

b) Anticipated duration (specify activities during each phase):

Activities are expected to occur for approximately 2-3 months.

c) Additional phases planned? ☐ Yes ☐ No

If yes, specify the start date and/or activities if known**:**

Start Date: Click or tap to enter a date.
Planned Activity:
Click or tap here to enter text.

Start Date: Click or tap to enter a date.
Planned Activity:
Click or tap here to enter text.

Start Date: Click or tap to enter a date.
Planned Activity:
Click or tap here to enter text.

d) Provide the planned date of occupancy for new buildings: Not applicable

CONTAMINATED MEDIA

1) Contaminated Media on the Brownfields Property

Part 1. Soil:..... ☒ **Yes** ☐ **No** ☐ **Suspected**
Part 2. Groundwater:..... ☒ **Yes** ☐ **No** ☐ **Suspected**
Part 3. Surface Water:..... ☐ **Yes** ☒ **No** ☐ **Suspected**
Part 4. Sediment:..... ☐ **Yes** ☒ **No** ☐ **Suspected**
Part 5. Soil Vapor:..... ☐ **Yes** ☒ **No** ☐ **Suspected**
Part 6. Sub-Slab Soil Vapor:..... ☐ **Yes** ☒ **No** ☐ **Suspected**
Part 7. Indoor Air:..... ☐ **Yes** ☒ **No** ☐ **Suspected**

2) For the Area of Proposed Redevelopment on the Brownfields Property, attach tabulated data summaries for each impacted media and figure(s) with sample locations.

PART 1. Soil – Please fill out the information below, using detailed site plans, if available, or estimate using known areas of contaminated soil and a conceptual redevelopment plan. Provide a figure overlaying new construction onto figure showing contaminated soil and groundwater locations.

1) Known or suspected contaminants in soil (list general groups of contaminants):

Multiple soil sampling events have been completed at the Brownfields property dating back to 2013. The soil assessments have indicated that the primary compounds of concern at the Brownfields property are metals from the historical placement of CCPs. A tabular summary of historical soil analytical data in comparison to DEQ's May 2019 Preliminary Soil Remediation Goals (PSRGs) and Site-specific background levels is included as Table 1 and soil sample locations are shown in Figure 4. In the initial phases of the investigation, some samples were collected for analysis of volatile organic compounds (VOCs), semi-volatile organic compounds (SVOCs), pesticides, polychlorinated biphenyls (PCBs) and petroleum hydrocarbon fractions are those data are summarized in Appendix C.

Soil assessment activities conducted in the lower portion of the Brownfields property have identified arsenic, barium, manganese, mercury, and selenium at concentrations above the Residential PSRGs and Site-specific background levels. Concentrations of arsenic were also detected in several samples above the Industrial/Commercial PSRG.

In 2016, soil laboratory analytical results were used by the North Carolina Department of Environmental Quality (DEQ) Inactive Hazardous Sites Branch (IHSB) to conduct a risk evaluation. Results of the risk evaluation for samples collected from the lower portion of the Brownfields property indicated calculated cumulative risk levels were acceptable (calculated cumulative carcinogenic risk below 1×10^{-4} and hazard index below 1 for a recreational user and construction worker. A copy of the May 2, 2016 risk evaluation letter by DEQ IHSB is included in Appendix B.

A human health and ecological risk assessment is currently being performed by Rudo Toxicological Consultants (Rudo) and Duncklee & Dunham (D&D) for existing conditions at the Brownfields property and as part of evaluation of potential interim remedial measures. To aid in preparation of the risk assessment, H&H conducted a soil sampling event in April 2019. Consistent with DEQ's risk evaluation conclusion in 2016, results of the 2019 risk assessment indicate calculated cumulative risk levels were acceptable for a recreational user and construction worker in the lower portion of the Brownfields property. A report of this risk assessment is currently in preparation and will be provided to DEQ upon completion.

2) Depth of known or suspected contaminants (feet):

Depositional CCPs are present in Areas G, H, and I at depths of up to approximately 1 foot below ground surface (bgs). Elevated levels of metals are located in and in close proximity to these areas.

3) Area of soil disturbed by redevelopment (square feet):

Up to approximately 12,000 sq ft is expected to be disturbed during excavation activities for

depositional CCPs Areas G, H, and I. An additional approximately 4,000 sq ft is expected to be disturbed during trail construction activities.

4) **Depths of soil to be excavated (feet):**
Proposed grading and excavation activities are expected to include depths of up to approximately 1 ft bgs.

5) **Estimated volume of soil (cubic yards) to be excavated (attach grading plan):**
Approximately 700 cubic yards of erosional CCPs and 100-200 cubic yards of soil are expected to be excavated and disposed of off-Site.

6) **Estimated volume of excavated soil (cubic yards) anticipated to be impacted by contaminants:**
See #5 above.

7) **Estimated volume of contaminated soil expected to be disposed of offsite, if applicable:**
See #5 above.

Part 1.A. MANAGING ONSITE SOIL

If soil is anticipated to be excavated from the Brownfield Property, relocated on the Brownfields Property, or otherwise disturbed during site grading or other redevelopment activities, please provide a grading plan that clearly illustrates areas of cut and fill (approximate areas & volumes are acceptable, if only preliminary data available).

1) **HAZARDOUS WASTE DETERMINATION:**

a) **Does the soil contain a LISTED WASTE as defined in the North Carolina Hazardous Waste Section under 40 CFR Part 261.31-261.35?**..... ☐**Yes** ☒**No**

☐ **If yes, explain why below, including the level of knowledge regarding processes generating the waste (include pertinent analytical results as needed).**
Click or tap here to enter text.

☐ **If yes, do the soils exceed the "Contained-Out" levels in Attachment 1 of the North Carolina Contained-In Policy?**..... ☐ **Yes** ☐ **No**

b) **NOTE: IF SOIL MEETS THE DEFINITION OF A LISTED HAZARDOUS WASTE AND EXCEEDS THE CONTAINED-OUT LEVELS IN ATTACHMENT 1 TO THE NORTH CAROLINA CONTAINED-IN POLICY THE SOIL MAY NOT BE RE-USED ON SITE AND MUST BE DISPOSED OF IN ACCORDANCE WITH DEQ HAZARDOUS WASTE SECTION RULES AND REGULATIONS.**

c) **Does the soil contain a CHARACTERISTIC WASTE?**..... ☐ **Yes** ☒ **No**

☐ **If yes**, mark reason(s) why below (and include pertinent analytical results).
☐ **Ignitability** Click or tap here to enter text.

☐ **Corrosivity** Click or tap here to enter text.

☐ **Reactivity** Click or tap here to enter text.

☐ **Toxicity** Click or tap here to enter text.

☐ **TCLP results** Click or tap here to enter text.

☐ **Rule of 20 results** (20 times total analytical results for an individual hazardous constituent on TCLP list cannot, by test method, exceed regulatory TCLP standard)
Click or tap here to enter text.

☒ **If no,** explain rationale:
Toxicity characteristic leaching procedure (TCLP) investigative derived waste (IDW) characterization of soil and CCPs samples were collected at the Brownfields property during assessment activities completed in 2016 and 2019. Based on the sampling results, soil and CCPs generated during the 2016 and 2019 assessment activities did not exceed toxicity characteristic levels. Composite samples of the erosional CCPs were recently collected for TCLP metals analysis in advance of the interim remedial and the data are pending.

d) NOTE: IF SOIL MEETS THE DEFINITION OF A CHARACTERISTIC HAZARDOUS WASTE, THE SOIL MAY NOT BE RE-USED ON SITE AND MUST BE DISPOSED OF IN ACCORDANCE WITH DEQ HAZARDOUS WASTE SECTION RULES AND REGULATIONS.

2) Screening criteria by which soil disposition decisions will be made (e.g., left in place, capped in place with low permeability barrier, removed to onsite location and capped, removed offsite):

☒ **Preliminary Health-Based Residential SRGs**

☐ **Preliminary Health-Based Industrial/Commercial SRGs**

☒ **Division of Waste Management Risk Calculator (For Brownfields Properties Only)**

☐ **Site-specific risk-based cleanup level. Please provide details of methods used for determination/explanation.**
Click or tap here to enter text.

Additional comments:
Click or tap here to enter text.

3) If known impacted soil is proposed to be reused within the Brownfields Property Boundary, please check the measures that will be utilized to ensure safe placement and documentation of same. Please attach a proposed location diagram/site map.

☐ **Provide documentation of analytical report(s) to Brownfields Project Manager**

☐ **Provide documentation of final location, thickness and depth of relocated soil on site map to Brownfields Project Manager once known**

☐ **Geotextile to mark depth of fill material.**

Provide description of material:

Click or tap here to enter text.

☐ **Manage soil under impervious cap** ☒ **or clean fill** ☐

☐ **Describe cap or fill:**

Click or tap here to enter text.

☐ **Confer with NC BF Project Manager if Brownfield Plat must be revised (or re-recorded if actions are Post-Recordation).**

☐ **GPS the location and provide site map with final location.**

☐ **Other. Please provide a description of the measure**:

Known impacted soil is not proposed to be reused on the Brownfields property at this time. If the Town proposes reuse of known impacted soil, DEQ Brownfields will be contacted for review and approval of the reuse plan.

4) Please describe the following action(s) to be taken during and following excavation and management of site soils:

<u>Management of fugitive dust from site</u>

☒ **Yes, describe the method will include**:

The environmental consultant will monitor ambient dust levels in the work zone (i.e., excavation areas) of on-Site personnel using a direct reading dust level meter (Casella Microdust Pro monitor or equivalent). Work area monitoring will also be performed immediately adjacent to excavation areas, construction areas, soil/CCP handling areas, and other areas as needed when work is occurring. If the dust analyzer readings are greater than 3.0 mg/cubic meter above background, Site activities will be halted, workers will move upwind, and the work area will be wetted to lower dust levels below the 3.0 mg/cubic meter. Monitoring will continue until measurements indicate that levels are acceptable to continue and the conditions that caused the elevated readings have been mitigated. If dust levels persist above 3.0 mg/cubic meter, then the Town and environmental consultant will devise and implement an engineering control. In conjunction with the on-Site monitoring, the environmental consultant will conduct perimeter monitoring during excavation, soil/CCP handling, and other activities as needed when work is occurring. Perimeter monitoring will consist of multiple fixed continuous particulate monitoring stations (Casella Microdust Pro monitors or equivalent) to evaluate the potential migration of COCs off-Site. Particulate monitoring stations will be established in the predominant downwind and upwind directions. At least one of the downwind monitoring locations will established in a downwind location between the Site and the nearest downwind residence, business, or open portion of the trail. During these work activities, the monitors will be checked periodically (typically every half hour) to evaluate detections against the 3.0 mg/cubic meter action level. A windsock will be positioned on-Site nearby the construction activities to monitor wind directions, to evaluate locations where monitoring will occur, and visibly determine changes in wind direction. Additional information regarding management of dust during the activities is provided in the August 2019 General Awareness Training Plan (Appendix A).

☐ **No, explain rationale**:
Click or tap here to enter text.

Field Screening of site soil

☒ **Yes, describe the field screening method, frequency of field screening, person conducting field screening**:
Field screening during the activities will be conducted in accordance with the August 2019 General Awareness Training Plan (Appendix A).

☐ **No, explain rationale:**
Click or tap here to enter text.

Soil Sample Collection

☒ **Yes, describe the sampling method (e.g., in-situ grab, composite, stockpile, etc.):**
During trail construction activities, excess soil will be stockpiled in general accordance with Figure 1 and sampled for waste profiling purposes and disposal facility acceptance. Composite soil sample(s) will be collected from the stockpile at a rate of approximately one sample per 250 cubic yards which will, at a minimum, be submitted for laboratory analysis of TCLP RCRA metals. Note that if samples are submitted for VOC analysis, the samples submitted for laboratory analysis will be a centrally located grab sample from the stockpile and not composite sample.

In advance of the interim remedial activities, three composite CCPs samples (approximately one composite per 250 cubic yards) were recently collected from depositional CCPs Areas G, H, and I for waste profiling purposes and disposal facility acceptance. Depositional CCPs samples were submitted for TCLP RCRA metals plus pH, total sulfur, and total sulfates (as requested by a possible disposal facility). These data will be provided to DEQ upon receipt from the analytical laboratory.

☐ **No, explain rationale**:
Click or tap here to enter text.

If soil samples are collected for analysis, please check the applicable chemical analytes:

☐ **Volatile organic compounds (VOCs) by EPA Method 8260**

☐ **Semi-volatile organic compounds (SVOCs) by EPA Method 8270**

☐ **Metals RCRA List (8)** (arsenic, barium, cadmium, chromium, mercury, lead, selenium and silver): Specify Analytical Method Number(s):
EPA Methods 6020/7471

☐ **Pesticides:** Specify Analytical Method Number(s):
Click or tap here to enter text.

☐ **PCBs:** Specify Analytical Method Number(s):
Click or tap here to enter text.

☒ **Other Constituents & Respective Analytical Method(s)** (i.e. Hexavalent Chromium, Herbicides, etc.): Specify Analytical Method Number(s):
TCLP RCRA metals and additional analyses as may be requested by the accepting facility.

☒ **Check to confirm that stockpiling of known or suspected impacted soils will be conducted in accordance with Figure 1 of this EMP. Stockpile methodology should provide erosion control, prohibiting contact between surface water/precipitation and contaminated soil, and preventing contaminated runoff. Explain any variances or provide additional details as needed:**

Click or tap here to enter text.

☒ **Final grade sampling of exposed native soil (i.e., soil that will not be under buildings or permanent hardscape).** Select chemical analyses for final grade samples with check boxes below (Check all that apply):

☒ **Volatile organic compounds (VOCs) by EPA Method 8260**

☒ **Semi-volatile organic compounds (SVOCs) by EPA Method 8270**

☐ **Metals RCRA List (8)** (arsenic, barium, cadmium, chromium, mercury, lead, selenium and silver): **Specify Analytical Method Number(s):**
Click or tap here to enter text.

☐ **Pesticides: Specify Analytical Method Number(s):**
Click or tap here to enter text.

☐ **PCBs: Specify Analytical Method Number(s):**
Click or tap here to enter text.

☒ **Other Constituents & Respective Analytical Method(s) (i.e. Hexavalent Chromium, Herbicides, etc.):**
arsenic, barium, beryllium, cadmium, total chromium, cobalt, copper, manganese, mercury, nickel, and selenium by EPA Methods 6020/7471, strontium by EPA Method 6010, and hexavalent chromium by EPA Method 7199.

Please provide a scope of work for final grade sampling, including a diagram of soil sampling locations, number of samples to be collected, and brief sampling methodology. Samples should be collected from 0-2 ft below ground surface, with the exception of VOCs which should be taken from 1-2 ft below ground surface. Alternatively, a work plan for final grade sampling may be submitted under separate cover.

Following removal of erosional CCPs in Areas G, H, and I and prior to placement of fill

material, shallow samples (0-1 ft) will be collected from the base of the excavation for analysis of the above metals to be used in the post-interim remedial action risk assessment to be prepared by Rudo/D&D. The locations of the proposed post-interim remedial measures soil samples are indicated in Figure 5. The following number of samples will be collected: one sample from Area G; six samples from Area H; and three samples from Area I. The samples will be collected with a stainless steel hand auger and then thoroughly homogenized in a stainless steel or glass bowl before being placed into jars for laboratory analysis. For Area G, the sample will be centrally located in the excavation area, and for Areas G and H, the samples will be evenly distributed across the areas. In addition, one centrally located grab sample will be collected from each of the three areas for analysis of VOCs by EPA Method 8260 and for SVOCs by EPA Method 8270. The locations of the soil samples for VOC and SVOC analysis are indicated in Figure 5. After collection, the soil sample locations will be determined using GPS. The results of analysis of the soil samples will be provided in the Post Redevelopment Report (see below).

☐ ***If final grade sampling was <u>NOT</u> selected please explain rationale:***

Click or tap here to enter text.

Part 1.B. IMPORTED FILL SOIL

<u>NO SOIL MAY BE BROUGHT ONTO THE BROWNFIELDS PROPERTY WITHOUT PRIOR APPROVAL FROM THE BROWNFIELDS PROGRAM.</u> According to the Brownfields IR 15, "Documenting imported soil (by sampling, analysis, and reporting in accordance with review and written approval in advance by the Brownfields Program), will safeguard the liability protections provided by the brownfields agreement and is in the best interest of the prospective developer/property owner."

<u>Requirements for importing fill</u>:

1) **Will fill soil be imported to the site?**..... ☒ **Yes** ☐ **No** ☐ **Unknown**

2) **If yes, what is the estimated volume of fill soil to be imported?**

   Approximately 700 cubic yards of import material will be needed to backfill the excavation of depositional CCPs Areas G, H, and I.

3) **If yes, what is the anticipated depth that fill soil will be placed at the property? (*If a range of depths, please list the range*.)**

   Up to approximately 1 ft bgs.

4) **Provide the source of fill, including: location, site history, nearby environmental concerns, etc. Attach aerial photos, maps, historic Sanborn maps and a borrow source site history:**

   To be determined. The source of the fill material will be provided to DEQ Brownfields for review prior to placing the soil at the site.

5) **PRIOR TO ITS PLACEMENT AT THE BROWNFIELDS PROPERTY, provide a plan to analyze fill soil to demonstrate that it meets acceptable standards applicable to the site and can be approved for use at the Brownfields property.**

See No. 7 below for details outlining the proposed plan to demonstrate import soil meets acceptable standards applicable to the Brownfields property.

6) **Please check the applicable chemical analytes for fill soil samples. (Check all that apply):**

☒ **Volatile organic compounds (VOCs) by EPA Method 8260**

☒ **Semi-volatile organic compounds (SVOCs) by EPA Method 8270**

☒ **Metals RCRA List (8)** (arsenic, barium, cadmium, chromium, mercury, lead, selenium and silver): **Specify Analytical Method Number(s):**
6020/7471

☐ **Pesticides: Specify Analytical Method Number(s):**
Click or tap here to enter text.

☐ **PCBs: Specify Analytical Method Number(s):**
Click or tap here to enter text.

☒ **Other Constituents & Respective Analytical Method(s) (i.e. Hexavalent Chromium, Herbicides, etc.):**
beryllium, cobalt, copper, manganese, nickel, and selenium by EPA Methods 6020/7471, strontium by EPA Method 6010, and hexavalent chromium by EPA Method 7199.

7) **The scope of work for import fill sampling may be provided below or in a Work Plan submitted separately for DEQ review and approval. Attach specific location maps for in-situ borrow sites. If using a quarry, provide information on the type of material to be brought onto the Brownfields Property.**

The Town will follow the procedures outlined below to demonstrate import soil meets acceptable criteria for Site use.

If the Town plans to import virgin fill material from a DEQ Brownfields pre-approved borrow source, no samples of the import material will be collected because adequate analytical data is available in the DEQ Brownfields database to demonstrate material from these facilities is suitable for use as fill at a Brownfields property.

If fill soil (other than topsoil) is obtained from an off-Site property that is not a known permitted quarry or is recycled material from a DEQ Brownfields pre-approved borrow source, a sampling plan will be developed and submitted for DEQ review. The sampling plan will include historic information about the source of the fill including historical aerial photographs and other information as appropriate (i.e., property owner interview, etc.). DEQ approval of the sampling plan and analytical results will be obtained prior to transporting import soil to the Site. The specific sampling rate will be outlined in the aforementioned sampling plan. However, if the

proposed borrow source has not been previously developed (i.e., virgin land), soil samples will be collected for laboratory analyses indicated above at a general rate of approximately one per 1,000 cubic yards. If the borrow source property has been previously developed, soil samples will be collected for laboratory analyses indicated above at a general rate of approximately one per 500 cubic yards. The DEQ Brownfields project manager will be contacted should an alternate sampling frequency be sought for either type of borrow source property.

Fill soil will be considered suitable for use at the Brownfields property if it does not contain compound concentrations above DEQ Residential PSRGs or metals concentrations which are consistent with Site-specific background levels.

Part 1.C. EXPORTED SOIL

NO SOIL MAY LEAVE THE BROWNFIELDS PROPERTY WITHOUT APPROVAL FROM THE BROWNFIELDS PROGRAM. FAILURE TO OBTAIN APPROVAL MAY VIOLATE A BROWNFIELDS AGREEMENT CAUSING A REOPENER OR JEOPARDIZING ELIGIBILITY IN THE PROGRAM, ENDANGERING LIABILITY PROTECTIONS AND MAKING SAID ACTION POSSIBLY SUBJECT TO ENFORCEMENT. JUSTIFICATIONS PROVIDED BELOW MUST BE APPROVED BY THE PROGRAM IN WRITING PRIOR TO COMPLETING TRANSPORT ACTIVITIES. Please refer to Brownfields IR 15 for additional details.

1) **If export from a Brownfields Property is anticipated, please provide details regarding the proposed export actions. Volume of exported soil, depths, location from which soil will be excavated on site, related sampling results, etc. Provide a site map with locations of export and sampling results included.**

   Approximately 700 cubic yards of CCPs and approximately 100-200 cubic yards of soil are expected to be exported.

2) **To what type of facility will the export Brownfields soil be sent?**

   ☒ **Subtitle D/Municipal Solid Waste Landfill** (analytical program to be determined by landfill)

   ☒ **Permitted but Unlined Landfill** (i.e. LCID, C&D, etc.) Analytical program to be determined by the accepting Landfill;

   ☐ **Landfarm or other treatment facility**

   ☒ **Use as fill at another suitable Brownfields Property –** determination that a site is suitable will require, at a minimum, that similar concentrations of the same or similar contaminants already exist at both sites, use of impacted soil will not increase the potential for risk to human health and the environment at the receiving Brownfields property, and that a record of the acceptance of such soil from the property owner of the receiving site is provided to Brownfields. Please provide additional details below.

   ☒ **Use as Beneficial Fill off-site at a non-Brownfields Property -** Please provide documentation of approval from the property owner for receipt of fill material. This will

also require approval by the DEQ Solid Waste Section. Additional information is provided in IR 15. Please provide additional details below.

3) Additional Details: (if transfer of soil to another property is requested above, please provide details related to the proposed plans).

It is anticipated that the erosional CCPs will be taken to a Subtitle D/Municipal Solid Waste (MSW) Landfill. The stockpiled soil may be taken to a Subtitle D/MSW landfill, a permitted but unlined landfill, another Brownfields property, or used as beneficial fill. The Town or the environmental professional will contact DEQ Brownfields to obtain DEQ Brownfields and DEQ Solid Waste approval (if warranted) prior to exporting soil to a location other than a Subtitle D/MSW landfill.

Part 1.D. MANAGEMENT OF UTILITY TRENCHES

☐ **Install liner between native impacted soils and base of utility trench before filling with clean fill (Preferred)**

☐ **Last out, first in principle for impacted soils (if soil can safely be reused onsite and is not a hazardous waste), i.e., impacted soils are placed back at approximately the depths they were removed from such that impacted soil is not placed at a greater depth than the original depth from which it was excavated.**

☐ **Evaluate whether necessary to install barriers in conduits to prevent soil vapor transport, and/or degradation of conduit materials due to direct impact with contaminants?**

☐ **If yes,** provide specifications on barrier materials:

Click or tap here to enter text.

☐ **If no**, include rationale here:

Click or tap here to enter text.

Other comments regarding managing impacted soil in utility trenches:

Not applicable

PART 2. GROUNDWATER – Please fill out the information below.

1) What is the depth to groundwater at the Brownfields Property?

Based on depth to groundwater information collected by H&H (see Table 3), depth to groundwater in the southern portion of the Site near Bolin Creek Trail (see wells MW-3A, MW-4A, and MW-6) has ranged from approximately 3 ft bgs to 10 ft bgs. The most recent depths to groundwater in the southern portion of the property collected in September 2019 ranged from approximately 7 to 10 ft bgs.

2) **Is groundwater known to be contaminated by ☒onsite ☐offsite ☐both or ☐unknown sources? Describe source(s)**:

Historical groundwater assessment activities conducted at the Brownfields property have identified the presence of arsenic, barium, cobalt, manganese, and selenium, thallium, and vanadium at concentrations above the DEQ 2L Groundwater Quality Standards (2L Standards). The primary metals detected above 2L Standards in the southern portion of the property are manganese, selenium, thallium, and vanadium. A tabular summary of historical groundwater analytical data in comparison to the 2L Standards is included as Table 2 (metals) and groundwater sample locations are shown in Figure 4. Analysis of compounds for compounds other than metals has not indicated the presence of detectable VOCs, SVOCs, pesticides, or PCBs. (see Appendix C).

3) **What is the direction of groundwater flow at the Brownfields Property?**

Groundwater flow direction mimics topography and flows towards Bolin Creek to the south-southeast.

4) **Will groundwater likely be encountered during planned redevelopment activities?**
☐Yes ☒No
If yes, describe these activities:
Click or tap here to enter text.

Regardless of the answer; in the event that contaminated groundwater is encountered during redevelopment activities (even if no is checked above), list activities for contingent management of groundwater (e.g., dewatering of groundwater from excavations or foundations, containerizing, offsite disposal, discharge to sanitary sewer, NPDES permit, or sampling procedures).

Although not anticipated at this time, appropriate worker safety measures will be undertaken if groundwater gathers in an open excavation within an area determined to be impacted during construction activities. The accumulated water will be allowed to evaporate/infiltrate to the extent time for dissipation does not disrupt the construction schedule. Should the time needed for natural dissipation of accumulated water be deemed inadequate, the water will be tested for analysis of the following metals: RCRA metals (arsenic, barium, cadmium, chromium, mercury, lead, selenium, silver), plus cobalt, manganese, selenium, strontium, thallium, and vanadium by EPA Methods 6020/6010/7470/. The water may be discharged off-Site at a permitted facility, may be discharged to the municipal sewer (with approval), or discharged to the ground surface (if not impacted above DEQ surface water standards).

5) **Are monitoring wells currently present on the Brownfields Property?**.....**☒Yes ☐No**
If yes, are any monitoring wells routinely monitored through DEQ or other agencies?.....**☒Yes ☐No**

6) **Please check methods to be utilized in the management of known and previously unidentified wells.**
☐ **Abandonment of site monitoring wells in accordance with all applicable regulations. It is the Brownfields Program's intent to allow proper abandonment of well(s) as specified in the Brownfields Agreement, except if required for active monitoring**

through another section of DEQ or the EPA.

☒ **Location of existing monitoring wells marked**

☒ **Existing monitoring wells protected from disturbance**

☐ **Newly identified monitoring wells will be marked and protected from further disturbance until notification to DEQ Brownfields can be made and approval for abandonment is given.**

7) **Please provide additional details as needed:**

Click or tap here to enter text.

Please note, disturbance of existing site monitoring wells without approval by DEQ is not permissible. If monitoring wells are damaged and/or destroyed, DEQ may require that the PD be responsible for replacement of the well.

PART 3. SURFACE WATER -Please fill out the information below.

1) **Is surface water present at the property? ☒ Yes ☐ No**
2) **Attach a map** showing the location of surface water at the Brownfields Property.
3) **Is surface water at the property known to be contaminated? ☐ Yes ☒ No**
4) **Will workers or the public be in contact with surface water during planned redevelopment activities? ☐ Yes ☒ No**
5) **In the event that contaminated surface water is encountered during redevelopment activities, or clean surface water enters open excavations, list activities for management of such events (e.g. flooding, contaminated surface water run-off, stormwater impacts):**

If surface water run-off gathers in an open excavation within an area determined to be impacted during construction activities, appropriate worker safety measures will be undertaken. The accumulated water will be allowed to evaporate/infiltrate to the extent time for dissipation does not disrupt the construction schedule. Should the time needed for natural dissipation of accumulated water be deemed inadequate, the water will be managed as described above in Part 2 Groundwater.

PART 4. SEDIMENT – Please fill out the information below.

1) **Are sediment sources present on the property? ☒ Yes ☐ No**
2) **If yes, is sediment at the property known to be contaminated: ☐ Yes ☒ No**
3) **Will workers or the public be in contact with sediment during planned redevelopment**

activities? ☐ Yes ☒ No

4) Attach a map showing location of known contaminated sediment at the property**.**

5) **In the event that contaminated sediment is encountered during redevelopment activities, list activities for management of such events (stream bed disturbance):**

Not applicable.

PART 5. SOIL VAPOR – Please fill out the information below.

1) Do concentrations of volatile organic compounds at the Brownfields property exceed the following vapor intrusion screening levels (current version) in the following media:

IHSB Residential Screening Levels:
Soil Vapor:……..**☐ Yes ☐ No ☒ Unknown**
Groundwater:…..**☐ Yes ☒ No ☐ Unknown**

IHSB Industrial/Commercial Screening Levels:
Soil Vapor:……..**☐ Yes ☐ No ☒ Unknown**
Groundwater:…..**☐ Yes ☒ No ☐ Unknown**

2) Attach a map showing the locations of soil vapor contaminants that exceed site screening levels.

3) If applicable, at what depth(s) is soil vapor known to be contaminated?

Not applicable

4) Will workers encounter contaminated soil vapor during planned redevelopment activities?
☐ Yes ☒ No ☐ Unknown

5) In the event that contaminated soil vapor is encountered during redevelopment activities (trenches, manways, basements or other subsurface work,) list activities for management of such contact:

In the unlikely event contaminated soil vapors are encountered during the activities, the area will be evacuated and appropriate safety screening of the vapors will be performed. If results indicate further action is warranted, appropriate engineering controls (such as use of industrial fans) will be implemented.

PART 6. SUB-SLAB SOIL VAPOR – Please fill out the information below if existing buildings or foundations will be retained in the redevelopment.

1) Are sub-slab soil vapor data available for the Brownfields Property? ☐ Yes ☒ No ☐ Unknown

2) If data indicate that sub-slab soil vapor concentrations exceed screening levels, attach a map showing the location of these exceedances.

3) **At what depth(s) is sub-slab soil vapor known to be contaminated? ☐0-6 inches ☐Other, please describe**:

Click or tap here to enter text.

4) **Will workers encounter contaminated sub-slab soil vapor during planned redevelopment activities? ☐ Yes ☒ No ☐ Unknown**

5) **In the event that contaminated soil vapor is encountered during redevelopment activities, list activities for management of such contact**

In the unlikely event impacted soil vapors are encountered during the activities, worker breathing zone will be monitored using a calibrated photoionization detector. If results indicate further action is warranted, appropriate engineering controls (such as use of industrial fans) will be implemented.

PART 7. INDOOR AIR – Please fill out the information below.

1) **Are indoor air data available for the Brownfields Property? ☒ Yes ☐ No ☐ Unknown**

2) **Attach a map showing the location(s) where indoor air contaminants exceed site screening levels.**

3) **If the structures where indoor air has been documented to exceed risk-based screening levels will not be demolished as part of redevelopment activities, will workers encounter contaminated indoor air during planned redevelopment activities? ☐ Yes ☐ No ☐ Unknown**

4) **In the event that contaminated indoor air is encountered during redevelopment activities, list activities for management of such contact**:

Previous indoor samples were collected from the police station building in April 2019 for radon as a screening for radionuclides potentially associated with coal ash. The results did not indicate radon above the EPA guidance level of 4 Pico Curies per liter (pCi/l). No buildings are located or planned in the southern portion of the Brownfields property.

VAPOR INTRUSION MITIGATION SYSTEM – Please fill out the information below.

Is a vapor intrusion mitigation system (VIMS) proposed for this Brownfields Property?
☐ Yes ☒ No ☐ Unknown

If yes, ☐ VIMS Plan Attached or ☐ VIMS Plan to be submitted separately
If submitted separately provide date:

Click or tap here to enter text.

VIMS Plan shall be signed and sealed by a NC Professional Engineer

If no, please provide a brief rationale as to why no vapor mitigation plan is warranted:

VOCs are not compounds of concern at the property and previous analysis of radon did not indicate levels of concern.

CONTINGENCY PLAN – encountering unknown tanks, drums, or other waste materials

In this section please provide actions that will be taken to identify or manage unknown potential new sources of contamination. During redevelopment activities, it is not uncommon that unknown tanks, drums, fuel lines, landfills, or other waste materials are encountered. Notification to DEQ Brownfields Project Manager, UST Section, Fire Department, and/or other officials, as necessary and appropriate, is required when new potential source(s) of contamination are discovered. These Notification Requirements were outlined on Page 1 of this EMP.

Should potentially impacted materials be identified that are inconsistent with known site impacts, the DEQ Brownfields Project Manager will be notified and a sampling plan will be prepared based on the EMP requirements and site-specific factors. Samples will generally be collected to document the location of the potential impacts.

Check the following chemical analysis that are to be conducted on newly identified releases:

☒ **Volatile organic compounds (VOCs) by EPA Method 8260**

☒ **Semi-volatile organic compounds (SVOCs) by EPA Method 8270**

☒ **Metals RCRA List (8)** (arsenic, barium, cadmium, chromium, mercury, lead, selenium and silver)

EPA Methods 6020/7471

☐ **Pesticides:** Specify Analytical Method Number(s):

Click or tap here to enter text.

☐ **PCBs:** Specify Analytical Method Number(s):

Click or tap here to enter text.

☐ **Other Constituents & Analytical Method(s)** (i.e. Hexavalent Chromium, Herbicides, etc.) **Please note, if field observations indicate the need for additional analyses, they should be conducted, even if not listed here**.

Click or tap here to enter text.

Please provide details on the proposed methods of managing the following commonly encountered issues during redevelopment of Brownfields Properties.

During construction activities, contractors may encounter unknown sub-surface environmental conditions (i.e. tanks, drums, utilities, or waste materials) that, if encountered, will warrant proper management. Prior to beginning Site work, the environmental professional will attend a pre-construction kick-off meeting with the Town and the contractors to discuss the EMP and various

scenarios when it would be appropriate and necessary to notify the environmental professional of the discovery of unknown subsurface features or potentially impacted media at the Site.

In the event that such conditions are encountered during site development activities, the environmental actions noted below will be used to direct environmental actions to be taken during these activities and sampling data for potentially impacted soil and the disposition of impacted soil will be provided to DEQ when the data becomes available.

Underground Storage Tanks:

In the event a previously unidentified UST or impacts associated with a UST release are discovered at the Site during redevelopment activities, the UST and/or UST related impacts will be addressed through the Brownfields Program.

If a previously unidentified UST is encountered, the UST will be removed and transported off-Site for disposal at a suitable facility. If the UST contains residual fluids, the fluids will be sampled for VOCs, SVOCs, and RCRA metals and transported off-Site for disposal at a suitable facility based on the laboratory analytical results prior to removing the UST from the ground. If a UST is encountered that cannot be removed or does not require removal for geotechnical or construction purposes, with DEQ prior approval, it may be abandoned in-place and construction will proceed. Otherwise, the UST will be removed from ground. Impacted soil in the vicinity of the UST will be managed in accordance with the Managing On-Site Soil section outlined above in the EMP. Following UST removal, soil samples will be collected for laboratory analysis from the base and four sidewalls of the UST basin as well as every 10 ft along piping connected to the UST. The soil samples will be analyzed for VOCs by EPA Method 8260, SVOCs by EPA Method 8270, and RCRA Metals by EPA Methods 602/7471.

Sub-Grade Feature/Pit:

If a sub-grade feature or pit is encountered and does not require removal for geotechnical or construction purposes, it will be filled with soil or suitable fill and construction will proceed or it will be removed. If let in place, the bottom may be penetrated before back filling to prevent fluid accumulation. If the pit has waste in it, the waste may be set aside in a secure area and will be sampled for waste disposal purposes for TCLP VOCs, TCLP SVOCs, and TCLP metals and disposed off-Site at a permitted facility or the waste will be managed in accordance with the Managing On-Site Soil section outlined above in the EMP, whichever is most applicable based on the type of waste present. If the pit is removed and the observed waste characteristics indicate the concrete may potentially be contaminated to a significant degree, the concrete will be sampled and analyzed by methods specified by the disposal facility.

Buried Waste Material:

If excavation into buried wastes occurs, the contractor is instructed to stop work in that location and notify the environmental professional. If the buried material is typical construction and demolition type waste such as bricks, concrete, tires, metal, plastic, etc. and there is not evidence of potential asbestos containing materials (floor tile, roofing shingles, wall board, non-fiberglass

insulation, etc.), then the buried materials will be stockpiled on-site and taken to an appropriate permitted disposal facility. In this case, no pos-excavation sampling will be performed. If the potential asbestos containing materials are present, then those suspect materials will be sampled for asbestos content by a North Carolina certified asbestos inspector prior to disposal. If the buried materials contain potentially hazardous substances, then DEQ will be contacted to discuss and implement a plan for waste material sampling, waste material removal, and post-excavation soil sampling.

Re-Use of Impacted Soils On-Site:

Please refer to description outlined in the Managing On-Site Soil section of the EMP above.

If unknown, impacted soil is identified on-site, management on-site can be considered after the project team provides the necessary information, outlined in Part 1.A. Item 11, for Brownfields Project Manager approval prior to final placement on-site.

If other potential contingency plans are pertinent, please provide other details or scenarios as needed below:

Click or tap here to enter text.

POST-REDEVELOPMENT REPORTING

☒ Check this box to acknowledge that a Redevelopment Summary Report will be required for the project. If the project duration is longer than one year, an annual update is required and will be due by January 31 of each year, or 30 days after each one-year anniversary of the effective date of this EMP (as agreed upon with the Project Manager). These reports will be required for as long as physical redevelopment of the Brownfields Property continues, except that the final Redevelopment Summary Report will be submitted within 90 days after completion of redevelopment. Based on the estimated construction schedule, the first Redevelopment Summary Report is anticipated to be submitted on To Be Determined

The Redevelopment Summary Report shall include environment-related activities since the last report, with a summary and drawings, that describes:

1. actions taken on the Brownfields Property;
2. soil grading and cut and fill actions;
3. methodology(ies) employed for field screening, sampling and laboratory analysis of environmental media;
4. stockpiling, containerizing, decontaminating, treating, handling, laboratory analysis and ultimate disposition of any soil, groundwater or other materials suspected or confirmed to be contaminated with regulated substances; and
5. removal of any contaminated soil, water or other contaminated materials (for example,

concrete, demolition debris) from the Brownfields Property (copies of all legally required manifests shall be included).

☒ Check box to acknowledge consent to provide a NC licensed P.G. or P.E. sealed, Redevelopment Summary Report in compliance with the site's Brownfields Agreement.

APPROVAL SIGNATURES

Brownfields Project Number: 23022-19-068

Brownfields Project Name: Chapel Hill Police Department

Maurice Jones 10-17-19

Prospective Developer: Town of Chapel Hill **Date** Click or tap to enter a date

Printed Name/Title/Company: Mr. Maurice Jones/Town Manager/Town of Chapel Hill

10/16/2019

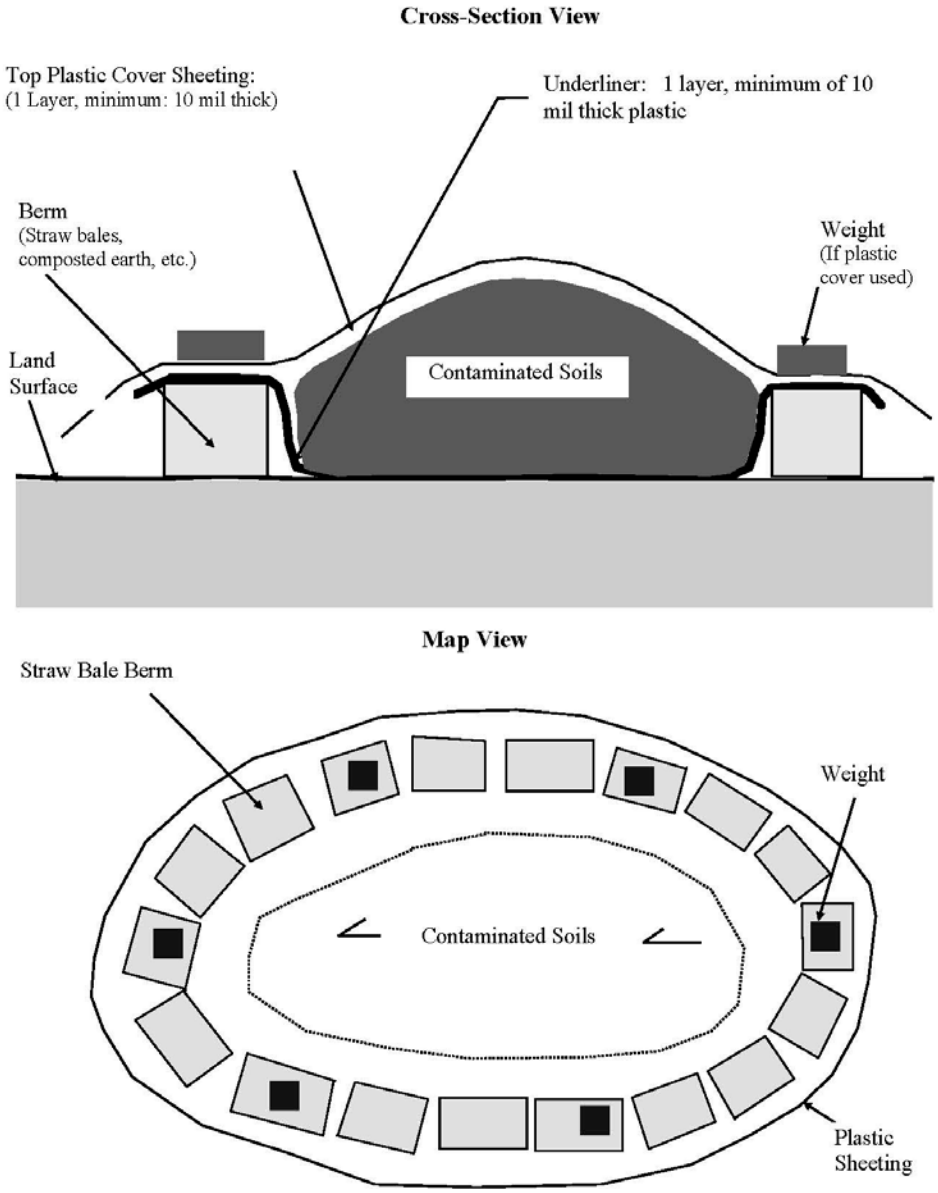
Consultant: Hart & Hickman, PC **Date** Click or tap to enter a date

Printed Name/Title/Company: Mr. Justin Ballard, P.G./Project Manager/Hart & Hickman, PC

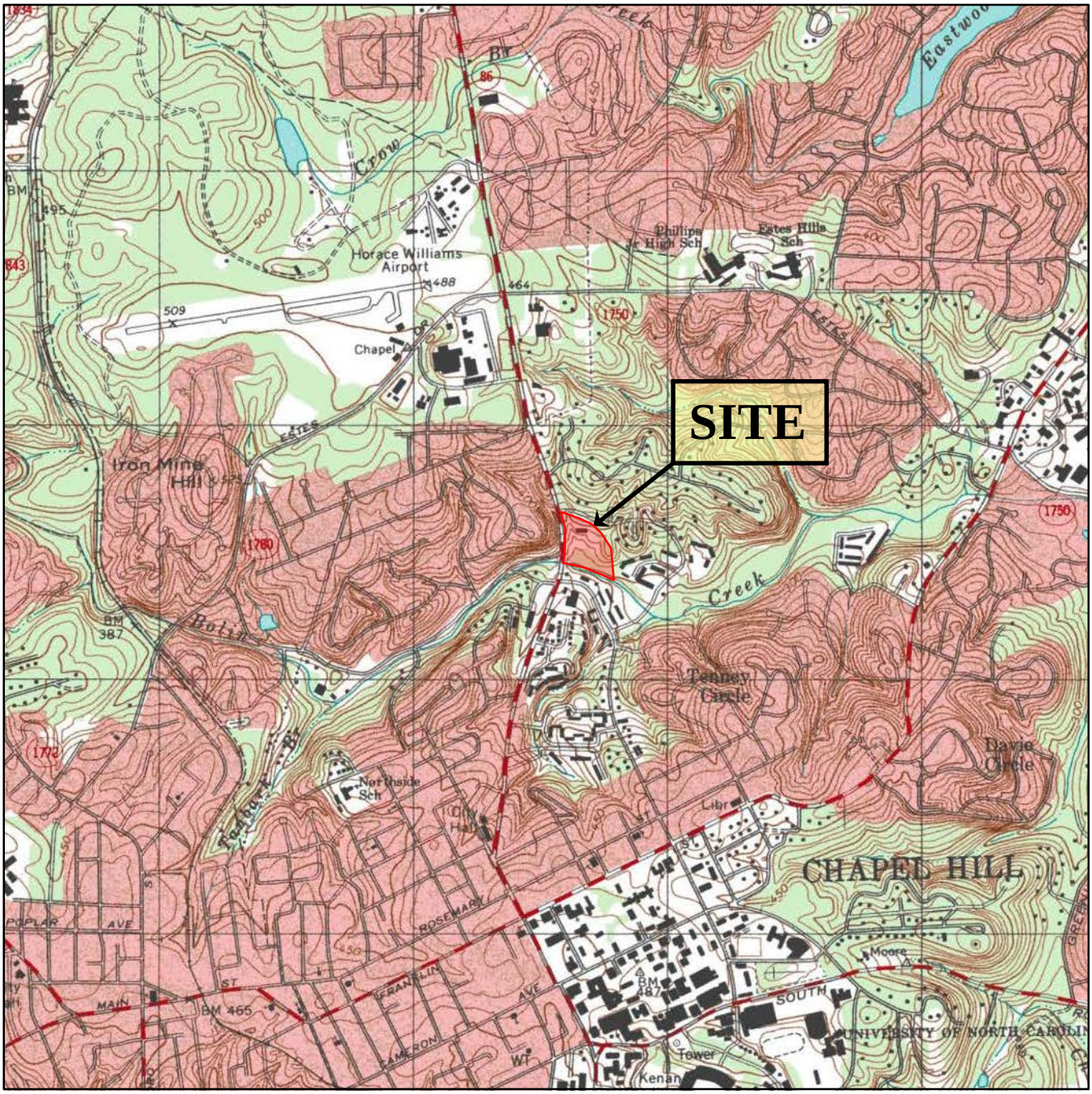
Hayley M. Irick 10/21/2019

Brownfields Project Manager: Hayley Irick **Date** Click or tap to enter a date

Figure 1
NCBP Diagram for Temporary Containment of Impacted or Potentially Impacted Soil



Note: Adapted from NC DEQ UST Section "Guidelines for Ex Situ Petroleum Contaminated Soil Remediation" dated December, 1, 2013



N

APPROXIMATE

0 2000 4000

SCALE IN FEET

U.S.G.S. QUADRANGLE MAP

CHAPEL HILL, NORTH CAROLINA, 2002

QUADRANGLE
7.5 MINUTE SERIES (TOPOGRAPHIC)

TITLE

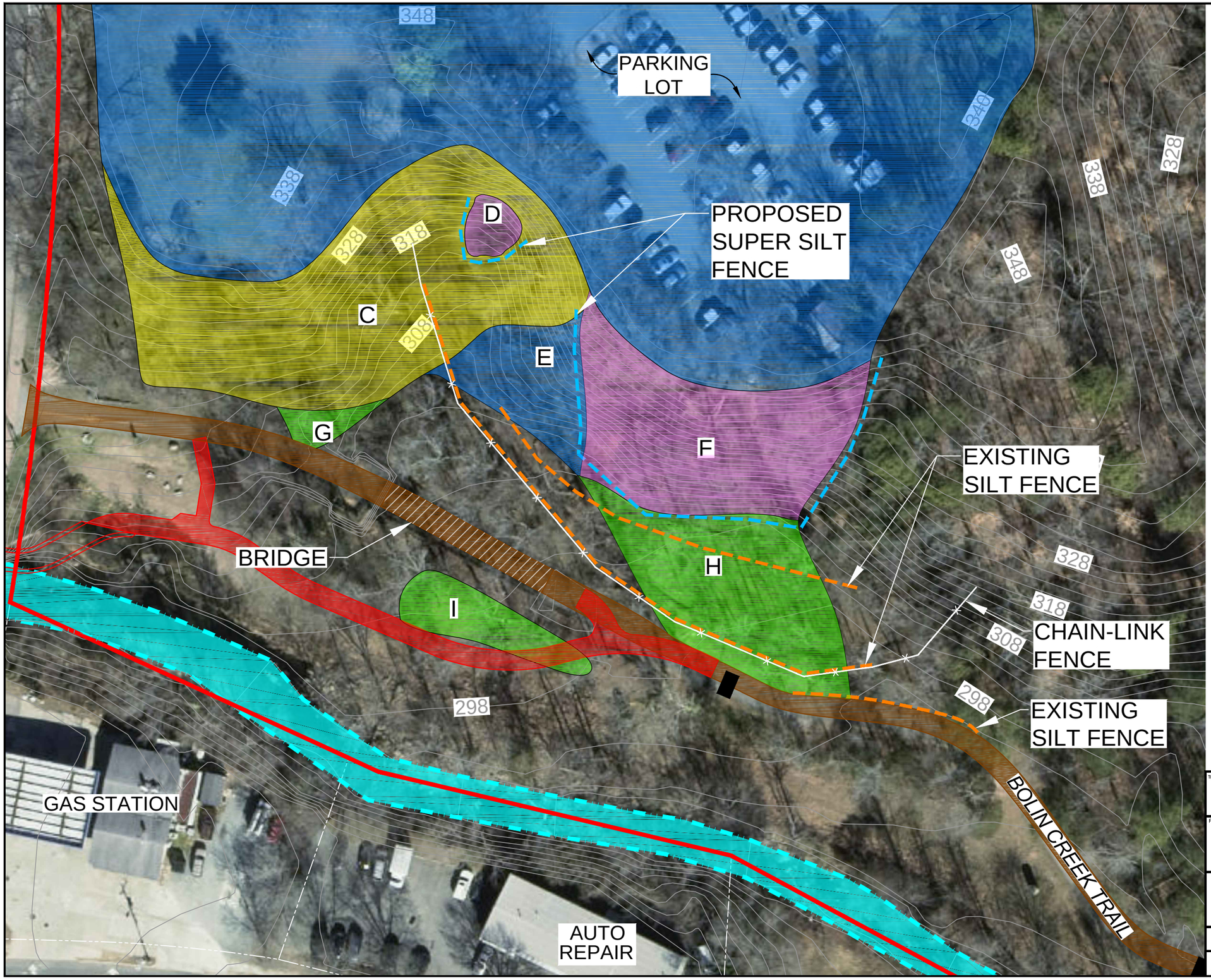
SITE LOCATION MAP

PROJECT

TOWN OF CHAPEL HILL
828 MARTIN LUTHER KING JR. BOULEVARD
CHAPEL HILL, NORTH CAROLINA

hart hickman
SMARTER ENVIRONMENTAL SOLUTIONS
2923 South Tryon Street-Suite 100
Charlotte, North Carolina 28203
704-586-0007 (p) 704-586-0373 (f)

DATE:	10-7-19	REVISION NO:	0
JOB NO:	TCH-009	FIGURE:	2



LEGEND

- SITE PROPERTY BOUNDARY
- BOLIN CREEK
- 101 TOPOGRAPHIC CONTOUR ELEVATION (FT MSL)
- FENCE LINE (APPROXIMATE LOCATION)
- EXISTING SILT FENCE (APPROXIMATE LOCATION)
- PROPOSED SUPER SILT FENCE (APPROXIMATE LOCATION)
- CCP UNDER > 2 FT COVER
- CCP UNDER < 2 FT COVER
- CCP EXPOSED AT GROUND SURFACE
- CCP DEPOSITIONAL LAYER
- STORMWATER CULVERT
- PROPOSED TRAIL

N

APPROXIMATE
0 50 100
SCALE IN FEET

TITLE
SITE MAP - PROPOSED INTERIM REMEDIAL MEASURES

PROJECT
TOWN OF CHAPEL HILL
828 MARTIN LUTHER KING JR. BOULEVARD
CHAPEL HILL, NORTH CAROLINA

hart hickman
SMARTER ENVIRONMENTAL SOLUTIONS
2923 South Tryon Street-Suite 100
Charlotte, North Carolina 28203
704-586-0007(p) 704-586-0373(f)
License # C-1269 / #C-245 Geology

DATE: 5-22-19	REVISION NO. 0
JOB NO. TCH-002	FIGURE NO. 3

LEGEND

- SITE PROPERTY BOUNDARY
- BOLIN CREEK
- 101 TOPOGRAPHIC CONTOUR ELEVATION (FT MSL)
- MONITORING WELL LOCATION (FALCON ENGINEERING)
- TEMPORARY MONITORING WELL LOCATION (FALCON ENGINEERING)
- SOIL BORING LOCATION (FALCON ENGINEERING)
- SURFACE WATER SAMPLE LOCATION (FALCON ENGINEERING)
- ABANDONED MONITORING WELL LOCATION
- MONITORING WELL LOCATION (H&H)
- SOIL BORING LOCATION (H&H)
- BACKGROUND SOIL BORING LOCATION (H&H)
- SURFACE WATER/SEDIMENT SAMPLE LOCATION (H&H)
- DRAINAGE PATHWAY SOIL SAMPLE LOCATION (H&H)
- DRAINAGE PATHWAY SURFACE WATER SAMPLE LOCATION (H&H)
- COVER EVALUATION BORING LOCATION
- CCP UNDER > 2 FT COVER
- CCP UNDER < 2 FT COVER
- CCP EXPOSED AT GROUND SURFACE
- CCP DEPOSITIONAL LAYER
- STORMWATER CULVERT
- EXISTING SILT FENCE (APPROXIMATE LOCATION)
- PROPOSED SUPER SILT FENCE (APPROXIMATE LOCATION)
- PROPOSED TRAIL

NOTES:

1. EXISTING MONITORING WELLS & OCTOBER/ NOVEMBER 2016 SAMPLING LOCATIONS SURVEYED BY CE GROUP ON DECEMBER 8, 9, & 20, 2016.

N

APPROXIMATE
0 115 230
SCALE IN FEET

TITLE

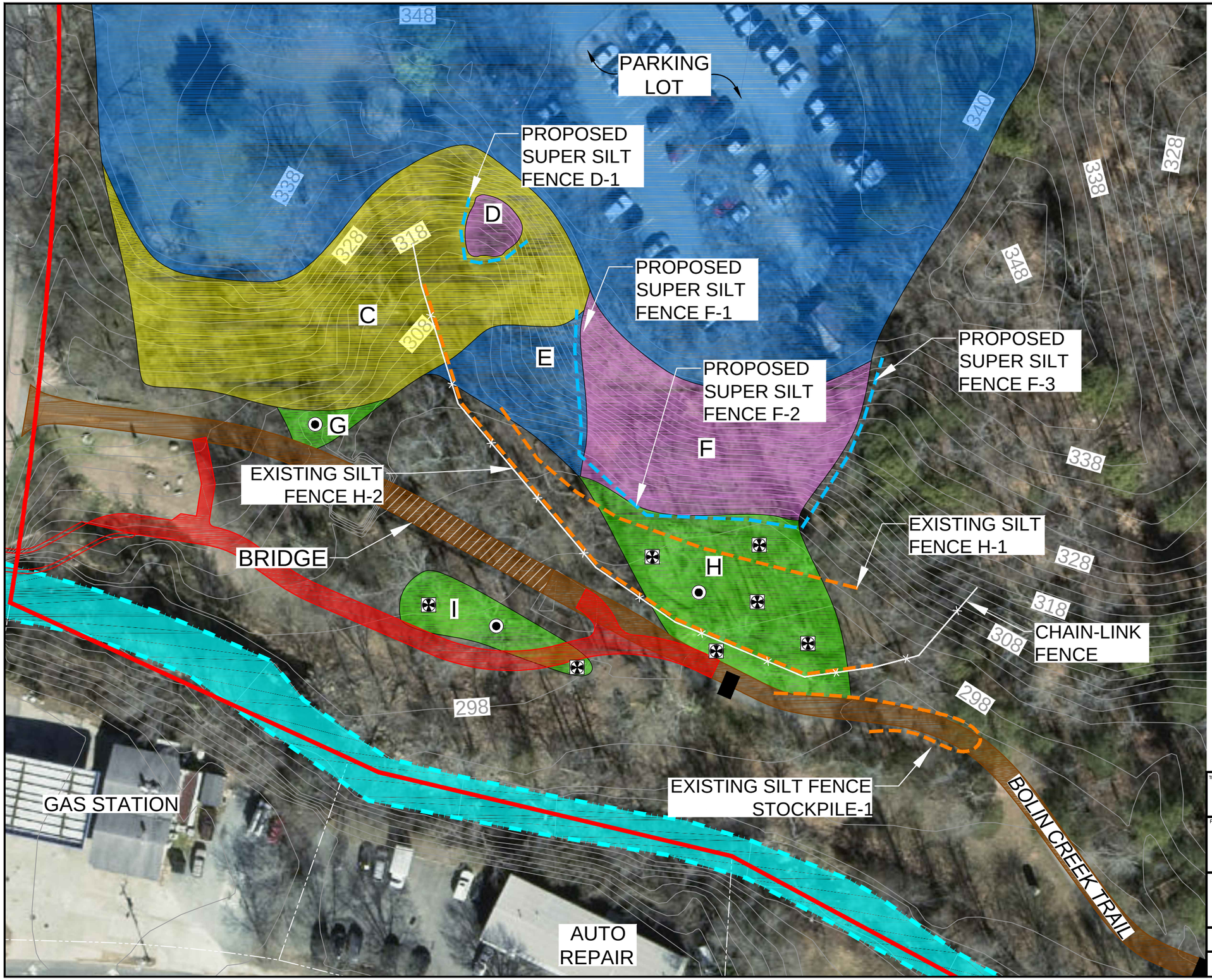
SAMPLE LOCATION MAP

PROJECT

TOWN OF CHAPEL HILL
828 MARTIN LUTHER KING JR. BOULEVARD
CHAPEL HILL, NORTH CAROLINA

hart hickman
SMARTER ENVIRONMENTAL SOLUTIONS
2923 South Tryon Street-Suite 100
Charlotte, North Carolina 28203
704-586-0007(p) 704-586-0373(f)
License # C-1269 / #C-245 Geology

DATE: 10-7-19	REVISION NO. 0
JOB NO. TCH-009	FIGURE NO. 4



LEGEND

- SITE PROPERTY BOUNDARY
- BOLIN CREEK
- 101 — TOPOGRAPHIC CONTOUR ELEVATION (FT MSL)
- FENCE LINE (APPROXIMATE LOCATION)
- EXISTING SILT FENCE (APPROXIMATE LOCATION)
- PROPOSED SUPER SILT FENCE (APPROXIMATE LOCATION)
- CCP UNDER > 2 FT COVER
- CCP UNDER < 2 FT COVER
- CCP EXPOSED AT GROUND SURFACE
- CCP DEPOSITIONAL LAYER
- STORMWATER CULVERT
- PROPOSED TRAIL
- SAMPLE FOR METALS ANALYSIS
- SAMPLE FOR METALS, VOC, AND SVOC ANALYSIS

N

APPROXIMATE
0 50 100
SCALE IN FEET

TITLE
POST INTERIM REMEDIAL MEASURES
SOIL SAMPLE LOCATIONS

PROJECT
TOWN OF CHAPEL HILL
828 MARTIN LUTHER KING JR. BOULEVARD
CHAPEL HILL, NORTH CAROLINA

hart hickman
SMARTER ENVIRONMENTAL SOLUTIONS
2923 South Tryon Street-Suite 100
Charlotte, North Carolina 28203
704-586-0007(p) 704-586-0373(f)
License # C-1269 / #C-245 Geology

DATE: 10-15-19	REVISION NO. 0
JOB NO. TCH-002	FIGURE NO. 5

Table 1 (page 1 of 2)
Summary of Soil Analytical Data
828 Martin Luther King, Jr. Blvd.
Chapel Hill, North Carolina
H&H Job No. TCH-009

Sample ID	Sample Date	Material Sampled (Soil or CCP)	Sample Depth	aluminum	antimony	arsenic	barium	beryllium	boron	cadmium	calcium	hexavalent chromium	trivalent chromium	total chromium	cobalt	copper	iron	lead	magnesium	manganese	mercury	molybdenum	nickel	potassium	selenium	silver	sodium	strontium	thallium	vanadium	zinc
S-4	4/29/2013	CCP	1 ft	23,000	ND	**14**	24	ND	NA	1.5	9,900	NA	NA	22	30	65	59,000	20	9,000	**1,500**	0.011	NA	43	680	ND	ND	150	NA	ND	21	120
S-5	1/31/2014	CCP	0-4 ft	NA	NA	**37**	**2,800**	NA	NA	ND	NA	1.3	19.7	21	NA	NA	NA	10	NA	NA	0.30	NA	NA	NA	**3.2**	ND	NA	NA	NA	NA	NA
S-6	1/31/2014	CCP	0-4 ft	NA	NA	**43**	**3,200**	NA	NA	ND	NA	2.7	19.3	22	NA	NA	NA	12	NA	NA	0.42	NA	NA	NA	**6.1**	ND	NA	NA	NA	NA	NA
S-7	1/31/2014	CCP	0-4 ft	NA	NA	**44**	**2,500**	NA	NA	ND	NA	1.4	27.6	29	NA	NA	NA	11	NA	NA	0.44	NA	NA	NA	**4.5**	ND	NA	NA	NA	NA	NA
GP-1	2/3/2014	CCP	8-12 ft	NA	NA	3.6	86	NA	NA	ND	NA	ND	8.8	8.8	NA	NA	NA	26	NA	NA	0.083	NA	NA	NA	ND	ND	NA	NA	NA	NA	NA
GP-2	2/3/2014	CCP	26-28 ft	NA	NA	**41**	**1,100**	NA	NA	ND	NA	ND	19	19	NA	NA	NA	11	NA	NA	0.24	NA	NA	NA	**4.0**	ND	NA	NA	NA	NA	NA
GP-3	2/3/2014	CCP	10-12 ft	NA	NA	**48**	**1,200**	NA	NA	ND	NA	0.53	22.47	23	NA	NA	NA	39	NA	NA	0.42	NA	NA	NA	ND	ND	NA	NA	NA	NA	NA
GP-4	2/4/2014	CCP	10-12 ft	NA	NA	**59**	**2,900**	NA	NA	ND	NA	ND	20	20	NA	NA	NA	11	NA	NA	0.51	NA	NA	NA	**5.8**	ND	NA	NA	NA	NA	NA
GP-5	2/4/2014	CCP	4-6 ft	NA	NA	**72**	**2,800**	NA	NA	ND	NA	ND	19	19	NA	NA	NA	9.5	NA	NA	0.33	NA	NA	NA	**2.6**	ND	NA	NA	NA	NA	NA
	4/3/2019	CCP	4-6 ft	NA	NA	**95.9**	**2,350**	5.46	NA	<0.956	NA	0.836 J	12.3	13.1	7.05	50.9	NA	NA	NA	34.7	**1.2**	NA	11.1	NA	**12.0**	NA	NA	325	NA	NA	NA
	4/3/2019[3]	CCP	4-6 ft	NA	NA	**95.9**	**2,630**	6.99	NA	<0.931	NA	0.712 J	16.2	16.9	10.3	62.5	NA	NA	NA	53.4	0.39	NA	17.1	NA	**13.0**	NA	NA	308	NA	NA	NA
GP-6	2/4/2014	CCP	9-11 ft	NA	NA	**65**	**850**	NA	NA	ND	NA	ND	19	19	NA	NA	NA	**27**	NA	NA	**11**	NA	NA	NA	**4.1**	ND	NA	NA	NA	NA	NA
	4/4/2019	CCP	9-10 ft	NA	NA	**6.73**	178	0.758	NA	0.118 J	NA	<1.11	10.0	10.0	5.18	11.0	NA	NA	NA	687	0.050	NA	6.24	NA	0.880	NA	NA	21.7	NA	NA	NA
GP-7	2/4/2014	CCP	10-12 ft	NA	NA	**55**	**1,700**	NA	NA	ND	NA	ND	19	19	NA	NA	NA	11	NA	NA	0.26	NA	NA	NA	**4.3**	ND	NA	NA	NA	NA	NA
GP-8	2/4/2014	CCP	11-15 ft	NA	NA	**54**	**4,100**	NA	NA	ND	NA	ND	20	20	NA	NA	NA	9.2	NA	NA	0.29	NA	NA	NA	**4.5**	ND	NA	NA	NA	NA	NA
GP-11	2/4/2014	CCP	4-6 ft	NA	NA	**16**	450	NA	NA	ND	NA	ND	16	16	NA	NA	NA	23	NA	NA	0.35	NA	NA	NA	ND	ND	NA	NA	NA	NA	NA
GP-12	2/4/2014	CCP	2-4 ft	NA	NA	**52**	**2,000**	NA	NA	ND	NA	ND	19	19	NA	NA	NA	14	NA	NA	0.28	NA	NA	NA	2.1	ND	NA	NA	NA	NA	NA
SS1	2/18/2016	Soil/CCP	2-12 in	NA	ND	**6.7**	210	1.2	ND	ND	NA	NA	NA	28	25	47	NA	22	NA	**2,400**	0.052	ND	15	NA	ND	ND	NA	120	1.3	88	100
SS1-Dup [1]	2/18/2016	Soil/CCP	2-12 in	NA	ND	**8.5**	260	1.4	ND	ND	NA	NA	NA	31	28	56	NA	29	NA	**3,300**	0.059	ND	18	NA	ND	ND	NA	150	1.7	95	110
SS2	2/18/2016	Soil/CCP	2-12 in	NA	ND	**24**	**830**	3.5	ND	ND	NA	NA	NA	27	20	57	NA	39	NA	**1,700**	0.21	1.7	19	NA	**2.4**	ND	NA	190	1.2	81	110
SS-3/SS-3A	8/27/2019	Soil	0-2 in	NA	NA	**23.4**	**1,080**	2.68	NA	0.226 J	NA	<1.51	18.4	18.4	9.99	37.9	NA	NA	NA	463	0.19	NA	13.6	NA	**3.79**	NA	NA	NA	NA	NA	NA
	2/18/2016	Soil	2-12 in	NA	ND	4.5	100	0.80	ND	ND	NA	NA	NA	13	6.8	22	NA	14	NA	240	0.048	ND	5.3	NA	ND	ND	NA	36	ND	41	28
SS4	2/18/2016	Soil	2-12 in	NA	ND	**8.5**	380	1.2	ND	ND	NA	NA	NA	22	12	29	NA	25	NA	910	0.061	ND	12	NA	ND	ND	NA	51	ND	54	51
SS5	2/18/2016	Soil	2-12 in	NA	ND	4.8	130	0.89	ND	ND	NA	NA	NA	17	9.4	25	NA	27	NA	460	0.091	ND	7.9	NA	ND	ND	NA	43	ND	47	48
SS6	2/18/2016	Soil	2-12 in	NA	ND	3.1	82	0.70	ND	ND	NA	NA	NA	35	7.6	23	NA	17	NA	410	0.038	ND	6.5	NA	ND	ND	NA	25	ND	45	43
SS7	2/18/2016	Soil	2-12 in	NA	ND	3.1	84	0.60	ND	ND	NA	NA	NA	14	6.9	15	NA	13	NA	500	0.038	ND	5.9	NA	ND	ND	NA	31	ND	37	37
HH-1	11/3/2016	Soil	0-1 ft	NA	<0.29	**5.9**	120	1.00	NA	<0.29	NA	0.45	20.55	21	7.9	25	NA	27	NA	350	0.052	NA	8.8	NA	0.69	NA	NA	31	<0.58	48	50
	11/3/2016[1]	Soil	0-1 ft	NA	<0.35	3.4	110	0.79	NA	<0.35	NA	0.54	19.46	20	8.4	17	NA	18	NA	360 BH	0.067	NA	12	NA	<0.71	NA	NA	30	<0.71	41	35
HH-2	11/3/2016	Soil	0-1 ft	NA	<0.29	4.9	140	0.93	NA	<0.29	NA	0.43	13.57	14	12	21	NA	30	NA	260	0.085	NA	5.9	NA	1.0	NA	NA	25	<0.58	48	43
HH-3	11/3/2016	Soil	0-1 ft	NA	<0.33	**9.9**	200	1.30	NA	<0.33	NA	0.46 J	17.54	18	7.8	31	NA	24	NA	350	0.076	NA	8.9	NA	**2.4**	NA	NA	36	<0.65	53	100
HH-4	11/3/2016	Soil	0-1 ft	NA	<0.28	2.4	72	1.00	NA	<0.28	NA	0.50	44.5	45	16	37	NA	2.3	NA	630	<0.023	NA	33	NA	<0.56	NA	NA	42	0.60	73	70
HH-5	11/3/2016	Soil	0-1 ft	NA	<0.30	2.4	73	0.75	NA	<0.30	NA	<0.14	23	23	8.4	19	NA	9.3	NA	410	<0.025	NA	14	NA	1.2	NA	NA	23	<0.60	39	51
HH-6	10/27/2016	Soil	0-1 ft	NA	NA	NA	NA	NA	NA	NA	NA	<0.33	20	20	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
HH-7	10/27/2016	Soil	0-1 ft	NA	NA	NA	NA	NA	NA	NA	NA	<0.61	22	22	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
HH-8	10/27/2016	Soil	0-1 ft	NA	<0.30	3.6	100	1.00	NA	<0.30	NA	<0.35	19	19	12	29	NA	18	NA	570	0.036	NA	9.0	NA	<0.60	NA	NA	28	<0.60	52	54
HH-9	4/3/2019	CCP	0-1 ft	NA	NA	3.37	131	0.398 J	NA	0.178 J	NA	<1.29	12.7	12.7	5.97	14.5	NA	NA	NA	260	0.31	NA	3.59	NA	0.722	NA	NA	33.2	NA	NA	NA
HH-10	4/3/2019	CCP	0-1 ft	NA	NA	**60.3**	**2,970**	5.14	NA	0.162 J	NA	<1.60	13.8	13.8	9.84	51.3	NA	NA	NA	73.3	0.22	NA	17.1	NA	5.04	NA	NA	269	NA	NA	NA
HH-11	4/3/2019	CCP	0-1 ft	NA	NA	**42.5**	**3,260**	5.90	NA	0.220 J	NA	0.467 J	18.7	19.2	13.4	55.3	NA	NA	NA	113	0.43	NA	23.5	NA	9.05	NA	NA	234	NA	NA	NA
MW-6	11/2/2016	Soil	0-1 ft	NA	<0.26	2.9	38	0.61	NA	<0.26	NA	0.21 J	9.79	10	9.5	23	NA	12	NA	570	0.082	NA	8.2	NA	1.0	NA	NA	22	0.81	31	77
MW-7	11/1/2016	Soil	0-1 ft	NA	<0.30	2.6	67	0.87	NA	<0.30	NA	0.89	9.11	10	3.9	180	NA	7.6	NA	100	0.030	NA	2.9	NA	<0.59	NA	NA	6.7	<0.59	61	46
SED-3A	4/5/2019	Soil	0-1 ft	NA	NA	3.45	33.9	0.418 J	NA	<0.582	NA	<1.16	17.4	17.4	16.5	6.97	NA	NA	NA	560	<0.0054	NA	5.82	NA	0.237 J	NA	NA	9.6	NA	NA	NA
SED-5A	4/4/2019	Soil	0-1 ft	NA	NA	1.25	13.5	0.156 J	NA	<0.571	NA	0.352 J	13.2	13.6	5.95	39.1	NA	NA	NA	243	0.0071	NA	4.38	NA	<0.571	NA	NA	10.9	NA	NA	NA
SED-8	4/5/2019	Drainage Pathway Soil	2-6 in	NA	NA	2.41	49.1	0.313 J	NA	0.122 J	NA	<1.25	12.0	12.0	7.01	14.3	NA	NA	NA	423	0.063	NA	4.66	NA	1.01	NA	NA	15.2	NA	NA	NA
SED-9	4/5/2019	Drainage Pathway Soil	2-6 in	NA	NA	1.16	33.8	0.199 J	NA	<0.660	NA	0.461 J	21.6	22.1	9.11	10.1	NA	NA	NA	431	0.013	NA	6.68	NA	<0.660	NA	NA	16.7	NA	NA	NA
SED-10	4/5/2019	Drainage Pathway Soil	2-6 in	NA	NA	1.29	24.4	0.118 J	NA	0.221 J	NA	0.418 J	12.0	12.4	4.43	10.8	NA	NA	NA	195	0.037	NA	4.03	NA	0.273 J	NA	NA	8.1	NA	NA	NA
SED-11	8/27/2019	Drainage Pathway Soil/CCP	0-2 in	NA	NA	**5.08**	317	1.19	NA	0.235 J	NA	<1.73	13.3	13.3	7.82	21.6	NA	NA	NA	351	0.030	NA	10.8	NA	1.71	NA	NA	NA	NA	NA	NA
	4/5/2019	Drainage Pathway Soil/CCP	2-6 in	NA	NA	**5.98**	285	0.768	NA	<0.753	NA	<1.51	9.72	9.72 B	6.61	15.1	NA	NA	NA	288	0.14	NA	7.03	NA	2.03	NA	NA	65.0	NA	NA	NA
SED-12	8/27/2019	Drainage Pathway Soil	0-2 in	NA	NA	**4.73**	102	0.765 J	NA	0.214 J	NA	<1.68	27.6	27.6	6.17	23.1	NA	NA	NA	341	0.042	NA	7.69	NA	0.961	NA	NA	NA	NA	NA	NA
	4/5/2019	Drainage Pathway Soil	2-6 in	NA	NA	3.97	122	0.499 J	NA	0.204 J	NA	<1.74	9.45	9.45 B	6.04	19.7	NA	NA	NA	319	0.077	NA	4.95	NA	1.36	NA	NA	32.8	NA	NA	NA
SED-13	8/27/2019	Drainage Pathway Soil	0-2 in	NA	NA	**12.4**	**958**	1.56	NA	0.284 J	NA	<2.03	29.4	29.4	13.9	38.9	NA	NA	NA	538	0.12	NA	19.2	NA	**3.07**	NA	NA	NA	NA	NA	NA
	4/5/2019	Drainage Pathway Soil	2-6 in	NA	NA	**14.5**	**724**	1.10	NA	0.171 J	NA	<1.58	14.0	14.0	7.58	27.1	NA	NA	NA	563	0.075	NA	8.73	NA	1.69	NA	NA	70.5	NA	NA	NA
SED-14	4/5/2019	Drainage Pathway Soil	2-6 in	NA	NA	1.86	18.9	0.152 J	NA	<0.611	NA	0.506 J	17.2	17.7	5.07	8.00	NA	NA	NA	231	0.012	NA	3.19	NA	<0.611	NA	NA	17.3	NA	NA	NA
SED-15	8/27/2019	Drainage Pathway Soil	0-2 in	NA	NA	3.89	251	0.759 J	NA	0.328 J	NA	0.458 J	18.7	19.2	9.08	24.0	NA	NA	NA	549	0.035	NA	9.64	NA	1.46	NA	NA	NA	NA	NA	NA
	4/5/2019	Drainage Pathway Soil	2-6 in	NA	NA	**5.33**	98.1	0.641 J	NA	<0.748	NA	<1.49	15.2	15.2	8.84	19.4	NA	NA	NA	550	0.030	NA	8.24	NA	**2.36**	NA	NA	39.5	NA	NA	NA
SED-16	8/27/2019	Drainage Pathway Soil/CCP	0-2 in	NA	NA	**21.0**	**739**	2.96	NA	0.414 J	NA	<1.60	23.4	23.4	17.8	50.9	NA	NA	Na	**1,250**	0.11	NA	18.3	NA	**5.05**	NA	NA	NA	NA	NA	NA
	4/5/2019	Drainage Pathway Soil/CCP	2-6 in	NA	NA	**28.3**	**758**	2.86	NA	0.238 J	NA	<2.03	22.8	22.8	13.7	48.8	NA	NA	NA	513	0.22	NA	17.7	NA	**5.42**	NA	NA	165	NA	NA	NA
SED-17	8/27/2019	Drainage Pathway Soil/CCP	0-2 in	NA	NA	**33.8**	**1,420**	4.18	NA	0.336 J	NA	<1.95	17.3	17.3	10.3	53.1	NA	NA	NA	296	0.24	NA	16.2	NA	**6.84**	NA	NA	NA	NA	NA	NA
	4/5/2019	Drainage Pathway Soil/CCP	2-6 in	NA	NA	**15.3**	565	1.98	NA	0.280 J	NA	<2.01	20.7	20.7	13.7	36.3	NA	NA	NA	452	0.14	NA	14.8	NA	**3.68**	NA	NA	179	NA	NA	NA
SED-18	4/5/2019	Drainage Pathway Soil	2-6 in	NA	NA	4.53	137	0.534 J	NA	<0.689	NA	<1.38	18.7	18.7	11.1	28.2	NA	NA	NA	464	0.051	NA	9.00	NA	1.85	NA	NA	32.6	NA	NA	NA
SED-19	4/5/2019	Drainage Pathway Soil	2-6 in	NA	NA	1.55	20.0	0.161 J	NA	<0.588	NA	0.435 J	21.7	22.1	7.98	8.38	NA	NA	NA	266	0.0073	NA	4.94	NA	0.334 J	NA	NA	15.0	NA	NA	NA
SED-20	4/5/2019	Drainage Pathway Soil	2-6 in	NA	NA	0.792	31.4	0.152 J	NA	<0.687	NA	<1.37	5.76	5.76 B	4.50	9.10	NA	NA	NA	360	0.012	NA	2.19	NA	0.263 J	NA	NA	11.5	NA	NA	NA
SED-21	4/5/2019	Drainage Pathway Soil	2-6 in	NA	NA	1.12	25.9	0.149 J	NA	<0.591	NA	<1.18	20.9	20.9	4.44	6.58	NA	NA	NA	221	0.011	NA	2.70	NA	0.286 J	NA	NA	12.8	NA	NA	NA
MW-5 (background)	11/2/2016	Soil	0-1 ft	NA	<0.30	2.1	76	0.99	NA	<0.30	NA	0.43 J	17.57	18	27	49	NA	4.0	NA	710	<0.023	NA	5.0	NA	<0.59	NA	NA	25	<0.59	190	47
	11/2/2016	Soil	6-7 ft	NA	<0.27	1.4	61	0.60	NA	<0.27	NA	0.81	38.19	39	19	18	NA	0.55	NA	940	<0.020	NA	20	NA	<0.53	NA	NA	29	2.3	67	75
BG-1 (background)	11/3/2016	Soil	0-1 ft	NA	<0.28	1.9	36	0.39	NA	<0.28	NA	0.87	17.13	18	6.3	16	NA	25	NA	310	0.033	NA	5.4	NA	1.6	NA	NA	15	<0.57	34	43
	11/3/2016	Soil	2-3 ft	NA	<0.29	2.3	45	0.48	NA	<0.29	NA	<0.12	19	19	7.3	18	NA	43	NA	440	0.280	NA	6.2	NA	1.6	NA	NA	15	<0.57	35	49
BG-2 (background)	11/3/2016	Soil	0-1 ft	NA	<0.28	1.9	45	0.50	NA	<0.28	NA	0.84	16.16	17	7.4	18	NA	32	NA	410	0.045	NA	4.9	NA	1.1	NA	NA	14	<0.56	35	44
	11/3/2016	Soil	2-3 ft	NA	<0.27	1.9	52	0.53	NA	<0.27	NA	0.70	23.3	24	7.5	20	NA	26	NA	450	0.038	NA	7.9	NA	1.7	NA	NA	19	<0.55	37	45
BG-3 (background)	11/3/2016	Soil	0-1 ft	NA	<0.30	1.7	44	0.43	NA	<0.30	NA	0.21 J	23.3	16	7.5	15	NA	25	NA	410	0.024	NA	5.1	NA	1.4	NA	NA	46	<0.60	37	40
	11/3/2016	Soil	2-3 ft	NA	<0.27	2.2	56	0.54	NA	<0.27	NA	0.88	21.12	22	7.5	18	NA	29	NA	410	0.040	NA	5.2	NA	1.2	NA	NA	19	<0.53	40	46
BG-4 (background)	11/3/2016	Soil	0-1 ft	NA	<0.29	1.7	50	0.50	NA	<0.29	NA	<0.13	19	19	9.5	16	NA	22	NA	450 BH	0.026	NA	6.0	NA	<0.59	NA	NA	16 A	<0.59	53	50
	11/3/2016	Soil	2-3 ft	NA	<0.33	2.0	53	0.52	NA	0.38	NA	0.50 J	22.5	23	11	23	NA	21	NA	460 BH	0.054	NA	8.5	NA	<0.65	NA	NA	19	<0.65	51	230
BG-6 (background)	4/3/2019	Soil	0-1 ft	NA	NA	2.05 O1	64.4	0.625	NA	0.177 J	NA	5.34	39.4	44.7	14.4	26.4	NA	NA	NA	448 J6	0.022	NA	12.8	NA	0.562 J	NA	NA	17.0	NA	NA	NA
	4/4/2019	Soil	2-3 ft	NA	NA	2.29	66.3	0.507 J	NA	0.139 J	NA	<1.19	22.9	22.9	14.7	32.3	NA	NA	NA	467	0.032	NA	7.78	NA	0.828	NA	NA	16.8	NA	NA	NA
BG-7 (background)	4/3/2019	Soil	0-1 ft	NA	NA	1.97	52.7	0.410 J	NA	0.136 J	NA	<1.16	70.2	70.2	18.9	36.4	NA	NA	NA	813	0.025	NA	12.8	NA	0.543 J	NA	NA	22.6	NA	NA	NA
	4/4/2019	Soil	2-3 ft	NA	NA	3.08	77.9	0.430 J	NA	0.108 J	NA	<1.16	27.0	27.0	16.3	32.5	NA	NA	NA	548	0.023	NA	6.20	NA	0.502 J	NA	NA	24.3	NA	NA	NA
BG-8 (background)	4/3/2019	Soil	0-1 ft	NA	NA	1.80	52.4	0.370 J	NA	0.0951 J	NA	<1.14	24.5	24.5	21.8	62.8	NA	NA	NA	759	0.0072	NA	9.04	NA	0.485 J	NA	NA	24.4	NA	NA	NA
	4/4/2019	Soil	2-3 ft	NA	NA	1.66	47.6	0.293 J	NA	0.0918 J	NA	<1.14	21.7	21.7	23.5	60.2	NA	NA	NA	732	<0.0067	NA	7.86	NA	0.306 J	NA	NA	25.1	NA	NA	NA
Site Specific Background Range					<0.27-<0.33	1.4-3.08	36-77.9	0.293 J-0.99		<0.27-0.38		<0.12-5.34	16.16-70.2	16-70.2	6.3-27	15-62.8		0.55-43		310-940	<0.0067-0.280		4.9-20		<0.59-1.7			14-46	<0.53-2.3	34-190	40-230
CL of Site Specific Background Range[2]						2.1	58	0.58		0.18		2.19	28	25	15	27		30		591	0.114		10		1.2			29		84	147
orth Carolina Background Range				7000 - >100,000	<1.0-8.8	1-18	50-1,000	ND-1.0	ND-100	1.0-10	100-280,000*	NS	NS	7-300	ND-50	2.0-20	100 - >100,000*	ND-50	50-50,000*	<2.0-7000*	0.03-0.52	<3-15*	ND	50-37,000*	<0.1-0.8	ND-5.0	<500-50,000*	ND-300	NS	15-300	11-59
SRG - Protection of Groundwater				110,000	0.90	5.8	580	63	45	3.0	NS	3.8	360,000	3.8	0.90	700	150	270	NS	65	1.0	7.1	130	NS	2.1	3.4	NS	1,500	0.28	350	1,200
PSRG - Residential Health-basec				16,000	6.3	0.68	3,100	31	3,100	14	NS	0.31	23,000	0.31	4.7	630	11,000	400	NS	2,200	2.3	78	310	NS	78	78	NS	9,400	0.16	78	4,700
- Industrial/Commercial Health-basec				230,000	93	3.0	47,000	470	47,000	200	NS	6.5	350,000	6.5	70	9,300	160,000	800	NS	32,000	9.7	1,200	4,700	NS	1,200	1,200	NS	140,000	2.3	1,200	70,000

Table 1 (page 2 of 2)
Summary of Soil Analytical Data
828 Martin Luther King, Jr. Blvd.
Chapel Hill, North Carolina
H&H Job No. TCH-009

Notes:
Yellow highlighting indicates samples collected as part of April 2019 data gap sampling
Orange highlighting indicates samples collected as part of August 2019 0-2 inch drainage pathway sampling
Soil concentrations are reported in milligrams per kilogram (mg/kg).
PSRG = North Carolina Department of Environmental Quality (DEQ) Preliminary Soil Remediation Goals (PSRGs) (May 2019); UCL = Upper Confidence Limit
95% UCL of site specific background ranges were calculated using EPA ProUCL 5.1
North Carolina Soil Background Range taken from *Elements in North American Soils, 2nd Edition* by James Dragun and Khaled Chekiri
*Not available for North Carolina. Used Eastern US Background Range
Bold denotes concentration above protection of groundwater PSRG and significantly above backgrou
Shading indicates concentration above residential PSRG and significantly above background.
Underlining indicates concentration above industrial PSRG and significantly above backgrour
ND = Not Detected; NA = Not Analyzed; NS = Not Specified; -- = statistical test not applicable to data set
J = Detected above method detection limit but below laboratory reporting limit; therefore, result is an estimated concentration
O1 = Analyte failed the method required serial dilution test and/or subsequent post-spike criteria. These failures indicate matrix interference.
J6 = The sample matrix interfered with the ability to make any accurate determination; spike value is low.
BH = Method blank greater than one-half laboratory reporting limit, but sample concentration greater than 10x the method blank.
A = Continuing Calibration Verification standard recovery (82%) is less than the lower control limit (90%). Result has possible low bias.
[1] denotes duplicate sample taken
[2] 95% UCL of Site Specific Background Values were calculated using values from samples collected through the Phase II RI
Analytical Methods
Metals by EPA Method 6010C or 6020B
Hexavalent Chromium by EPA Method 7196 or 7199 (Phase II RI and April 2019 Data Gap Samples)
Mercury by EPA Method 7471B

Table 2 (page 1 of 1)
Summary of Groundwater Analytical Data
828 Martin Luther King, Jr. Blvd.
Chapel Hill, North Carolina
H&H Job No. TCH-009

Monitoring Well ID	Sample Date	turbidity	aluminum	antimony*	arsenic	barium	beryllium	boron	cadmium	calcium	hexavalent chromium	trivalent chromium	Total chromium	cobalt*	copper	iron	lead	magnesium	manganese	mercury	molybdenum	nickel	potassium	selenium	silver	sodium	strontium	thallium*	vanadium*	zinc
2L Standard or IMAC		NS	NS	1	10	700	4	700	2	NS	NS	NS	10	1	1,000	300	15	NS	50	1	NS	100	NS	20	20	NS	NS	0.2	0.3	1,000
MW-5 (Background)	11/9/2016	3.8	NA	<0.5	<10	51	<2.0	NA	<1.0	NA	NA	NA	<5.0	0.27 J	<10	NA	<5.0	NA	**580**	<0.2	NA	<10	NA	**23**	NA	NA	190	<2.5	0.39 J	<30
	4/3/2017	8.2	NA	NA	NA	NA	NA	NA	NA	NA	<4.8	NA	<10.0	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
MW-1	5/3/2013	NA	5,600	**5.4**	**85**	**1,100**	1.6	NA	0.17	110,000	NA	NA	**15**	**15**	25	**6,500**	5.8	25,000	**7,600**	ND	NA	12	7,600	2.5	ND	34,000	NA	**1.0**	**38**	52
	2/18/2016	NS	NA	ND	**67**	**1,300**	**11.0**	ND	ND	NA	NA	NA	**100**	**78**	170	NA	**36**	NA	**9,600**	0.26	ND	58	NA	ND	ND	NA	2,900	ND	**260**	330
	2/18/2016[4]	NS	NA	ND	**52**	**1,100**	**8.8**	ND	ND	NA	NA	NA	**86**	**61**	130	NA	**29**	NA	**9,000**	0.21	ND	46	NA	ND	ND	NA	2,700	ND	**200**	260
	11/10/2016	475.0	NA	<0.5	**19**	470	**4.1**	NA	0.15 J	NA	NA	NA	**31**	**32**	57	NA	10	NA	**8,600**	<0.2	NA	21	NA	**23**	NA	NA	2,200	<2.5	**92**	99
	11/10/2016[4]	NA	NA	<0.5	<10	160	0.53 J	NA	<1.0	NA	NA	NA	<5.0	**6.0**	<10	NA	<5.0	NA	**8,000**	<0.2	NA	2.3 J	NA	<20	NA	NA	2,100	<2.5	**1.2 J**	<30
	4/3/2019	7.76	NA	NA	**22.9**	**1,730**	<0.10	NA	<0.080	NA	NA	NA	<0.50	**1.8**	0.33 J	NA	NA	NA	**3,090**	<0.20	NA	0.60	NA	<0.50	NA	NA	4,710	NA	NA	NA
MW-1A	9/26/2019	6.63	NA	NA	10	**1,040**	<0.50	NA	<0.40	NA	NA	NA	<2.5	**1.2**	<2.5	NA	NA	NA	**2,420**	<0.20	NA	0.82 J	NA	<2.5	NA	NA	6,360	NA	NA	NA
MW-2	6/20/2013[1]	NA	16,000	0.61	8.3	**1,100**	**5.5**	NA	0.93	260,000	NA	NA	8.4	**23**	**1,200**	**13,000**	**27**	47,000	**1,200**	0.18	NA	70	42,000	18	0.27	52,000	NA	**0.48**	**71**	**2,200**
MW-3	2/5/2014	NA	NA	NA	ND	160	NA	NA	ND	NA	ND	NA	ND	NA	NA	NA	ND	NA	NA	NA	NA	NA	NA	ND	ND	NA	NA	NA	NA	NA
	2/5/2014[2]	NA	NA	NA	ND	250	NA	NA	ND	NA	ND	NA	**24**	NA	NA	NA	ND	NA	NA	NA	NA	NA	NA	ND	ND	NA	NA	NA	NA	NA
	8/15/2014[3]	1,500	NA	NA	**51**	**830**	NA	NA	ND	NA	30	NA	**78**	NA	NA	NA	**30**	NA	NA	ND	NA	NA	NA	ND	ND	NA	NA	NA	NA	**NA**
	8/20/2014[4]	13.0	NA	NA	ND	220	NA	NA	ND	NA	23	NA	ND	NA	NA	NA	ND	NA	NA	NA	NA	NA	NA	ND	ND	NA	NA	NA	NA	NA
MW-3A	7/21/2015	5.7	NA	NA	ND	67	NA	520	ND	NA	ND	NA	ND	NA	NA	NA	ND	NA	NA	ND	NA	NA	NA	ND	ND	NA	NA	NA	NA	NA
	2/17/2016	1.3	NA	ND	ND	89	ND	ND	ND	NA	NA	NA	ND	ND	ND	NA	ND	NA	ND	ND	ND	ND	NA	**23**	ND	NA	2,400	ND	ND	ND
	2/17/2016[2]	1.3	NA	ND	ND	80	ND	ND	ND	NA	NA	NA	ND	ND	ND	NA	ND	NA	23	ND	ND	ND	NA	**26**	ND	NA	2,100	ND	ND	ND
	11/9/2016	1.2	NA	<0.5	<10	53	<2.0	NA	<1.0	NA	NA	NA	<5.0	<0.11	<10	NA	<5.0	NA	14	<0.2	NA	<10	NA	**50**	NA	NA	2,400	**5.4 J**	**0.94 J**	12 J
	11/9/2016[2]	1.2	NA	<0.5	<10	53	<2.0	NA	<1.0	NA	NA	NA	<5.0	<0.11	<10	NA	<5.0	NA	15	<0.2	NA	<10	NA	**52**	NA	NA	2,400	**5.3 J**	**0.95 J**	<30
	4/4/2019	0.00	NA	NA	0.15	68.2	<0.10	NA	<0.080	NA	NA	NA	<0.50	0.21	0.55	NA	NA	NA	5.8	<0.20	NA	0.50 J	NA	**34.2**	NA	NA	2,950	NA	NA	NA
MW-4	2/5/2014	NA	NA	NA	**140**	**6,500**	NA	NA	1.7	NA	ND	NA	**930**	NA	NA	NA	**250**	NA	NA	**1.4**	NA	NA	NA	**99**	ND	NA	NA	NA	NA	NA
	8/20/2014[4,5]	<10	NA	NA	ND	75	NA	NA	ND	NA	ND	NA	ND	NA	NA	NA	ND	NA	NA	NA	NA	NA	NA	ND	ND	NA	NA	NA	NA	NA
MW-4A	7/21/2015	24.7	NA	NA	ND	64	NA	ND	ND	NA	ND	NA	ND	NA	NA	NA	ND	NA	NA	ND	NA	NA	NA	ND	ND	NA	NA	NA	NA	NA
	7/21/2015[4]	24.7	NA	NA	ND	61	NA	ND	ND	NA	ND	NA	ND	NA	NA	NA	ND	NA	NA	ND	NA	NA	NA	ND	ND	NA	NA	NA	NA	NA
	2/18/2016	189.0	NA	ND	ND	26	ND	ND	ND	NA	NA	NA	ND	ND	ND	NA	7.8	NA	49	ND	ND	ND	NA	ND	ND	NA	110	ND	ND	34
	2/18/2016[4]	189.0	NA	ND	ND	33	ND	ND	ND	NA	NA	NA	ND	ND	ND	NA	8.4	NA	41	ND	ND	ND	NA	ND	ND	NA	78	ND	ND	48
	11/9/2016	4.8	NA	<0.5	<10	36	<2.0	NA	<1.0	NA	NA	NA	1.2 J	<0.11	<10	NA	<5.0	NA	**140**	<0.2	NA	<10	NA	7.2 J	NA	NA	170	<2.5	<0.15	17 J
	4/4/2019	9.43	NA	NA	<0.10	22.5	0.070 J	NA	<0.080	NA	NA	NA	<0.50	0.063 J	0.63	NA	NA	NA	6.0	<0.20	NA	1.5	NA	0.82	NA	NA	73	NA	NA	NA
MW-6	11/9/2016	2.5	NA	<0.5	<10	340	<2.0	NA	<1.0	NA	NA	NA	**29**	<0.11	1.9 J	NA	<5.0	NA	**2,500**	<0.2	NA	22	NA	20	NA	NA	690	<2.5	**1.2 J**	<30
	4/3/2017	7.6	NA	NA	NA	NA	NA	NA	NA	NA	<4.8	NA	<10.0	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	4/4/2019	4.48	NA	NA	0.14	283	<0.10	NA	<0.080	NA	NA	NA	<0.50	0.33	<0.50	NA	NA	NA	**2,210**	<0.20	NA	0.20 J	NA	0.12 J	NA	NA	752	NA	NA	NA
	4/4/2019[2]	4.48	NA	NA	0.14	279	<0.10	NA	<0.080	NA	NA	NA	<0.50	0.32	0.50 J	NA	NA	NA	**2,160**	<0.20	NA	0.19 J	NA	0.11 J	NA	NA	736	NA	NA	NA
MW-7	11/14/2016	8.9	NA	<0.5	<10	10	<2.0	NA	<1.0	NA	NA	NA	1.3 J	0.17 J	1.6 J	NA	<5.0	NA	**140**	<0.2	NA	1.6 J	NA	<20	NA	NA	42	<2.5	**1.1 J**	26 J
	4/3/2019	8.95	NA	NA	0.13	4.5	<0.10	NA	<0.080	NA	NA	NA	<0.50	<0.050	0.72	NA	NA	NA	20.5	<0.20	NA	0.43 J	NA	0.10 J	NA	NA	44.9	NA	NA	NA
MW-8	9/26/2019	7.95	NA	NA	6.1	219	<0.10	NA	<0.080	NA	NA	NA	0.51	**4.0**	0.98	NA	NA	NA	**4,880**	<0.20	NA	4.1	NA	<0.50	NA	NA	750	NA	NA	NA
MW-9	9/26/2019	1.74	NA	NA	0.75	394	<0.20	NA	<0.16	NA	NA	NA	<1.0	**1.5**	2.1	NA	NA	NA	**5,060**	<0.20	NA	0.41 J	NA	<1.0	NA	NA	2,160	NA	NA	NA

Notes:
Yellow highlighting indicates samples collected as part of April 2019 data gap sampling
Orange highlighting indicates samples collected as part of August 2019 groundwater sampling
All results in ug/l, except turbidity which is NTUs
2L Standard = North Carolina Department of Environmental Quality (DEQ) 15A NCAC 02L.0202 Groundwater Standards (April 2013).
IMAC = Interim Maximum Allowable Concentration
Bold denotes above the 2L standard or IMAC and background levels
ND = Not Detected; NA = Not Analyzed; NS = Not Specified
J = Detected above method detection limit but below laboratory reporting limit; therefore, result is an estimated concentration
U = Below method detection limit
*reported to the method detection limit instead of laboratory reporting limit
[1] Denotes sample labeled as "Well #1" in the lab report associated with the Limited Phase II ESA prepared by Falcon
[2] Denotes duplicate sample taken.
[3] Denotes sample labeled as "Well 1" in the lab report associated with the October 3, 2014 letter prepared by Falcon
[4] Denotes filtered samples
[5] An unfiltered sample was also collected from MW-4 on August 20, 2014 and the results were reported in mg/kg-wet, presumably because of the high sediment load. These data are not included in this table.
Analytical Methods:
Metals by EPA Method 6010C, 6020A, or 6020B
Hexavalent Chromium by EPA Method 7196A / SM3500
Mercury by 7470A/245.1

Table 3 (page 1 of 1)
Monitoring Well Construction Details and Groundwater Elevation Data
828 Martin Luther King, Jr. Blvd.
Chapel Hill, North Carolina
H&H Job No. TCH-003

Well ID	Permanent or Temporary	Date Installed	Date Abandoned	Drilling Method	Well Material	Screen Slot Size (in)	Total Depth (ft bls)	Screened Interval	TOC Elevation (ft)	November 9, 2016		April 3, 2019		Sepember 26, 2019	
										Depth to Water (ft bls)	Groundwater Elevation (ft)	Depth to Water (ft bls)	Groundwater Elevation (ft)	Depth to Water (ft bls)	Groundwater Elevation (ft)
MW-1	Permanent	4/29/2013	N/A	DPT	2" PVC	0.01	40	30-40	346.12	35.48	310.64	30.90	315.22	35.67	310.45
MW-1A	Permanent	9/24/2019	N/A	Sonic	2" PVC	0.01	40	25-40	345.96	--	--	--	--	31.43	314.53
MW-2	Temporary	6/20/2013	6/20/2013	HA	Unknown	Unknown	8	Unknown	--	--	--	--	--	--	--
MW-3	Permanent	1/27/2014	1/7/2015	Auger	2" PVC	0.01	11	6-11	--	--	--	--	--	--	--
MW-4	Permanent	1/27/2014	1/6/2015	Auger	2" PVC	0.01	9.2	4.2-9.2	--	--	--	--	--	--	--
MW-3A	Permanent	5/12/2015	N/A	Air Rotary	2" PVC	0.01	16	1-16	298.10	5.91	292.19	2.79	295.31	7.14	290.96
MW-4A	Permanent	5/14/2015	N/A	Air Rotary	2" PVC	0.01	19	4-19	298.00	6.72	291.28	3.20	294.80	7.83	290.17
MW-5	Permanent	11/2/2016	N/A	Air Rotary	2" PVC	0.01	27.5	27.5 - 17.5	369.33	9.27	360.06	7.03	362.30	10.24	359.09
MW-6	Permanent	11/2/2016	N/A	HSA	2" PVC	0.01	17.5	17.5 - 7.5	315.39	9.92	305.47	7.42	307.97	10.54	304.85
MW-7	Permanent	11/2/2016	N/A	Air Rotary	2" PVC	0.01	69.5	69.5 - 59.5	339.54	46.97	292.57	43.58	295.96	47.05	292.49
MW-8	Permanent	9/24/2019	N/A	Sonic	2" PVC	0.01	44.5	29.5-44.5	343.89	--	--	--	--	40.16	303.73
MW-9	Permanent	9/24/2019	N/A	Sonic	2" PVC	0.01	45.0	30-45	339.04	--	--	--	--	26.92	312.12
TMW-10	Temporary	9/24/2019	9/24/2019	Sonic	2" PVC	0.01	40.0	25-40	349.35	--	--	--	--	27.23*	322.12*

Notes:
MW-1, MW-3A, MW-4A, MW-5, MW-6, and MW-7 were surveyed by CE Group on December 8, 2016
MW-1A, MW-8, MW-9, and TMW-10 were surveyed by H&H on September 26, 2019
ft = feet; bls = below land surface; in = inches
DPT = Direct Push Technology; HA = Hand Auger; HSA = Hollow Stem Auger
TOC = Top of Casing; -- = Not Specified; N/A = Not Applicable
* = depth to water gauged on September 24, 2019.

Appendix A

August 21, 2019 General Awareness Training Plan

hart hickman
SMARTER ENVIRONMENTAL SOLUTIONS

DRAFT
General Awareness Training Plan – Bolin Creek Trail Construction Activities and Interim Remedial Measures

828 Martin Luther King Jr. Blvd. Property
Chapel Hill, North Carolina
DEQ Identification No. NONCD0001486

H&H Job No. TCH-002
August 21, 2019

hart hickman

SMARTER ENVIRONMENTAL SOLUTIONS

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#C-245 Geology

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General Awareness Training Plan
Bolin Creek Trail Construction Activities
and Interim Remedial Measures
828 Martin Luther King Jr. Blvd. Property
Chapel Hill, North Carolina
H&H Job No. TCH-002

Table of Contents

List of Figures

List of Appendices

General Awareness Training Plan
Bolin Creek Trail Construction Activities
and Interim Remedial Measures
828 Martin Luther King Jr. Blvd. Property
Chapel Hill, North Carolina
H&H Job No. TCH-002

Emergency Contact Numbers

Site Address:	828 Martin Luther King Jr. Blvd. Chapel Hill, NC 28208 Location of Chapel Hill Police Department	(919) 968-2760
Site/Client Contacts:	Mr. John Richardson Community Resilience Officer	(919) 801-8225
	Ms. Laura Selmer Program Coordinator	(919) 968-2742
	Mr. Vencelin Harris Emergency Management Coordinator	(919) 968-2705
	Mr. Bill Webster Planning and Development Manager	(919) 968-2819
Fire/Ambulance/Police:		911
Hospital:	**University of North Carolina Hospital** 101 Manning Drive, Chapel Hill, NC 27514 ***(See Hospital Route Map in Appendix A)***	(984) 974-1000
Poison Control:	Poison Control Center	(800) 222-1222
Emergency Response:	National Response Center	(800) 424-8802
	EPA Emergency Response Team EPA RRT 4 Coordinator Andrew.Gary@epa.gov	

Hart & Hickman, PC Contact Information

Principal:	Steve Hart, PG	(704) 887-4610 (704) 576-0145 cell
Project Manager:	Justin Ballard, PG	(919) 847-4241 (252) 548-9191 cell
Health & Safety Officer:	Shannon Cottrill	(704) 586-0007 (704) 577-8810 cell
On-Site Representatives:	Jeffrey Ollison	(919) 847-4241 (336) 214-2417 cell
	Patrick Stevens	(919) 847-4241 (919) 802-2784 cell

Subcontractor Contact Information

S&C Construction, LLC	Clint Roberson	(910) 520-6430

(others to be added if needed)

Glossary of Terms, Acronyms, and Abbreviations used in this Plan	
ACGIH	American Conference of Governmental Industrial Hygienists
Analyzer	Refers to the field instrument described in Section 4.2
C	Ceiling value
CAS	Chemical Abstract Service Number
CCPs	Coal Combustion Products
CFR	Code of Federal Regulations
COCs	Compounds of Concern
H&H	Hart & Hickman, PC
IDLH	Immediately Dangerous to Life and Health
lf	Linear foot
mg/m^3	milligram per cubic meter
NCDEQ	North Carolina Department of Environmental Quality
NIOSH	National Institute for Occupational Safety and Health
OSHA	Occupational Safety and Health Administration
PEL	Permissible Exposure Limit
PPE	Personal Protective Equipment
ppm	parts per million
PSRG	Preliminary Soil Remediation Goal
sq ft	Square foot
STEL	Short Term Exposure Limit
TLV	Threshold Limit Value
TWA	Time-Weighted Average

General Awareness Training Plan
828 Martin Luther King Jr. Blvd. Property
Chapel Hill, North Carolina
H&H Job No. TCH-002

1.0 Introduction

On behalf of the Town of Chapel Hill (Town), this General Awareness Training Plan (Plan) has been prepared by Hart & Hickman, PC (H&H) to assist with construction activities and interim remedial measures proposed for areas located on the Town's property at 828 Martin Luther King Jr., Blvd. in Chapel Hill, North Carolina (Site or subject Site). Previous assessment activities indicate that coal combustion products (CCPs) were used in portions of the property for structural fill in the 1960s and 1970s. The CCPs are primarily covered with soil, but exposed coal combustion products (CCPs) are present near the Bolin Creek Trail and along a steep embankment north of the Bolin Creek Trail. Proposed construction activities include excavation, grading, and management of soil along Bolin Creek Trail to facilitate installation of a new section of Bolin Creek Trail. In addition, proposed construction activities include implementation of interim remedial measures outlined in H&H's May 23, 2019 *Draft Interim Remedial Measures Cost Evaluation* to remove or stabilize areas of exposed CCPs. A Site Map showing the existing and proposed trail locations, and the areas of exposed CCPs along the Bolin Creek Trail (referred to as Areas H and I) and in the embankment (Areas D and F), is included as Figure 1. *(Note that the location of the Proposed Trail in Figure 1 may need to be modified based upon the revised plans).*

This Plan has been prepared for the Town and its contractors to provide a general awareness of Site conditions, approximate expected locations of CCPs, compounds of concern (COCs) identified in soil and CCPs during previous environmental assessments, recommended procedures to be used to minimize exposure to Town personnel, the Town's contractors, and residents during trail construction and interim remedial measures activities, and excavated material management procedures. This Plan is not intended to be used as a United States Department of Labor Occupational Safety and Health Administration (OSHA) Safety Plan under the Federal Health and Safety Regulations set forth in 29 CFR 1910 and 1926. Per OSHA, it is

each employer's responsibility to provide their employees with a health and safety program. It is expected that this Plan will be used to inform Town personnel and contractors of potential hazards associated with the CCPs in development of their own Safety Plan. The Town or Town's contractors may to choose to perform measures that are more stringent than those recommended herein, but the measures should not be less stringent.

Note that this Plan primarily focuses on minimizing worker exposure to potentially impacted media that may be encountered during the activities and to minimize the potential for migration of potentially impacted materials beyond the work areas. This Plan describes the suggested air monitoring, personal protective equipment (PPE), and Site control measures to be implemented during work activities. This Plan does not cover other potential hazards related to general construction activities such as climate (heat and cold stress), biological hazards (i.e., poisonous plants, venomous snakes, insects, etc.), and construction hazards (i.e., working around excavations, use of tools, heavy equipment, slips/trips/falls, etc.).

The Plan includes the following sections:

- Section 2.0: A summary of background information, COCs, and personal protective measures.
- Section 3.0: Expected scope of the activities.
- Section 4.0: Job hazard analysis and monitoring to be performed during the work activities.
- Section 5.0: Recommended personal protection measures for workers.
- Section 6.0: Recommended safe work practices to be used during the activities.

2.0 Summary

2.1 Brief Site Background Summary

The Site is comprised of one land parcel that is approximately 10.24 acres in size and contains a two-story approximately 35,000 sq. ft building located in the north-central portion of the Site that is currently used for police department operations. The Site topography consists of an elevated area where the police building and associated parking lots are located which slopes along an embankment to the south to a lower area along Bolin Creek where the Bolin Creek Trail are located.

Previous assessment activities indicate that the Site was initially used as a borrow pit from the late 1950s to early 1960s, and then was used as a fill site from the mid-1960s to the mid-1970s. It appears that the fill initially consisted of construction debris, and then coal combustion products (CCPs) were placed above the construction debris for structural fill. CCPs are exposed at the surface along the eastern and central portions of the embankment that separates the elevated and lower portions of the site. Erosion of CCPs along some portions of the embankment has resulted in deposition of a layer of CCPs generally less than 1 to 1.5 ft thick at the ground surface in some of the lower portions of the site north and south of the Bolin Creek Trail. A Site Map showing the areas where exposed CCPs were observed is included as Figure 1.

Previous environmental assessment activities were conducted from 2013 to 2017 which culminated in the completion of a *Phase II Remedial Investigation (RI) Report* for the Site dated August 14, 2017. In April 2019, H&H conducted additional assessment activities as part of a Human Health and Ecological Risk Assessment conducted by Duncklee & Dunham and Dr. Ken Rudo of Rudo Toxicological Consultants. The additional assessment activities are documented in a May 23, 2019 *Draft Result of Data Gap Sampling* letter report. A figure depicting the locations of previous CCP, soil, and drainage pathway soil samples and a tabular summary of the results of analysis of the samples are provided in Appendix B. Additional information and documents concerning the conditions at the property associated with the presence of CCPs may be reviewed on the Town's Coal Ash Disposal Site Remediation Project website:

https://www.townofchapelhill.org/town-hall/news-events/current-issues/coal-ash-disposal-site-remediation-project .

2.2 Compounds of Concern

As indicated in the table in Appendix B, the primary COCs detected in CCPs, shallow soil, and drainage pathway soil are certain metals. Results of analysis of samples of CCPs indicate that the following metals were detected above background levels and North Carolina Department of Environmental Quality (DEQ) Preliminary Soil Remediation Goals (PSRGs) in CCPs: arsenic, barium, manganese, mercury, and selenium. The most prevalent compound detected above background levels and PSRGs in CCPs is arsenic.

Results of analysis of shallow soil samples collected near Bolin Creek Trail indicate that the primary metal detected above background levels and PSRGs is arsenic with less frequent detections of manganese and selenium. Near Bolin Creek Trail, the presence of metals above PSRGs is associated with erosion of CCPs from the embankment and resultant deposition north and south of the trail.

Results of analysis of drainage pathway soil samples in areas where stormwater appears to flow during wet weather conditions indicate arsenic and barium were detected above background levels and PSRGs in samples collected near the erosional CCPs. Drainage pathway samples located away from the erosional CCP areas generally did not indicate significantly elevated metals or only slightly elevated metals.

In summary, the primary COCs in CCPs, shallow soil, and wet weather drainage pathway soil at the Site are arsenic, barium, manganese, mercury, and selenium. Recommended procedures to minimize potential exposures to the COCs based on previous assessment activities, observed Site conditions, and the proposed scope of work are summarized below and detailed information is presented in Sections 3.0 to 4.0.

2.3 Personal Protective Equipment

Skin contact with impacted soil and CCPs will be minimized by wearing personal protective clothing (as described in Section 5.0). Inhalation of airborne dust particulates during construction activities will be minimized by chemical exposure/air monitoring, and engineering controls if action levels (see Section 4.2) are exceeded. Ingestion of impacted materials will be minimized by the use of good personal hygiene during decontamination (i.e., thoroughly washing face and hands with soap and water before eating or drinking).

2.4 Monitoring

When performing activities such as clearing, excavation, grading, or other construction related activities which may disturb surface materials, the work zone will be monitored for dust by H&H personnel. A Microdust Pro (or equivalent) will be used to monitor the work areas for airborne dust particulates which may contain the COCs. These handheld direct-reading instruments will be used at periodic intervals to monitor in the immediate vicinity of the work area, as well as other upwind and downwind locations.

2.5 Pre-Construction General Awareness Meeting

Prior to the start of the construction activities, H&H will hold a pre-construction conference to discuss this Plan, work activities, potential hazards, PPE, and safety procedures with Town personnel and the Town's contractors. The purpose of the meeting will be to discuss expectations, procedures, and answer questions regarding this Plan and conditions at the Site.

3.0 Expected Scope of Work

3.1 Town Personnel

The primary Site activities to be performed by Town personnel during construction of the new segment of Bolin Creek Trail and during interim remedial measures include the following:

- Observation, coordination, and inspection of the Town's contractor's activities during trail construction.
- Inspections of super silt fencing, standard silt fencing, and hydroseeded areas as part of interim remedial measures.

The initial recommended inspection frequency for silt fencing/hydroseeding is as follows:

- once per week, and
- after each significant rainfall event.

This frequency may be modified based upon the results of an initial quarter of inspection. Possible maintenance activities for the interim remedial measures include: reinstallation of geotextile fabric along the silt fence, chain-link backing (super silt fence only), and/or support posts. Other maintenance activities could include removal and disposal of accumulated CCP behind the silt fences. A Silt Fence Inspection Log to be used by Town personnel for each inspection is included in Appendix D.

3.2 Town Contractors

The primary Site activities to be performed by the Town's contractors during construction of the new Bolin Creek Trail segment and during interim remedial measures include the following:

<u>Trail Construction</u>

- Operation of heavy equipment during Site clearing, excavation, and grading activities during trail construction.

- Operation of heavy equipment during management of excavated material during trail construction. Note that H&H will assist with management of excavated material by providing the Town's contractors with guidance on the locations of CCPs and how to identify potential CCPs (generally identifiable by their grey to dark grey color whereas Site soils are typically brown and tan silts and clays). Excavated soil without obvious CCPs should be segregated from excavated CCPs and placed in separate stockpiles. Stockpiles of soil and CCPs will be underlain by and covered with minimum 10-mil plastic sheeting. In addition, the stockpile area should have erosion control through use of silt fencing and/or other berm mechanisms (straw bales, composted earth, etc.). Erosion control measures for soil or CCPs stockpile will be inspected weekly and after each significant rainfall event.

Removal of Erosional CCPs

- Excavation, transportation, and disposal (expected to be disposed at a Subtitle D landfill to be selected by the Town) of approximately 900 tons of erosional CCPs along Bolin Creek Greenway Trail (Areas G, H, and I in Figure 1), including implementation of erosion and sediment control measures prior to the start of excavation.

- Site restoration in the form of backfilling the shallow excavations along the trail and seeding with grass seed and straw cover.

- Installation of approximately 375 linear feet (lf) of super silt fencing (GEOTEX® 200ST or similar product) along the flanks and downgradient of Areas D and F where exposed CCP is present. The proposed super silt fencing location is shown on the attached Figure 2. Product specification sheets are included in Appendix C.

- Repair of approximately 100 lf of existing silt fencing (WINFAB® 77SF or similar product) in the vicinity of embankment Area F. Product specification sheets are included in Appendix C.

- Prior to silt fence placement, some brush removal and limited removal of fallen trees that cross the path of the existing and/or proposed silt fence will likely need to occur.

- Application of a hydroseed mixture to embankment Areas F and G (estimated at approximately 10,000 square feet [sq ft]). The hydroseed mixture will include both warm-season grass seed (Bermuda or similar grass), cool-season grass seed (fescue or similar grass), and an organic matter amendment (ProGanics™ Biotic Soil Media™ or similar product) to promote sustainable vegetation. In addition, the mixture would also include a biodegradable growth medium (Flexterra® HP-FGM™ or similar product) to provide erosion resistance to the embankment slope. Product specification sheets are included in Appendix C.

3.3 H&H Personnel

H&H will provide construction assistance services that will include:

- On-Site pre-construction general awareness training with the Town and the Town's contractors.
- Perimeter and ambient air monitoring during the activities.
- Assistance with CCP identification and stockpile management during the trail construction activities.
- Observation, coordination, and inspection of the Town's contractor's activities for the interim remedial measures.
- Stockpile sample collection and disposal coordination.
- Sampling of material to be excavated prior to excavation for waste profiling purposes and disposal facility acceptance.
- Collection of post-excavation soil samples from the base of the excavation areas to determine post-excavation concentrations of metals for use in future risk evaluations.

4.0 Job Hazard Analysis and Monitoring

The primary hazard anticipated is the potential exposures to metals. The primary metals of concern at the Site are arsenic, barium, manganese, mercury, and selenium. A discussion of chemical hazards and methods to reduce exposures are provided below.

4.1 Chemical Hazards

From an occupational health standpoint, given that potential exposure to Site personnel will be only for a short period of time (intermittent for several days), the levels of metals expected at the Site should not represent a significant concern. Overviews of the hazards associated with exposure to the primary COCs are presented below in terms of the following types of occupational exposure limits:

- PEL - Permissible Exposure Limit
- C - Ceiling
- TLV - Threshold Limit Value
- TLV-STEL - Short Term Exposure Limit
- IDLH – Immediately Dangerous to Life or Health

OSHA Permissible Exposure Limits (PELs), ACGIH Threshold Limit Values (TLVs), and time-weighted averages (TWAs) are defined as concentrations for an 8-hour workday, 40-hour workweek to which almost all workers can be repeatedly exposed without suffering adverse health effects.

Short Term Exposure Limit (STEL) is defined as the concentration to which workers can be exposed for short time periods without irritation, tissue damage, or narcosis sufficient to likely cause impairment of self-rescue or precipitate accidental injury. The STEL is typically a 15-minute time-weighted average that should not be exceeded at any time during the workday.

A ceiling value (C) is a concentration that should not be exceeded at any time in any workday. The current NIOSH immediately dangerous to life or health (IDLH) value is defined as the

situation that poses a threat of exposure to airborne contaminants when that exposure is likely to cause death or immediate or delayed permanent adverse health effects or prevent escape from such an environment. The following table summarizes the primary COCs expected to be present at the Site and their respective TWA, STEL, ceiling, and IDLH values.

Compound	Air TWA (ppm) (1)	Air STEL/Ceiling (ppm)	IDLH (ppm)
Arsenic (inorganic compounds, as As)	0.010 mg/m^3	---	5 mg/m^3
Barium (inorganic compounds, as Ba)	0.5 mg/m^3	---	50 mg/m^3
Manganese (inorganic compounds, as Mn)	5 mg/m^3	C 5 mg/m^3	500 mg/m^3
Mercury (inorganic compounds, as Hg)	0.1 mg/m^3	C 0.1 mg/m^3	10 mg/m^3
Selenium (compounds, as Se)	0.2 mg/m^3	---	1 mg/m^3

Ref: NIOSH Pocket Guide (September 2008) and ACGIH TLVs and BEIs (2017)
(1) Compound TWAs with units of mg/m^3 are based on dust exposure

Based on the anticipated scope of work, the following potential exposures may exist at the site:

- Skin contact with impacted materials (CCPs and/or soil);
- Inhalation of vapors or particulates (dust); and
- Ingestion of impacted materials; especially if poor personal hygiene is practiced.

Skin contact with potentially contaminated CPPs or soil will be minimized by the use of personal protective clothing (as described in Section 5.0). Air monitoring and the use of engineering controls will minimize inhalation of vapors or particulates during the sampling activities if action levels (see Section 4.2) are exceeded. Ingestion of impacted materials will be minimized by the use of appropriate personal hygiene procedures during decontamination (i.e., thoroughly washing face and hands with soap and water after leaving the work area and prior to eating or drinking) as described in Section 6.0.

4.2 Chemical Exposure/Air Monitoring

Precautions will be taken to reduce the exposure potential of Site COCs to both on-Site personnel and the public. This will be accomplished by conducting chemical exposure/air monitoring and eliminating visible dust at the Site by wetting the work area during work activities as necessary. Based on the potential metals that may be encountered during the course of this project and the level of disturbance anticipated to be associated with the construction activities, chemical exposure/air monitoring will consist of on-Site area monitoring and perimeter monitoring as described below.

On-Site Monitoring

H&H will monitor ambient dust levels in the work zone (i.e., excavation areas) of on-Site personnel using a direct reading dust level meter (Casella Microdust Pro monitor or equivalent). Work area monitoring will also be performed immediately adjacent to excavation areas, construction areas, soil/CCP handling areas, and other areas as needed when work is occurring. If action levels are exceeded as described in the below table, Site activities will be halted and monitoring will continue until measurements indicate that levels are acceptable to continue and the conditions that caused the elevated readings have been mitigated.

Perimeter Monitoring

In conjunction with the on-Site monitoring, H&H will conduct perimeter monitoring during excavation, soil/CCP handling, and other activities as needed when work is occurring. Perimeter monitoring will consist of multiple fixed continuous particulate monitoring stations (Casella Microdust Pro monitors or equivalent) to evaluate the potential migration of COCs off-Site. Particulate monitoring stations will be established in the predominant downwind and upwind directions. At least one of the downwind monitoring locations will established in a downwind location between the Site and the nearest downwind residence, business, or open portion of the trail. During these work activities, the monitors will be checked periodically (typically every half hour) to evaluate detections against the below action levels. A windsock will be positioned on-Site nearby the construction activities to monitor wind directions, to evaluate locations where monitoring will occur, and visibly determine changes in wind direction.

In the event that perimeter exposure monitoring indicates dust levels are approaching or exceeding action levels, Site activities will be halted and monitoring will continue until measurements indicate that levels are acceptable to continue and the conditions that caused the elevated readings have been mitigated.

A summary of action levels and response criteria for total dust is presented in the tables that follow.

Action Levels and Response Criteria
DUST

Microdust Pro Analyzer Reading*	Location	Time Period	Action
< 3.0 mg/m^3	Work area, upwind and downwind	----	Continue periodic monitoring.
> 3.0 mg/m^3 or presence of visible dust	Work area, upwind and downwind	> 1 minute	Stop work; move upwind; wet area to eliminate dust; if dusty conditions persist notify H&H and Town contacts for guidance on implementing engineering solution.

* Above background readings, see Section 4.3

4.3 Background Readings

All direct-reading instrument readings will be evaluated relative to background readings, not "meter zero". Prior to the start of work at each shift, and whenever there is a significant shift in wind direction, instrument readings will be obtained upwind of the work zone in order to determine the level of "background" readings from local vehicle traffic, emissions from nearby operations unrelated to the Site, etc. Site readings will be evaluated against these background readings (*i.e.*, if an action level is listed as 1 ppm and the background reading is 2 ppm, then the action level becomes 3 ppm).

4.4 Data Logging

Exposure monitoring data, including background readings, will be logged in the field logbook. The results of daily instrument calibrations will be logged in the field logbook. Monitoring instruments will be calibrated in accordance with the manufacturer's instructions and noted in the field logbook. Calibration will also be performed when inconsistent or erratic readings are obtained.

5.0 Personal Protective Equipment (PPE)

Minimum Suggested PPE for Site Personnel:

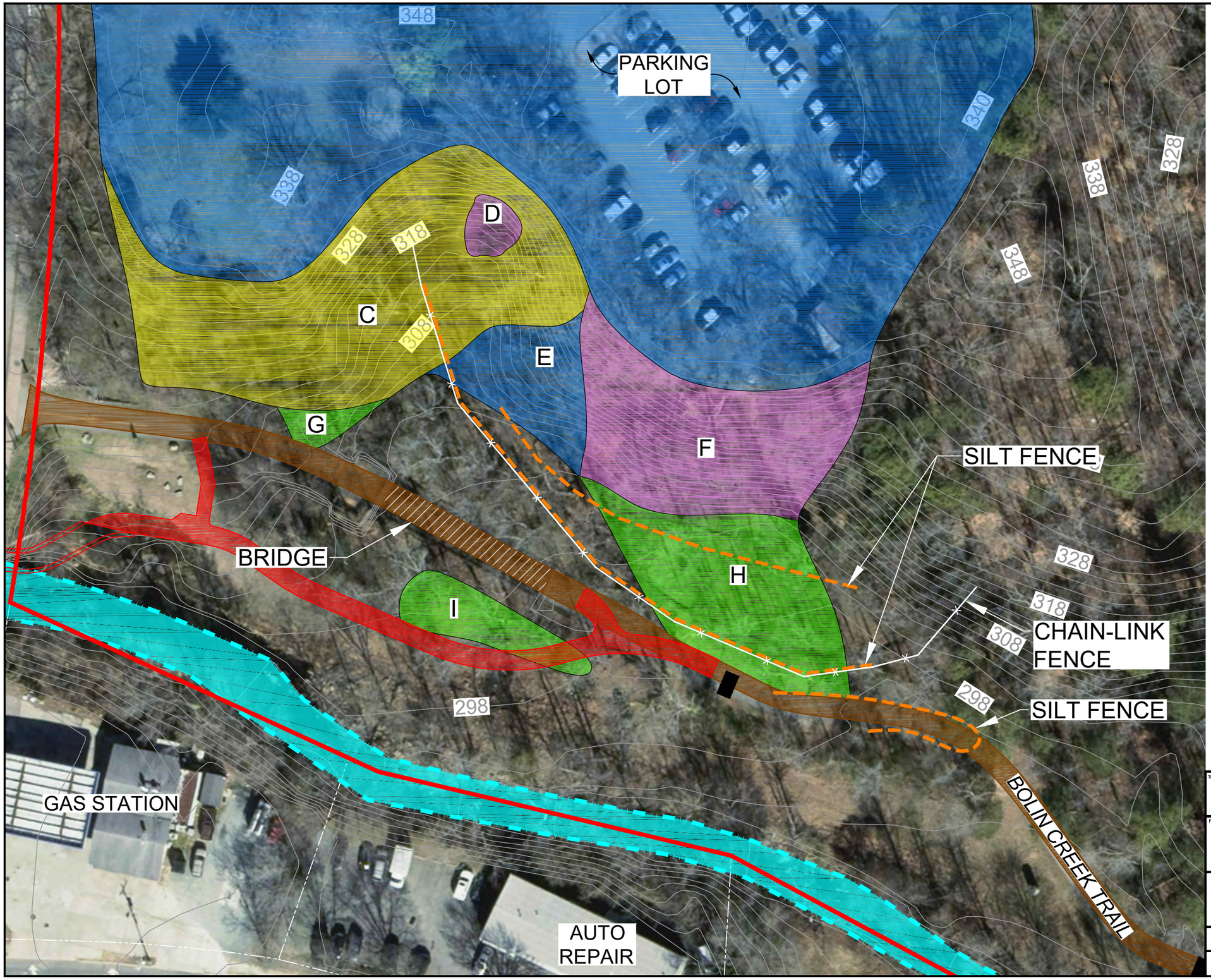
- Hardhat
- Safety glasses/safety goggles/face shield
- Steel-toed boots

Work Zone Suggested PPE for Site Personnel:

- Hardhat
- Eye protection (face shield, goggles, and/or safety glasses)
- Chemical-resistant steel-toed boots
- Ear protection in vicinity of construction equipment
- Long sleeve shirt and long pantst
- Nitrile/latex/vinyl gloves (as needed for chemical protection when hand contact with soil/CCPs may occur)

6.0 Safe Work Practices

1. Eating, drinking, chewing gum or tobacco, and smoking are prohibited in the work areas.
2. Personnel should wash their hands and face thoroughly with soap and water prior to eating, drinking or smoking.
3. Avoid contact with potentially impacted materials. Avoid walking through puddles, pools, mud, etc. Avoid, whenever possible, kneeling on the ground, leaning or sitting on equipment or ground.
4. Field crewmembers should make use of their senses to alert them to potentially dangerous situations *(i.e.,* presence of strong, irritating or nauseating odors).
5. Only those vehicles and equipment needed to complete work tasks should be permitted within the work zone (excavators and similar items). All non-essential vehicles should remain outside the work zone.
6. No matches or lighters will be permitted in the work area.
7. Field crew members shall be familiar with wind direction in relation to potential impacted areas.
8. The number of personnel and equipment in the impacted areas should be minimized but only to the extent consistent with workforce requirements of safe operations.
9. Personal protective equipment will be used as specified.
10. Personnel are to notify as soon as possible H&H and Town contacts if there are indications of unusual conditions or complaints or concerns from Town residents.
11. Disposable PPE (i.e., nitrile/latex/vinyl gloves) should be placed in an on-Site trash receptable and disposed off-Site as general waste.
12. Before leaving the Site, heavy equipment should be inspected for soil, CCPs, and mud, and the material should be removed prior to leaving the Site. This may necessitate establishing a gravel ingress/egress pathway and equipment wash area in the work area.
13. Excessive soil and mud should be removed from steel toed boots each day prior to leaving the Site. Depending upon Site conditions, this may necessitate establishing a boot wash for personnel to use prior to leaving the work area.



LEGEND

- SITE PROPERTY BOUNDARY
- BOLIN CREEK
- 101 TOPOGRAPHIC CONTOUR ELEVATION (FT MSL)
- FENCE LINE (APPROXIMATE LOCATION)
- SILT FENCE (APPROXIMATE LOCATION)
- CCP UNDER > 2 FT COVER
- CCP UNDER < 2 FT COVER
- CCP EXPOSED AT GROUND SURFACE
- CCP DEPOSITIONAL LAYER
- STORMWATER CULVERT
- PROPOSED TRAIL

N

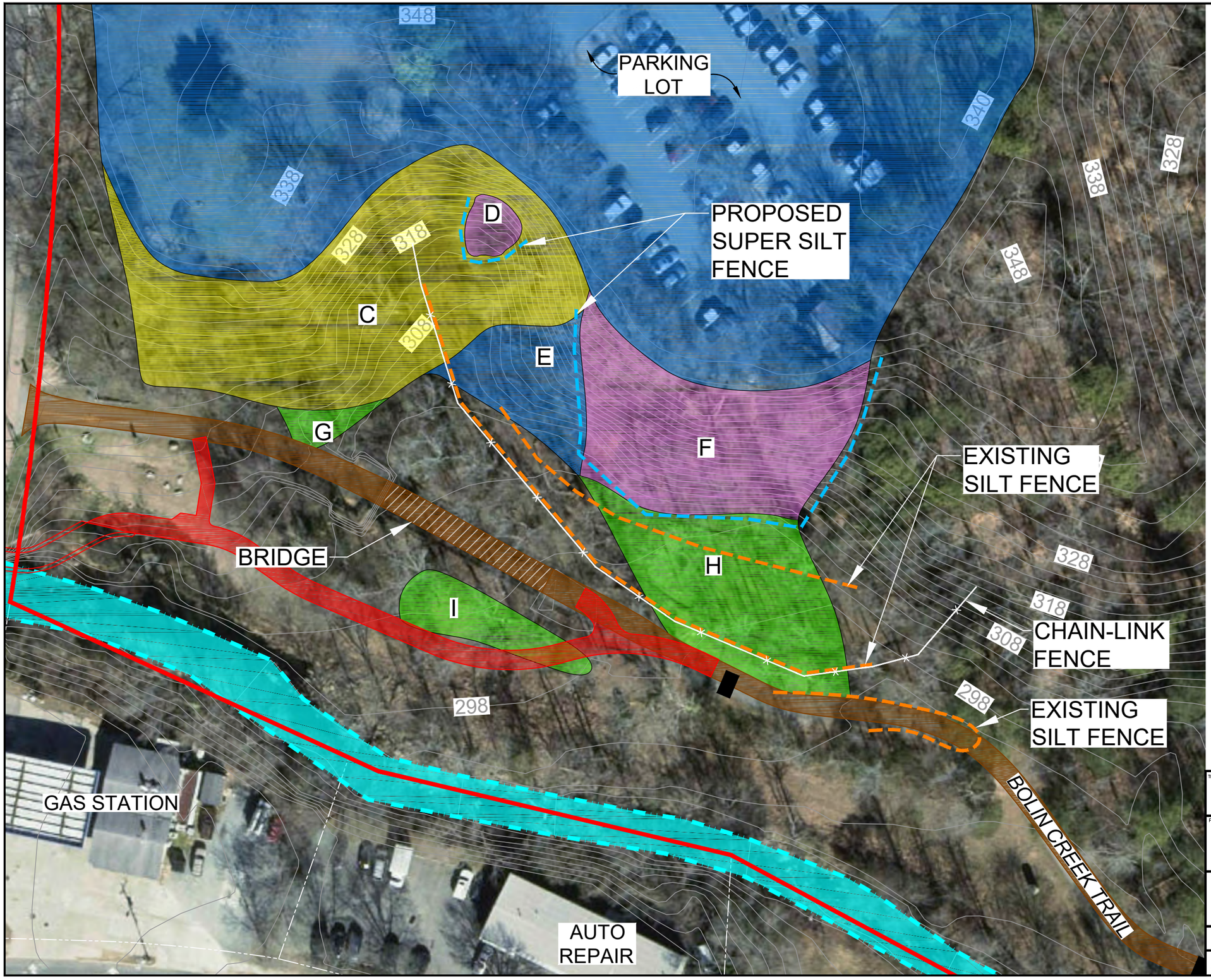
APPROXIMATE
0 50 100
SCALE IN FEET

TITLE
SITE MAP - PROPOSED TRAIL LOCATION

PROJECT
TOWN OF CHAPEL HILL
828 MARTIN LUTHER KING JR. BOULEVARD
CHAPEL HILL, NORTH CAROLINA

hart hickman
SMARTER ENVIRONMENTAL SOLUTIONS
2923 South Tryon Street-Suite 100
Charlotte, North Carolina 28203
704-586-0007(p) 704-586-0373(f)
License # C-1269 / #C-245 Geology

DATE: 5-10-19	REVISION NO. 0
JOB NO. TCH-002	FIGURE NO. 1



LEGEND

- SITE PROPERTY BOUNDARY
- BOLIN CREEK
- 101 TOPOGRAPHIC CONTOUR ELEVATION (FT MSL)
- FENCE LINE (APPROXIMATE LOCATION)
- EXISTING SILT FENCE (APPROXIMATE LOCATION)
- PROPOSED SUPER SILT FENCE (APPROXIMATE LOCATION)
- CCP UNDER > 2 FT COVER
- CCP UNDER < 2 FT COVER
- CCP EXPOSED AT GROUND SURFACE
- CCP DEPOSITIONAL LAYER
- STORMWATER CULVERT
- PROPOSED TRAIL

N

APPROXIMATE
0 50 100
SCALE IN FEET

TITLE
SITE MAP - PROPOSED INTERIM REMEDIAL MEASURES

PROJECT
TOWN OF CHAPEL HILL
828 MARTIN LUTHER KING JR. BOULEVARD
CHAPEL HILL, NORTH CAROLINA

hart hickman
SMARTER ENVIRONMENTAL SOLUTIONS
2923 South Tryon Street-Suite 100
Charlotte, North Carolina 28203
704-586-0007(p) 704-586-0373(f)
License # C-1269 / #C-245 Geology

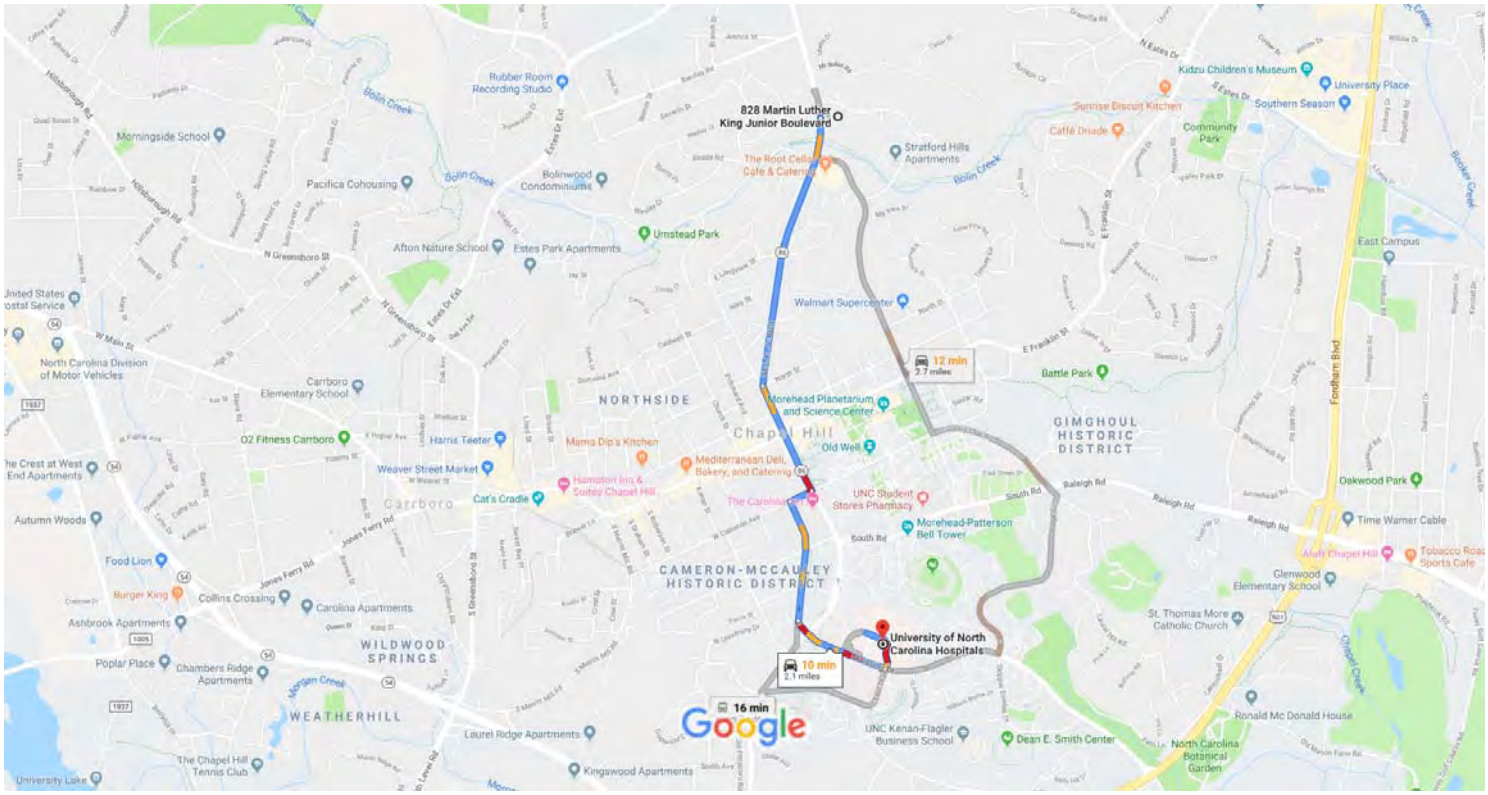
DATE: 5-22-19	REVISION NO. 0
JOB NO. TCH-002	FIGURE NO. 2

Appendix A

Hospital Route Map

828 M.L.K. Jr Blvd to University of North Carolina Hospitals

Drive 2.1 miles, 10 min



Map data ©2019 Google 1000 ft

828 M.L.K. Jr Blvd

Chapel Hill, NC 27514

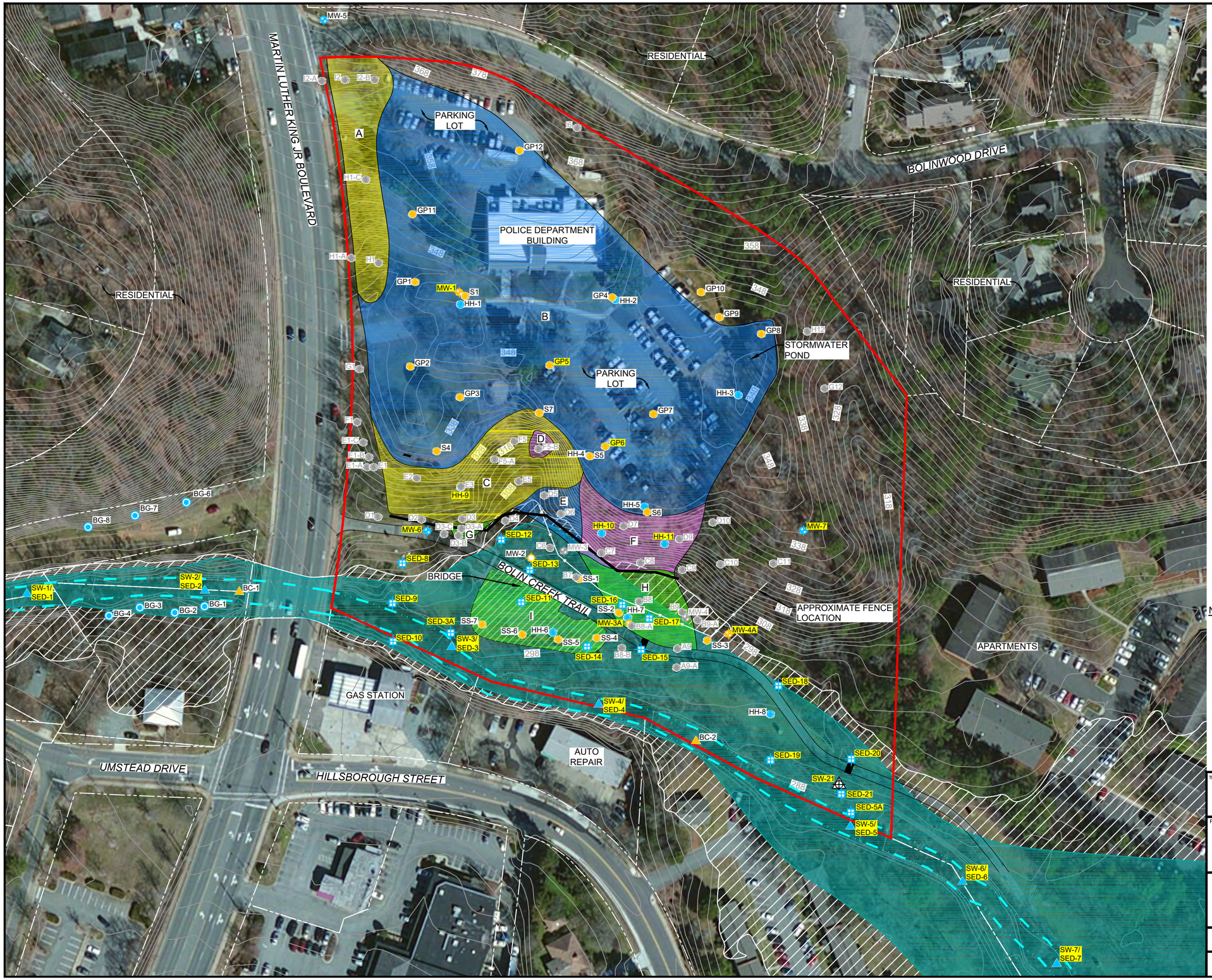
1. Head south on M.L.K. Jr Blvd toward Bolin Creek Trail — 0.8 mi
2. Continue onto N Columbia St — 0.3 mi
3. N Columbia St turns right and becomes W Cameron Ave — 381 ft
4. Use the left 2 lanes to turn left onto Pittsboro St — 0.4 mi
5. Use any lane to turn slightly left onto Manning Dr — 0.3 mi
6. Turn left onto Hospital Dr — 459 ft
7. Continue straight — 341 ft

University of North Carolina Hospitals

101 Manning Dr, Chapel Hill, NC 27514

Appendix B

Figure of Site Sampling Locations and Summary of Soil Analytical Data



LEGEND

- SITE PROPERTY BOUNDARY
- BOLIN CREEK
- —101— TOPOGRAPHIC CONTOUR ELEVATION (FT MSL)
- MONITORING WELL LOCATION (FALCON ENGINEERING)
- TEMPORARY MONITORING WELL LOCATION (FALCON ENGINEERING)
- SOIL BORING LOCATION (FALCON ENGINEERING)
- SURFACE WATER SAMPLE LOCATION (FALCON ENGINEERING)
- ABANDONED MONITORING WELL LOCATION
- MONITORING WELL LOCATION (H&H)
- SOIL BORING LOCATION (H&H)
- BACKGROUND SOIL BORING LOCATION (H&H)
- SURFACE WATER/SEDIMENT SAMPLE LOCATION (H&H)
- DRAINAGE PATHWAY SOIL SAMPLE LOCATION (H&H)
- DRAINAGE PATHWAY SURFACE WATER SAMPLE LOCATION (H&H)
- COVER EVALUATION BORING LOCATION
- CCP UNDER > 2 FT COVER
- CCP UNDER < 2 FT COVER
- CCP EXPOSED AT GROUND SURFACE
- CCP DEPOSITIONAL LAYER
- APPROXIMATE CCP DEPOSISTIONAL LAYER AREA REPORTED BY DEQ
- STORMWATER CULVERT
- REGULATORY FLOODWAY (ORANGE COUNTY GIS)
- 100 & 500 YEAR FLOODPLAIN (ORANGE COUNTY GIS)
- PROPOSED RETAINING WALL

NOTES:

1. EXISTING MONITORING WELLS & OCTOBER/ NOVEMBER 2016 SAMPLING LOCATIONS SURVEYED BY CE GROUP ON DECEMBER 8, 9, & 20, 2016.
2. HIGHLIGHTED SAMPLE IDs REFLECT SAMPLES COLLECTED AS PART OF APRIL 2019 DATA GAP SAMPLING ACTIVITIES.

N

APPROXIMATE
0 115 230
SCALE IN FEET

TITLE

SAMPLE LOCATION MAP

PROJECT

TOWN OF CHAPEL HILL
828 MARTIN LUTHER KING JR. BOULEVARD
CHAPEL HILL, NORTH CAROLINA

hart hickman
SMARTER ENVIRONMENTAL SOLUTIONS
2923 South Tryon Street-Suite 100
Charlotte, North Carolina 28203
704-586-0007(p) 704-586-0373(f)
License # C-1269 / #C-245 Geology

DATE: 4-26-19	REVISION NO. 0
JOB NO. TCH-003	FIGURE NO. B

Table B (page 1 of 2) Summary
of Soil Analytical Data 828
Martin Luther King, Jr. Blvd.
Chapel Hill, North Carolina
H&H Job No. TCH-003

Sample ID	Sample Date	Material Sampled (Soil or CCP)	Sample Depth	aluminum	antimony	arsenic	barium	beryllium	boron	cadmium	calcium	hexavalent chromium	trivalent chromium	total chromium	cobalt	copper	iron	lead	magnesium	manganese	mercury	molybdenum	nickel	potassium	selenium	silver	sodium	strontium	thallium	vanadium	zinc
S-4	4/29/2013	CCP	1 ft	23,000	ND	14	24	ND	NA	1.5	9,900	NA	NA	22	30	65	59,000	20	9,000	1,500	0.011	NA	43	680	ND	ND	150	NA	ND	21	120
S-5	1/31/2014	CCP	0-4 ft	NA	NA	37	2,800	NA	NA	ND	NA	1.3	19.7	21	NA	NA	NA	10	NA	NA	0.30	NA	NA	NA	3.2	ND	NA	NA	NA	NA	NA
S-6	1/31/2014	CCP	0-4 ft	NA	NA	43	3,200	NA	NA	ND	NA	2.7	19.3	22	NA	NA	NA	12	NA	NA	0.42	NA	NA	NA	6.1	ND	NA	NA	NA	NA	NA
S-7	1/31/2014	CCP	0-4 ft	NA	NA	44	2,500	NA	NA	ND	NA	1.4	27.6	29	NA	NA	NA	11	NA	NA	0.44	NA	NA	NA	4.5	ND	NA	NA	NA	NA	NA
GP-1	2/3/2014	CCP	8-12 ft	NA	NA	3.6	86	NA	NA	ND	NA	ND	8.8	8.8	NA	NA	NA	26	NA	NA	0.083	NA	NA	NA	ND	ND	NA	NA	NA	NA	NA
GP-2	2/3/2014	CCP	26-28 ft	NA	NA	41	1,100	NA	NA	ND	NA	ND	19	19	NA	NA	NA	11	NA	NA	0.24	NA	NA	NA	4.0	ND	NA	NA	NA	NA	NA
GP-3	2/3/2014	CCP	10-12 ft	NA	NA	48	1,200	NA	NA	ND	NA	0.53	22.47	23	NA	NA	NA	39	NA	NA	0.42	NA	NA	NA	ND	ND	NA	NA	NA	NA	NA
GP-4	2/4/2014	CCP	10-12 ft	NA	NA	59	2,900	NA	NA	ND	NA	ND	20	20	NA	NA	NA	11	NA	NA	0.51	NA	NA	NA	5.8	ND	NA	NA	NA	NA	NA
GP-5	2/4/2014	CCP	4-6 ft	NA	NA	72	2,800	NA	NA	ND	NA	ND	19	19	NA	NA	NA	9.5	NA	NA	0.33	NA	NA	NA	2.6	ND	NA	NA	NA	NA	NA
	4/3/2019	CCP	4-6 ft	NA	NA	95.9	2,350	5.46	NA	<0.956	NA	0.836 J	12.3	13.1	7.05	50.9	NA	NA	NA	34.7	1.2	NA	11.1	NA	12.0	NA	NA	325	NA	NA	NA
GP-6	4/3/2019[1]	CCP	4-6 ft	NA	NA	95.9	2,630	6.99	NA	<0.931	NA	0.712 J	16.2	16.9	10.3	62.5	NA	NA	NA	53.4	0.39	NA	17.1	NA	13.0	NA	NA	308	NA	NA	NA
	2/4/2014	CCP	9-11 ft	NA	NA	55	850	NA	NA	ND	NA	ND	19	19	NA	NA	NA	27	NA	NA	11	NA	NA	NA	4.1	ND	NA	NA	NA	NA	NA
	4/4/2019	CCP	9-10 ft	NA	NA	6.73	178	0.758	NA	0.118 J	NA	<1.11	10.0	10.0	5.18	11.0	NA	NA	NA	687	0.050	NA	6.24	NA	0.880	NA	NA	21.7	NA	NA	NA
GP-7	2/4/2014	CCP	10-12 ft	NA	NA	55	1,700	NA	NA	ND	NA	ND	19	19	NA	NA	NA	11	NA	NA	0.26	NA	NA	NA	4.3	ND	NA	NA	NA	NA	NA
GP-8	2/4/2014	CCP	11-15 ft	NA	NA	54	4,100	NA	NA	ND	NA	ND	20	20	NA	NA	NA	9.2	NA	NA	0.29	NA	NA	NA	4.5	ND	NA	NA	NA	NA	NA
GP-11	2/4/2014	CCP	4-6 ft	NA	NA	16	450	NA	NA	ND	NA	ND	16	16	NA	NA	NA	23	NA	NA	0.35	NA	NA	NA	ND	ND	NA	NA	NA	NA	NA
GP-12	2/4/2014	CCP	2-4 ft	NA	NA	52	2,000	NA	NA	ND	NA	ND	19	19	NA	NA	NA	14	NA	NA	0.28	NA	NA	NA	2.1	ND	NA	NA	NA	NA	NA
SS1	2/18/2016	Soil/CCP	2-12 in	NA	ND	6.7	210	1.2	ND	ND	NA	NA	NA	28	25	47	NA	22	NA	2,400	0.052	ND	15	NA	ND	ND	NA	120	1.3	88	100
SS1-Dup [1]	2/18/2016	Soil/CCP	2-12 in	NA	ND	8.5	260	1.4	ND	ND	NA	NA	NA	31	28	56	NA	29	NA	3,300	0.059	ND	18	NA	ND	ND	NA	150	1.7	95	110
SS2	2/18/2016	Soil/CCP	2-12 in	NA	ND	24	830	3.5	ND	ND	NA	NA	NA	27	20	57	NA	39	NA	1,700	0.21	1.7	19	NA	2.4	ND	NA	190	1.2	81	110
SS3	2/18/2016	Soil	2-12 in	NA	ND	4.5	100	0.80	ND	ND	NA	NA	NA	13	6.8	22	NA	14	NA	240	0.048	ND	5.3	NA	ND	ND	NA	36	ND	41	28
SS4	2/18/2016	Soil	2-12 in	NA	ND	8.5	380	1.2	ND	ND	NA	NA	NA	22	12	29	NA	25	NA	910	0.061	ND	12	NA	ND	ND	NA	51	ND	54	51
SS5	2/18/2016	Soil	2-12 in	NA	ND	4.8	130	0.89	ND	ND	NA	NA	NA	17	9.4	25	NA	27	NA	460	0.091	ND	7.9	NA	ND	ND	NA	43	ND	47	48
SS6	2/18/2016	Soil	2-12 in	NA	ND	3.1	82	0.70	ND	ND	NA	NA	NA	35	7.6	23	NA	17	NA	410	0.038	ND	6.5	NA	ND	ND	NA	25	ND	45	43
SS7	2/18/2016	Soil	2-12 in	NA	ND	3.1	84	0.60	ND	ND	NA	NA	NA	14	6.9	15	NA	13	NA	500	0.038	ND	5.9	NA	ND	ND	NA	31	ND	37	37
HH-1	11/3/2016	Soil	0-1 ft	NA	<0.29	5.9	120	1.00	NA	<0.29	NA	0.45	20.55	21	7.9	25	NA	27	NA	350	0.052	NA	8.8	NA	0.69	NA	NA	31	<0.58	48	50
	11/3/2016[1]	Soil	0-1 ft	NA	<0.35	3.4	110	0.79	NA	<0.35	NA	0.54	19.46	20	8.4	17	NA	18	NA	360 BH	0.067	NA	12	NA	<0.71	NA	NA	30	<0.71	41	35
HH-2	11/3/2016	Soil	0-1 ft	NA	<0.29	4.9	140	0.93	NA	<0.29	NA	0.43	13.57	14	12	21	NA	30	NA	260	0.085	NA	5.9	NA	1.0	NA	NA	25	<0.58	48	43
HH-3	11/3/2016	Soil	0-1 ft	NA	<0.33	9.9	200	1.30	NA	<0.33	NA	0.46 J	17.54	18	7.8	31	NA	24	NA	350	0.076	NA	8.9	NA	2.4	NA	NA	36	<0.65	53	100
HH-4	11/3/2016	Soil	0-1 ft	NA	<0.28	2.4	72	1.00	NA	<0.28	NA	0.50	44.5	45	16	37	NA	2.3	NA	630	<0.023	NA	33	NA	<0.56	NA	NA	42	0.60	73	70
HH-5	11/3/2016	Soil	0-1 ft	NA	<0.30	2.4	73	0.75	NA	<0.30	NA	<0.14	23	23	8.4	19	NA	9.3	NA	410	<0.025	NA	14	NA	1.2	NA	NA	23	<0.60	39	51
HH-6	10/27/2016	Soil	0-1 ft	NA	NA	NA	NA	NA	NA	NA	NA	<0.33	20	20	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
HH-7	10/27/2016	Soil	0-1 ft	NA	NA	NA	NA	NA	NA	NA	NA	<0.61	22	22	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
HH-8	10/27/2016	Soil	0-1 ft	NA	<0.30	3.6	100	1.00	NA	<0.30	NA	<0.35	19	19	12	29	NA	18	NA	570	0.036	NA	9.0	NA	<0.60	NA	NA	28	<0.60	52	54
HH-9	4/3/2019	CCP	0-1 ft	NA	NA	3.37	131	0.398 J	NA	0.178 J	NA	<1.29	12.7	12.7	5.97	14.5	NA	NA	NA	260	0.31	NA	3.59	NA	0.722	NA	NA	33.2	NA	NA	NA
HH-10	4/3/2019	CCP	0-1 ft	NA	NA	60.3	2,970	5.14	NA	0.162 J	NA	<1.60	13.8	13.8	9.84	51.3	NA	NA	NA	73.3	0.22	NA	17.1	NA	5.04	NA	NA	269	NA	NA	NA
HH-11	4/3/2019	CCP	0-1 ft	NA	NA	42.5	3,260	5.90	NA	0.220 J	NA	0.467 J	18.7	19.2	13.4	55.3	NA	NA	NA	113	0.43	NA	23.5	NA	9.05	NA	NA	234	NA	NA	NA
MW-6	11/2/2016	Soil	0-1 ft	NA	<0.26	2.9	38	0.61	NA	<0.26	NA	0.21 J	9.79	10	9.5	23	NA	12	NA	570	0.082	NA	8.2	NA	1.0	NA	NA	22	0.81	31	77
MW-7	11/1/2016	Soil	0-1 ft	NA	<0.30	2.6	67	0.87	NA	<0.30	NA	0.89	9.11	10	3.9	180	NA	7.6	NA	100	0.030	NA	2.9	NA	<0.59	NA	NA	6.7	<0.59	61	46
SED-3A	4/5/2019	Soil	0-1 ft	NA	NA	3.45	33.9	0.418 J	NA	<0.582	NA	<1.16	17.4	17.4	16.5	6.97	NA	NA	NA	560	<0.0054	NA	5.82	NA	0.237 J	NA	NA	9.6	NA	NA	NA
SED-5A	4/4/2019	Soil	0-1 ft	NA	NA	1.25	13.5	0.156 J	NA	<0.571	NA	0.352 J	13.2	13.6	5.95	39.1	NA	NA	NA	243	0.0071	NA	4.38	NA	<0.571	NA	NA	10.9	NA	NA	NA
SED-8	4/5/2019	Drainage Pathway Soil	2-6 in	NA	NA	2.41	49.1	0.313 J	NA	0.122 J	NA	<1.25	12.0	12.0	7.01	14.3	NA	NA	NA	423	0.063	NA	4.66	NA	1.01	NA	NA	15.2	NA	NA	NA
SED-9	4/5/2019	Drainage Pathway Soil	2-6 in	NA	NA	1.16	33.8	0.199 J	NA	<0.660	NA	0.461 J	21.6	22.1	9.11	10.1	NA	NA	NA	431	0.013	NA	6.68	NA	<0.660	NA	NA	16.7	NA	NA	NA
SED-10	4/5/2019	Drainage Pathway Soil	2-6 in	NA	NA	1.29	24.4	0.118 J	NA	0.221 J	NA	0.418 J	12.0	12.4	4.43	10.8	NA	NA	NA	195	0.037	NA	4.03	NA	0.273 J	NA	NA	8.1	NA	NA	NA
SED-11	4/5/2019	Drainage Pathway Soil/CCP	2-6 in	NA	NA	5.98	285	0.768	NA	<0.753	NA	<1.51	9.72	9.72 B	6.61	15.1	NA	NA	NA	288	0.14	NA	7.03	NA	2.03	NA	NA	65.0	NA	NA	NA
SED-12	4/5/2019	Drainage Pathway Soil	2-6 in	NA	NA	3.97	122	0.499 J	NA	0.204 J	NA	<1.74	9.45	9.45 B	6.04	19.7	NA	NA	NA	319	0.077	NA	4.95	NA	1.36	NA	NA	32.8	NA	NA	NA
SED-13	4/5/2019	Drainage Pathway Soil	2-6 in	NA	NA	14.5	724	1.10	NA	0.171 J	NA	<1.58	14.0	14.0	7.58	27.1	NA	NA	NA	563	0.075	NA	8.73	NA	1.69	NA	NA	70.5	NA	NA	NA
SED-14	4/5/2019	Drainage Pathway Soil	2-6 in	NA	NA	1.86	18.9	0.152 J	NA	<0.611	NA	0.506 J	17.2	17.7	5.07	8.00	NA	NA	NA	231	0.012	NA	3.19	NA	<0.611	NA	NA	17.3	NA	NA	NA
SED-15	4/5/2019	Drainage Pathway Soil	2-6 in	NA	NA	5.33	98.1	0.641 J	NA	<0.746	NA	<1.49	15.2	15.2	8.84	19.4	NA	NA	NA	550	0.030	NA	8.24	NA	2.36	NA	NA	39.5	NA	NA	NA
SED-16	4/5/2019	Drainage Pathway Soil/CCP	2-6 in	NA	NA	28.3	758	2.86	NA	0.238 J	NA	<2.03	22.8	22.8	13.7	48.8	NA	NA	NA	513	0.22	NA	17.7	NA	5.42	NA	NA	165	NA	NA	NA
SED-17	4/5/2019	Drainage Pathway Soil/CCP	2-6 in	NA	NA	15.3	565	1.98	NA	0.280 J	NA	<2.01	20.7	20.7	13.7	36.3	NA	NA	NA	452	0.14	NA	14.8	NA	3.68	NA	NA	179	NA	NA	NA
SED-18	4/5/2019	Drainage Pathway Soil	2-6 in	NA	NA	4.53	137	0.534 J	NA	<0.689	NA	<1.38	18.7	18.7	11.1	28.2	NA	NA	NA	464	0.051	NA	9.00	NA	1.85	NA	NA	32.6	NA	NA	NA
SED-19	4/5/2019	Drainage Pathway Soil	2-6 in	NA	NA	1.55	20.0	0.161 J	NA	<0.588	NA	0.435 J	21.7	22.1	7.98	8.38	NA	NA	NA	266	0.0073	NA	4.94	NA	0.334 J	NA	NA	15.0	NA	NA	NA
SED-20	4/5/2019	Drainage Pathway Soil	2-6 in	NA	NA	0.792	31.4	0.152 J	NA	<0.687	NA	<1.37	5.76	5.76 B	4.50	9.10	NA	NA	NA	360	0.012	NA	2.19	NA	0.263 J	NA	NA	11.5	NA	NA	NA
SED-21	4/5/2019	Drainage Pathway Soil	2-6 in	NA	NA	1.12	25.9	0.149 J	NA	<0.591	NA	<1.18	20.9	20.9	4.44	6.58	NA	NA	NA	221	0.011	NA	2.70	NA	0.286 J	NA	NA	12.8	NA	NA	NA
MW-5 (background)	11/2/2016	Soil	0-1 ft	NA	<0.30	2.1	76	0.99	NA	<0.30	NA	0.43 J	17.57	18	27	49	NA	4.0	NA	710	<0.023	NA	5.0	NA	<0.59	NA	NA	25	<0.59	190	47
	11/2/2016	Soil	6-7 ft	NA	<0.27	1.4	61	0.60	NA	<0.27	NA	0.81	38.19	39	19	18	NA	0.55	NA	940	<0.020	NA	20	NA	<0.53	NA	NA	29	2.3	67	75
BG-1 (background)	11/3/2016	Soil	0-1 ft	NA	<0.28	1.9	36	0.39	NA	<0.28	NA	0.87	17.13	18	6.3	16	NA	25	NA	310	0.033	NA	5.4	NA	1.6	NA	NA	15	<0.57	34	43
	11/3/2016	Soil	2-3 ft	NA	<0.29	2.3	45	0.48	NA	<0.29	NA	<0.12	19	19	7.3	18	NA	43	NA	440	0.280	NA	6.2	NA	1.6	NA	NA	15	<0.57	35	49
BG-2 (background)	11/3/2016	Soil	0-1 ft	NA	<0.28	1.9	45	0.50	NA	<0.28	NA	0.84	16.16	17	7.4	18	NA	32	NA	410	0.045	NA	4.9	NA	1.1	NA	NA	14	<0.56	35	44
	11/3/2016	Soil	2-3 ft	NA	<0.27	1.9	52	0.53	NA	<0.27	NA	0.70	23.3	24	7.5	20	NA	26	NA	450	0.038	NA	7.9	NA	1.7	NA	NA	19	<0.55	37	45
BG-3 (background)	11/3/2016	Soil	0-1 ft	NA	<0.30	1.7	44	0.43	NA	<0.30	NA	0.21 J	23.3	16	7.5	15	NA	25	NA	410	0.024	NA	5.1	NA	1.4	NA	NA	46	<0.60	37	40
	11/3/2016	Soil	2-3 ft	NA	<0.27	2.2	56	0.54	NA	<0.27	NA	0.88	21.12	22	7.5	18	NA	29	NA	410	0.040	NA	5.2	NA	1.2	NA	NA	19	<0.53	40	46
BG-4 (background)	11/3/2016	Soil	0-1 ft	NA	<0.29	1.7	50	0.50	NA	<0.29	NA	<0.13	19	19	9.5	16	NA	22	NA	450 BH	0.026	NA	6.0	NA	<0.59	NA	NA	16 A	<0.59	53	50
	11/3/2016	Soil	2-3 ft	NA	<0.33	2.0	53	0.52	NA	0.38	NA	0.50 J	22.5	23	11	23	NA	21	NA	460 BH	0.054	NA	8.5	NA	<0.65	NA	NA	19	<0.65	51	230
BG-6 (background)	4/3/2019	Soil	0-1 ft	NA	NA	2.05 O1	64.4	0.625	NA	0.177 J	NA	5.34	39.4	44.7	14.4	26.4	NA	NA	NA	448 J6	0.022	NA	12.8	NA	0.562 J	NA	NA	17.0	NA	NA	NA
	4/4/2019	Soil	2-3 ft	NA	NA	2.29	66.3	0.507 J	NA	0.139 J	NA	<1.19	22.9	22.9	14.7	32.3	NA	NA	NA	467	0.032	NA	7.78	NA	0.828	NA	NA	16.8	NA	NA	NA
BG-7 (background)	4/3/2019	Soil	0-1 ft	NA	NA	1.97	52.7	0.410 J	NA	0.136 J	NA	<1.16	70.2	70.2	18.9	36.4	NA	NA	NA	813	0.025	NA	12.8	NA	0.543 J	NA	NA	22.6	NA	NA	NA
	4/4/2019	Soil	2-3 ft	NA	NA	3.08	77.9	0.430 J	NA	0.108 J	NA	<1.16	27.0	27.0	16.3	32.5	NA	NA	NA	548	0.023	NA	6.20	NA	0.502 J	NA	NA	24.3	NA	NA	NA
BG-8 (background)	4/3/2019	Soil	0-1 ft	NA	NA	1.80	52.4	0.370 J	NA	0.0951 J	NA	<1.14	24.5	24.5	21.8	62.8	NA	NA	NA	759	0.0072	NA	9.04	NA	0.485 J	NA	NA	24.4	NA	NA	NA
	4/4/2019	Soil	2-3 ft	NA	NA	1.66	47.6	0.293 J	NA	0.0918 J	NA	<1.14	21.7	21.7	23.5	60.2	NA	NA	NA	732	<0.0067	NA	7.86	NA	0.306 J	NA	NA	25.1	NA	NA	NA
Site Specific Background Range					<0.27-<0.33	1.4-3.08	36-77.9	0.293 J-0.99		<0.27-0.38		<0.12-5.34	16.16-70.2	16-70.2	6.3-27	15-62.8		0.55-43		310-940	<0.0067-0.280		4.9-20		<0.59-1.7			14-46	<0.53-2.3	34-190	40-230
95% UCL of Site Specific Background Range [2]						2.1	58	0.58		0.18		2.19	28	25	15	27		30		591	0.114		10		1.2			29		84	147
North Carolina Background Range				7000 - >100,000	<1.0-8.8	1-18	50-1,000	ND-1.0	ND-100	1.0-10	100-280,000*	NS	NS	7-300	ND-50	2.0-20	100 - >100,000*	ND-50	50-50,000*	<2.0-7000*	0.03-0.52	<3-15*	ND	50-37,000*	<0.1-0.8	ND-5.0	<500-50,000*	ND-300	NS	15-300	11-59
PSRG - Protection of Groundwater				110,000	0.9	5.8	580	63	45	3.0	NS	3.8	360,000	3.8	0.9	700	150	270	NS	65	1.0	7.1	130	NS	2.1	3.4	NS	1,500	0.28	350	1,200
PSRG - Residential Health-based				16,000	6.3	0.68	3,100	31	3,100	14	NS	0.3	23,000	0.31	4.7	630	11,000	400	NS	2,200	2.3	78	310	NS	78	78	NS	9,400	0.16	78	4,700
PSRG - Industrial Health-based				230,000	93	3.0	47,000	470	47,000	200	NS	6.5	350,000	6.5	70	9,300	160,000	800	NS	32,000	9.7	1,200	4,700	NS	1,200	1,200	NS	140,000	2.3	1,200	70,000

Table 2 (page 2 of 2)
Summary of Soil Analytical Data
828 Martin Luther King, Jr. Blvd.
Chapel Hill, North Carolina
H&H Job No. TCH-003

Notes:
Yellow highlighting indicates samples collected as part of April 2019 data gap sampling
Soil concentrations are reported in milligrams per kilogram (mg/kg).
PSRG = North Carolina Department of Environmental Quality (DEQ) Preliminary Soil Remediation Goals (PSRGs) (February 2018); UCL = Upper Confidence Limit
95% UCL of site specific background ranges were calculated using EPA ProUCL 5.1
North Carolina Soil Background Range taken from *Elements in North American Soils, 2nd Edition* by James Dragun and Khaled Chekiri
*Not available for North Carolina. Used Eastern US Background Range
Bold denotes concentration above protection of groundwater PSRG and significantly above background.
Shading indicates concentration above residential PSRG and significantly above background.
Underlining indicates concentration above industrial PSRG and significantly above background.
ND = Not Detected; NA = Not Analyzed; NS = Not Specified; -- = statistical test not applicable to data set
J = Detected above method detection limit but below laboratory reporting limit; therefore, result is an estimated concentration
O1 = Analyte failed the method required serial dilution test and/or subsequent post-spike criteria. These failures indicate matrix interference.
J6 = The sample matrix interfered with the ability to make any accurate determination; spike value is low.
BH = Method blank greater than one-half laboratory reporting limit, but sample concentration greater than 10x the method blank.
A = Continuing Calibration Verification standard recovery (82%) is less than the lower control limit (90%). Result has possible low bias.
[1] denotes duplicate sample taken
[2] 95% UCL of Site Specific Background Values were calculated using values from samples collected through the Phase II RI
Analytical Methods
Metals by EPA Method 6010C or 6020B
Hexavalent Chromium by EPA Method 7196 or 7199 (Phase II RI and April 2019 Data Gap Samples)
Mercury by EPA Method 7471B

Appendix C

Interim Remedial Measures Product Specifications

Standard Silt Fencing

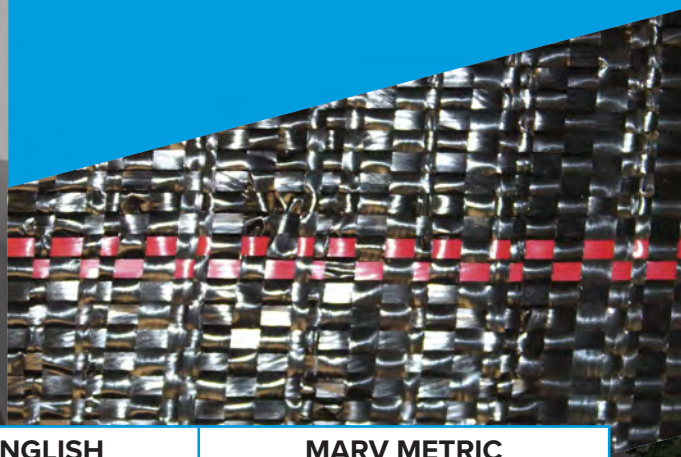
WINFAB®

REINFORCING SUCCESS

PRODUCT DATA SHEET
WINFAB 77SF

WINFAB 77SF is manufactured using high tenacity polypropylene yarns that are woven to form a dimensionally stable network, which allows the yarns to maintain their relative position.

WINFAB 77SF resists ultraviolet deterioration, rotting, and biological degradation and is inert to commonly encountered soil chemicals. It meets or exceeds the requirements of AASHTO M288 for supported silt fence and ASTM D6461 table 1.



PROPERTY	TEST METHOD	MARV ENGLISH	MARV METRIC
Tensile Strength (Grab)	ASTM D4632	100 x 100 lbs	445 x 445 N
Elongation (Grab)	ASTM D4632	15% x 15%	15% x 15%
Trapezoidal Tear Strength	ASTM D4533	50 x 50 lbs	322.4 x 322.4 N
CBR Puncture	ASTM D6241	250 lbs	1,112.5 N
UV Resistance (500 hrs)	ASTM D4355	80%	80%
Apparent Opening Size*	ASTM D4751	30 US Std. Sieve	0.60 mm
Permittivity	ASTM D4491	.1 sec^{-1}	.1 sec^{-1}
Water Flow Rate	ASTM D4491	8 gpm/ft^2	326 lpm/m^2

***Maximum Average Roll Valve**

PROPERTY	TEST METHOD	TYPICAL ENGLISH	TYPICAL METRIC
Roll Dimensions	Measured	36 in x 3300 yds 36 in x Custom 42 in x 3300 yds 42 in x Custom 48 in x 3300 yds 48 in x Custom	.91 m x 3018 m .91 m x Custom 1.07 m x 3018 m 1.07 m x Custom 1.22 m x 3018 m 1.22 m x Custom

WINFAB | **www.winfabusa.com**
1 Nashville Mills Rd. Nashville GA 31639
Ph: (912) 534-5757 • Fax: (912) 534-5533

GMA Geosynthetic Materials Association

GAI-LAP
Initials: GK # : 87
Date: 2016

Super Silt Fencing

GEOTEX® Woven

Product Data

GEOTEX® 200ST

GEOTEX® 200ST is a woven polypropylene geotextile containing heavy woven flat tape yarns and will meet the following Minimum Average Roll Values (MARV) when tested in accordance with the methods listed below. These characteristics make GEOTEX® 200ST ideal for the construction of embankments over soft soils, steepened slopes, and modular block and/or wrapped-face retaining walls. The geotextile is resistant to ultraviolet degradation and to biological and chemical environments normally found in soils.

GEOTEX® 200ST conforms to the property values listed below[1]. Propex performs internal Manufacturing Quality Control (MQC) tests that have been accredited by the Geosynthetic Accreditation Institute – Laboratory Accreditation Program (GAI-LAP). This product is NTPEP tested for AASHTO standards.

		MARV[2]	
PROPERTY	TEST METHOD	ENGLISH	METRIC
MECHANICAL			
Grab Tensile Strength	ASTM D-4632	200 lbs	890 N
Grab Elongation	ASTM D-4632	15%	15%
CBR Puncture	ASTM D-6241	700 lbs	3114 N
Trapezoidal Tear	ASTM D-4533	75 lbs	334 N
ENDURANCE			
UV Resistance at 500 hrs	ASTM D-4355	70%	70%
HYDRAULIC			
Apparent Opening Size (AOS)[3]	ASTM D-4751	40 US Std. Sieve	0.425 mm
Permittivity	ASTM D-4491	0.05 sec^{-1}	0.05 sec^{-1}
Water Flow Rate	ASTM D-4491	4 gpm/ft^2	163 $l/min/m^2$
ROLL SIZES[4]		12.5 ft x 432 ft 15.0 ft x 360 ft 17.5 ft x 309 ft	3.81 m x 131.7 m 4.57 m x 109.7 m 5.33 m x 94.2 m

NOTES:

1. The property values listed above are effective 12/17/2018 and are subject to change without notice.
2. Values shown are in weaker principal direction. Minimum average roll values (MARV) are calculated as the typical minus two standard deviations. Statistically, it yields a 97.7% degree of confidence that any samples taken from quality assurance testing will exceed the value reported. Values represent testing at time of manufacture.
3. Maximum average roll value.
4. Contact your local Territory Business Manager (TBM) for custom widths and colors. Lead times may vary depending on customer requirements and volume requested.

Propex GEOSOLUTIONS

ENGINEERED EARTH SOLUTIONS™

www.propexglobal.com

Propex Operating Company, LLC · 4019 Industry Drive Chattanooga, TN 37416 · ph 800 621 1273 · ph 423 855 1466

ProGanics™ Biotic Soil Media

Solutions for your Environment™

GREEN DESIGN ENGINEERING™
EARTH-FRIENDLY SOLUTIONS FOR SUSTAINABLE RESULTS™

Description

ProGanics™ Biotic Soil Media™ (BSM™) is designed as an alternative to topsoil to accelerate development of depleted soils/substrates with low organic matter, low nutrient levels and limited biological activity. This Engineered Soil Media™ (ESM™) helps unleash soils to their fullest potential for vegetative establishment and more effective erosion control. ProGanics is non-toxic with bark and wood fibers that have been phytosanitized to eliminate potential weed seeds and pathogens - prior to the introduction of soil building components.

Recommended Applications

- Development of Soils with Low Organic Matter (< 5%)
- Rapid Establishment and Sustained Growth of Vegetation
- Replacement of Costly or Difficult to Obtain Topsoil
- Replacement of Compost, Peat, Manure and Other Sources of Organic Material
- Typically Installed Beneath Hydraulically-applied and Rolled Erosion Control Products (HECPs and RECPs) as Growing Media.

Soil Building and Revegetation

Mix seed and specified Prescriptive Agronomic Formulations at recommended rates in approved hydraulic seeding/mulching equipment when water has reached approximately 1/3 of the working capacity. Add ProGanics™ Biotic Soil Media at a rate of 100 pounds per 100 gallons of water (45 kg / 379 L) on hydraulic equipment with gear or positive displacement pumps and 75 pounds per 100 gallons of water(34 kg / 379 L) on centrifugal pumps while agitating; add fertilizer when the tank is approximately 3/4 full. Apply over properly prepared surfaces that are deemed geotechnically stable. Confirm specific material loading rates with equipment manufacturer.

Erosion Control Solution

Apply ProGanics as directed above being sure to include all Prescriptive Agronomic Formulations, fertilizer and seed at their recommended rates. Apply Flexterra® HP-FGM™, ProMatrix™ EFM™, or RECP over ProGanics as directed by manufacturer's recommendation. Follow all manufacturer's product selection guidelines or go to www.ProfilePS3.com for assistance.

Technical Data

Physical Properties*	Test Method	Units	Tested Value
Organic Material	ASTM D586	%	≥ 94
Mass/Unit Area	ASTM D6566[1]	g/m^2 (oz/yd^2)	≥ 392 (11.6)
Ground Cover	ASTM D6567[1]	%	≥ 99
Water Holding Capacity	ASTM D7367	%	≥ 900
pH	ASTM D1293	n/a	6.0 ± 1.0
C:N Ratio	ASTM E1508 & EPA Method 1687	n/a	50:1 ± 10
Material Color	Observed	n/a	Brown
Performance Properties*	**Test Method**	**Units**	**Tested Value**
Cover Factor[2]	Large Scale[4,5]	n/a	≤ 0.01
Percent Effectiveness[3]	Large Scale[4,5]	%	≥ 99
Vegetation Establishment	ASTM D7322[1]	%	≥ 850
Environmental Properties*	**Test Method**	**Units**	**Tested Value**
Ecotoxicity	EPA 2021.0	%	48-hr LC_{50} > 100%
Biodegradability	ASTM D5338	n/a	Yes
EPA 503 Metal Pass/Fail[6]	EPA 503 Metal Limits	Pass/Fail	Pass
Pathogen Reduction	40 CFR 503 Class A Compost	Pass/Fail	Pass
Product Composition			**Typical Value**
Thermally Processed Bark and Wood Fibers[7] (within a pressurized vessel)			89%
Proprietary blend of Polysaccharide Polymers, Biochar, Seaweed Extract, Humic Acid, Endomycorrhizae, and Beneficial Bacteria			11%
Moisture Content			12%

* When uniformly applied at a rate of 3,500 pounds per acre (3,900 kilograms/hectare) under laboratory conditions. 1. ASTM test methods developed for Rolled Erosion Control Products that have been modified to accommodate Hydraulic Erosion Control Products. 2. Cover Factor is calculated as soil loss ratio of treated surface versus an untreated control surface. 3. % Effectiveness = One minus Cover Factor multiplied by 100%. 4. Large scale testing conducted at Utah Water Research Laboratory. For specific testing information please contact a Profile technical service representative at 800-508-8681 or +1-847-215-1144. 5. Performance Property values derived from testing of ProMatrix Engineered Fiber Matrix (EFM) applied at 3,500 pounds per acre (3,900 kilograms/hectare) over ProGanics at an application of 3,500 pounds per acre (3,900 kilograms/hectare). 6. A list of Metals included in the EPA 503 Metal Limits Testing is available upon request. 7. Heated to a temperature greater than 360 degrees Fahrenheit (193 degrees Celsius) for 5 minutes at a pressure greater than 50 psi (345 kPa) in order to be Thermally Refined™/Processed and to achieve phyto-sanitization.

Packaging Data

Properties	Test Method	Units	Nominal Value
Bag Weight	Scale	kg (lb)	22.7 (50)
Bags per Pallet	Observed	#	40

UV and weather-resistant plastic bags. Pallets are weather-proof stretch wrapped with UV resistant pallet cover.

Profile Products
750 Lake Cook Road, Ste. 440
Buffalo Grove, IL 60089
800-508-8681 or +1-847-215-1144
www.profileproducts.com

Flexterra® HP-FGM™
High Performance Flexible Growth Medium

Solutions for your Environment™

GREEN DESIGN ENGINEERING™
EARTH-FRIENDLY SOLUTIONS FOR SUSTAINABLE RESULTS™

Description

Flexterra® HP-FGM™ is a fully biodegradable, High Performance-Flexible Growth Medium (HP-FGM) composed of 100% recycled and Thermally Refined™ wood fibers, crimped interlocking biodegradable fibers, micro-pore granules, naturally derived cross-linked biopolymers and water absorbents. The HP-FGM is phytosanitized, free from weed seeds, free from plastic netting, requires no curing period and upon application forms an intimate bond with the soil surface to create a continuous, porous, absorbent and flexible erosion resistant blanket that allows for rapid germination and accelerated plant growth.

Recommended Applications

- Erosion control for slopes ranging from mild to severe (≤0.25H:1V)
- Rough graded slopes
- Superior performance over rolled erosion control blankets
- Enhancement of vegetation establishment
- Ideal infill material to create the GreenArmor™ System

Technical Data

Physical Properties*	Test Method	Units	Tested Value
Mass/Unit Area	ASTM D6566[1]	g/m^2 (oz/yd^2)	≥ 390 (11.6)
Thickness	ASTM D6525[1]	mm (in)	≥ 5.6 (0.22)
Ground Cover	ASTM D6567[1]	%	≥ 99
Water Holding Capacity	ASTM D7367	%	≥ 1,700
Material Color	Observed	n/a	Green
Performance Properties*	**Test Method**	**Units**	**Tested Value**
Cover Factor[2]	Large Scale[4]	n/a	≤ 0.01
Percent Effectiveness[3]	Large Scale[4]	%	≥ 99
Cure Time	Observed	hours	0 - 2
Vegetation Establishment	ASTM D7322[1]	%	≥ 800
Functional Longevity[5]	ASTM D5338	months	≤ 18
Environmental Properties*	**Test Method**	**Units**	**Tested Value**
Ecotoxicity	EPA 2021.0	%	48-hr LC_{50} > 100%
Effluent Turbidity	Large Scale[4]	NTU	< 250
Biodegradability	ASTM D5338	n/a	Yes
Product Composition			**Typical Value**
Thermally Processed Wood Fiber[6] (within a pressurized vessel)			80 %
Wetting Agents-including high-viscosity colloidal polysaccharides, cross-linked biopolymers, and water absorbents			10 %
Crimped, Biodegradable Interlocking Fibers			5 %
Micro-Pore Granules			5 %

* When uniformly applied at a rate of 3500 pounds per acre (3900 kilograms/hectare) under laboratory conditions. 1. ASTM test methods developed for Rolled Erosion Control Products that have been modified to accommodate Hydraulic Erosion Control Products. 2. Cover Factor is calculated as soil loss ratio of treated surface versus an untreated control surface. 3. % Effectiveness = One minus Cover Factor multiplied by 100%. 4. Large scale testing conducted at Utah Water Research Laboratory. For specific testing information please contact a Profile technical service representative at 866-325-6262 or +1-847-215-1144. 5. Functional Longevity is the estimated time period, based upon field observations, that a material can be anticipated to provide erosion control and agronomic benefits as influenced by composition, as well as site-specific conditions, including; but not limited to – temperature, moisture, light conditions, soils, biological activity, vegetative establishment and other environmental factors. 6. Heated to a temperature greater than 380 degrees Fahrenheit (193 degrees Celsius) for 5 minutes at a pressure greater than 50 psi (345 kPa) in order to be Thermally Refined™/Processed and to achieve phyto-sanitization.

Packaging Data

Properties	Test Method	Units	Nominal Value
Bag Weight	Scale	kg (lb)	22.7 (50)
Bags per Pallet	Observed	#	40

UV and weather-resistant plastic bags. Pallets are weather-proof stretch wrapped with UV resistant pallet cover.

Profile Products
750 Lake Cook Road, Ste. 440
Buffalo Grove, IL 60089
800-508-8681 or +1-847-215-1144
www.profileproducts.com

Appendix D

Silt Fence and Hydroseeded Areas Inspection Log

Silt Fence and Hydroseeded Areas Inspection Log
828 Martin Luther King Jr., Blvd.
Chapel Hill, North Carolina

Date of Inspection: _____

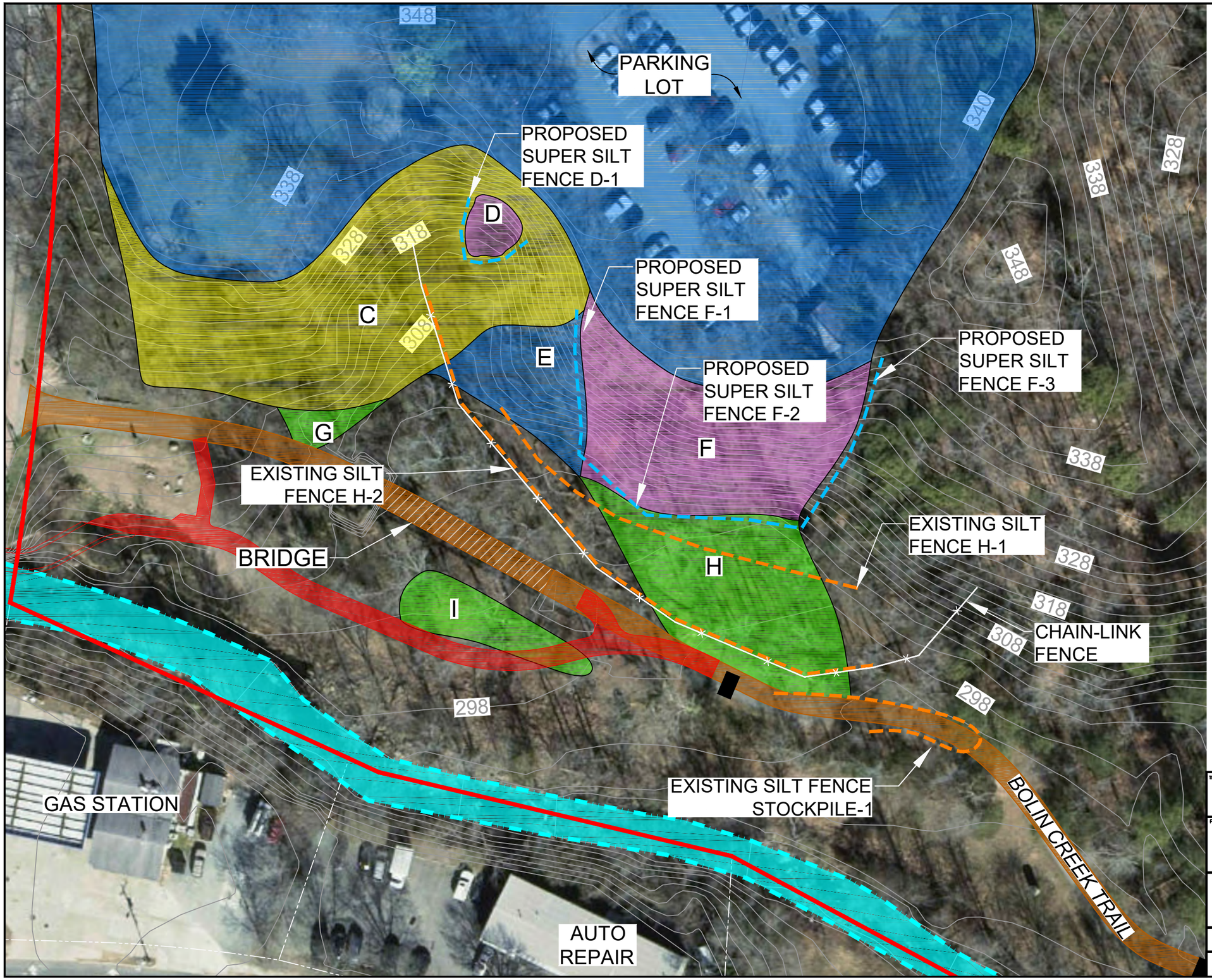
Reason for Inspection (scheduled or weather related): _____

Name of Inspector: _____

Signature of Inspector: _____

	Inspection Task	Yes	No	N/A	Location[1]	Notes, Improvements Made, or Recommended Actions
1.0	**Silt Fencing (areas D-1, F-1, F-2, F-3, H-1, and Soil Stockpiles, if present)**					
1.1	Is geotextile fabric in good condition (i.e., no signs of tears or unravelling)?					
1.2	Is chain-link backing (super silt fence only) in good condition?					
1.3	Are support posts in their original position and are adequately providing stability to the fence system?					
1.4	Has sediment accumulated behind the silt fencing? If yes, estimate thickness in Notes.					
1.5	Is sediment behind silt fence within 6 inches of top of silt fence?					
1.6	Has any sediment accumulated beyond the silt fencing?					
1.7	Are stockpiles underlain by and covered with minimum 10-mil plastic sheeting?					
2.0	**Hydroseed Areas (areas D and F)**					
2.1	Do hydroseeded areas shown signs of distressed or absent vegetation?					
2.2	Do hydroseeded areas shown signs of erosion?					

Notes:
1. Site inspection locations include silt fencing in areas D-1, F-1, F-2, F-3, H-1, Stockpile-1, and future stockpiles, and hydroseeded areas D and F (see Figure 1).
N/A = not applicable



LEGEND

- SITE PROPERTY BOUNDARY
- BOLIN CREEK
- 101 TOPOGRAPHIC CONTOUR ELEVATION (FT MSL)
- FENCE LINE (APPROXIMATE LOCATION)
- EXISTING SILT FENCE (APPROXIMATE LOCATION)
- PROPOSED SUPER SILT FENCE (APPROXIMATE LOCATION)
- CCP UNDER > 2 FT COVER
- CCP UNDER < 2 FT COVER
- CCP EXPOSED AT GROUND SURFACE
- CCP DEPOSITIONAL LAYER
- STORMWATER CULVERT
- PROPOSED TRAIL

N

APPROXIMATE
0 50 100
SCALE IN FEET

TITLE
SITE MAP - PROPOSED INTERIM REMEDIAL MEASURES

PROJECT
TOWN OF CHAPEL HILL
828 MARTIN LUTHER KING JR. BOULEVARD
CHAPEL HILL, NORTH CAROLINA

hart hickman
SMARTER ENVIRONMENTAL SOLUTIONS
2923 South Tryon Street-Suite 100
Charlotte, North Carolina 28203
704-586-0007(p) 704-586-0373(f)
License # C-1269 / #C-245 Geology

DATE: 5-22-19	REVISION NO. 0
JOB NO. TCH-002	FIGURE NO. 1

Appendix B

May 2, 2016 DEQ IHSB Risk Evaluation Letter

Waste Management
ENVIRONMENTAL QUALITY

PAT MCCRORY
Governor

DONALD R. VAN DER VAART
Secretary

MICHAEL E. SCOTT
Acting Director

May 2, 2016

Mr. Lance Norris, Public Works Director
Town of Chapel Hill
405 Martin Luther King Jr Blvd
Chapel Hill NC 27514

Re: Chapel Hill Police Department Property
828 Martin Luther King Jr Blvd
Chapel Hill, Orange County
NONCD0001486

Dear Mr. Norris

This letter is written regarding the soil sample results from the requested testing in and around the proposed greenway construction that will cross onto the Chapel Hill Police Department Property Site (Site). The sample results were evaluated by our industrial hygienist to determine if they exceed safe levels for park/recreational use and worker exposure. The complete results of the evaluation are attached for your review. In summary, the risk of adverse health effects to park visitors and construction workers is below the US EPA and NC DEQ maximum acceptable limits.

If you have any questions, please contact me at (919) 707-8371.

Sincerely,

Amy Axon, Hydrogeologist
Inactive Hazardous Sites Branch

Enclosures
CC: Curtis Brooks

Axon, Amy

From: Assefa, Hanna
Sent: Tuesday, March 22, 2016 5:13 PM
To: Axon, Amy
Subject: Risk Assessment for the Chapel Hill Police Department soil contamination-828 Martin Luther King Jr Blvd. Chapel Hill, Orange County, NONCDD0001486
Attachments: recreator risk calc chapel hil pd property 03 21 2016.pdf; Construction_Worker_chem_22MAR2016_prg6491 Chapel Hill Police Department Soil.pdf

Amy, I have evaluated the maximum contaminant concentrations you provided for the subject site, for risk posed for a recreational/park scenario and a construction worker scenario. I used the USEPA risk calculator for this calculation. For the recreational/park scenario I assumed several age groups including infants going to the park twice a week 110 days a year for 1 hr. This is likely very conservative. Under these assumptions the risk of adverse health effects to the park visitor is below the USEPA and NCDEQ acceptable limits. Similarly, I assumed that construction workers would be exposed to the contaminants when they are grading the land when converting to a park. I ultra-conservatively assumed that they would work in the same area for 1 year.

The risk of adverse health effects calculated for the construction worker was also below the USEPA and NCDEQ maximum acceptable limits.

The USEPA and the NCDEQ maximum acceptable limits are a cumulative 1.0E-04 cancer risk a hazard index of 1.0 for non-cancer adverse health effects.

I have attached the calculations for your records.

Chapel Hill Police Department Property, 828 Martin Luther King Jr Blvd
Chapel Hill, Orange County
Incident #NONCD0001486

Site-specific

Construction Worker Equation Inputs for Soil - Other Construction Activities

Variable	Value
TR (target cancer risk) unitless	1.0E-6
THQ (target hazard quotient) unitless	1
EF_{cw} (exposure frequency - construction worker) day/yr	250
ED_{cw} (exposure duration - construction worker) yr	1
ET_{cw} (exposure time - construction worker) hr/day	8
LT (lifetime) yr	70
BW_{cw} (body weight - construction worker) kg	80
IR_{cw} (soil ingestion rate - construction worker) mg/day	330
SA_{cw} (surface area - construction worker) cm^2/day	3527
AF_{cw} (skin adherence factor - construction worker) mg/cm^2	0.3
AT_{cw} (averaging time - construction worker)	365
EW_{cw} (overall duration of construction) weeks/year	50
DW_{cw} (days worked - construction worker) days/week	5
A_c (acres)	0.13
A_{till} (areal extent of tilling) acres	0.13
A_{excav} (area of excavation site) m^2	0.13
$A_{c\text{-}grade}$ (areal extent of grading) acres	0.13
$A_{c\text{-}doz}$ (areal extent of dozing) acres	0.13
$M_{m\text{-}doz}$ (Gravimetric soil moisture content) %	7.9
$M_{m\text{-}excav}$ (Gravimetric soil moisture content) %	12
ρ$_{soil}$ (density) g/cm^3 - chemical-specific	1.68
$N_{A\text{-}dump}$ (number of times soil is dumped)	2
$N_{A\text{-}till}$ (number of times soil is tilled)	2
s_{till} (soil silt content) %	18
s_{doz} (soil silt content) %	6.9
B_l (dozing blade length) m	1
B_l (grading blade length) m	1
$N_{A\text{-}doz}$ (number of times site was dozed)	2
$N_{A\text{-}grade}$ (number of times site was graded)	4
S_{doz} (dozing speed) kph	11.4
S_{grade} (dozing speed) kph	11.4
d_{excav} (average depth of excavation site) m	.6
V (fraction of vegetative cover)	0

Output generated 22MAR2016:15:16:25

Site-specific

Construction Worker Equation Inputs for Soil - Other Construction Activities

Variable	Value
U_m (mean annual wind speed) m/s	4.69
U_t (equivalent threshold value) m/s	11.32
t_c (overall duration of construction) hours	8400
F_D Unitless Dispersion Correction Factor	0.185837208
T (time over which traffic occurs) s	7200000
$J`_T$ (g/m^2s)	0.0000010282552
F(x) (function dependant on U_m/U_t derived using Cowherd et al. (1985))	0.194
M_{wind} (dust emitted by wind erosion) g	2289.0175219211
M_{doz} (dust emitted from dozing operations) g	31.265918140303
M_{till} (dust emitted from tilling operations) g	655.63592234891
M_{grade} (dust emitted from grading operations) g	918.93655526399
M_{excav} (dust emitted from excavation soil dumping) g	0.0319584249322
ΣVKT_{doz} (sum of fleet vehicle km traveled) km	1.05222
ΣVKT_{grade} (sum of fleet vehicle km traveled) km	2.10444
Q/C_{ea} (inverse of the ratio of the geometric mean air concentration to the emission flu	18.747540287861
$PEF`_{sc}$ (particulate emission factor) m^3/kg	98109416.470716
A (PEF Dispersion Constant)	2.4538
B (PEF Dispersion Constant)	17.5660
C (PEF Dispersion Constant)	189.0426
A_{surf} (areal extent of site) m^2	526.0918
A_s ($VF_{ulim-sc}$ acres)	0.5
T (temperature) °C	25
foc (fraction organic carbon in soil) g/g	0.006
ρ$_b$ (dry soil bulk density) g/cm^3	1.5
ρ$_s$ (soil particle density) g/cm^3	2.65
θ$_w$ (water-filled soil porosity) L_{water}/L_{soil}	0.15
A (VF Dispersion Constant)	2.4538
B (VF Dispersion Constant)	17.5660
C (VF Dispersion Constant)	189.0426
Q/C_{ea} (inverse of the ratio of the geometric mean air concentration to the emission flu	14.31407
n (total soil porosity) L_{pore}/L_{soil}	0.43396
θ$_a$ (air-filled soil porosity) L_{air}/L_{soil}	0.28396
A_s ($VF_{mlim-sc}$ acres)	0.5

Output generated 22MAR2016:15:16:25

Site-specific

Construction Worker Equation Inputs for Soil - Other Construction Activities

Variable	Value
ρ$_{b}$ (dry soil bulk density) g/cm ^{3}	1.5
d_{e} (average source depth) m	.
Q/C_{vol} (inverse of the ratio of the geometric mean air concentration to the emission fl	14.31407
$VF_{mlim\text{-}sc}$ (volitization factor) m $^{3}_{air}/kg_{soil}$	.

Output generated 22MAR2016:15:16:25

Site-specific

Construction Worker Screening Levels (RSL) for Soil - Other Construction Activities

ca=Cancer, nc=Noncancer, ca* (Where nc SL < 100 x ca SL),
ca** (Where nc SL < 10 x ca SL), max=SL exceeds ceiling limit (see User's Guide), sat=SL exceeds csat,
Smax=Soil SL exceeds ceiling limit and has been substituted with the max value (see User's Guide),
Ssat=Soil inhalation SL exceeds csat and has been substituted with the csat

Chemical	CAS Number	Mutagen?	VOC?	Ingestion SF (mg/kg-day) $^{-1}$	SFO Ref	Inhalation Unit Risk (ug/m ^{3})$^{-1}$	IUR Ref	Subchronic RfD (mg/kg-day)	Subchronic RfD Ref	Subchronic RfC (mg/m ^{3})	Subchronic RfC Ref	GIABS	ABS	RBA	Volatilization Factor (m ^{3}/kg)
Arsenic, Inorganic	7440-38-2	No	No	1.50E+00	I	4.30E-03	I	3.00E-04	I	1.50E-05	C	1	0.03	0.6	-
Barium	7440-39-3	No	No	-		-		2.00E-01	A	5.00E-03	H	0.07	-	1	-
Beryllium and compounds	7440-41-7	No	No	-		2.40E-03	I	5.00E-03	H	2.00E-05	I	0.007	-	1	-
Chromium(III), Insoluble Salts	16065-83-1	No	No	-		-		1.50E+00	H	5.00E-03	A	0.013	-	1	-
Cobalt	7440-48-4	No	No	-		9.00E-03	P	3.00E-03	P	2.00E-05	P	1	-	1	-
Copper	7440-50-8	No	No	-		-		1.00E-02	A	-		1	-	1	-
Mercury (elemental)	7439-97-6	No	Yes	-		-		-		3.00E-04	H	1	-	1	7.53E+03
Molybdenum	7439-98-7	No	No	-		-		5.00E-03	H	-		1	-	1	-
Nickel Soluble Salts	7440-02-0	No	No	-		2.60E-04	C	2.00E-02	H	2.00E-04	A	0.04	-	1	-
Selenium	7782-49-2	No	No	-		-		5.00E-03	H	2.00E-02	C	1	-	1	-
Strontium, Stable	7440-24-6	No	No	-		-		2.00E+00	A	-		1	-	1	-
Thallium (Soluble Salts)	7440-28-0	No	No	-		-		4.00E-05	S	-		1	-	1	-
Vanadium and Compounds	7440-62-2	No	No	-		-		1.00E-02	A	1.00E-04	A	0.026	-	1	-
Zinc and Compounds	7440-66-6	No	No	-		-		3.00E-01	A	-		1	-	1	-

Site-specific

Construction Worker Screening Levels (RSL) for Soil - Other Construction Activities

ca=Cancer, nc=Noncancer, ca* (Where nc SL < 100 x ca SL),
ca** (Where nc SL < 10 x ca SL), max=SL exceeds ceiling limit (see User's Guide), sat=SL exceeds csat,
Smax=Soil SL exceeds ceiling limit and has been substituted with the max value (see User's Guide),
Ssat=Soil inhalation SL exceeds csat and has been substituted with the csat

Chemical	Soil Saturation Concentration (mg/kg)	Particulate Emission Factor (m^3/kg)	Ingestion SL TR=1.0E-6 (mg/kg)	Dermal SL TR=1.0E-6 (mg/kg)	Inhalation SL TR=1.0E-6 (mg/kg)	Carcinogenic SL TR=1.0E-6 (mg/kg)	Ingestion SL THQ=1 (mg/kg)	Dermal SL THQ=1 (mg/kg)	Inhalation SL THQ=1 (mg/kg)	Noncarcinogenic SL THI=1 (mg/kg)	Screening Level (mg/kg)
Arsenic, Inorganic	-	9.81E+07	2.75E+01	1.72E+02	7.00E+03	2.36E+01	1.70E+02	1.06E+03	6.18E+03	1.43E+02	2.36E+01 ca**
Barium	-	9.81E+07	-	-	-	-	6.79E+04	-	2.06E+06	6.57E+04	6.57E+04 nc
Beryllium and compounds	-	9.81E+07	-	-	1.25E+04	1.25E+04	1.70E+03	-	8.24E+03	1.41E+03	1.41E+03 nc
Chromium(III), Insoluble Salts	-	9.81E+07	-	-	-	-	5.09E+05	-	2.06E+06	4.08E+05	4.08E+05 max
Cobalt	-	9.81E+07	-	-	3.34E+03	3.34E+03	1.02E+03	-	8.24E+03	9.06E+02	9.06E+02 nc
Copper	-	9.81E+07	-	-	-	-	3.39E+03	-	-	3.39E+03	3.39E+03 nc
Mercury (elemental)	3.13E+00	9.81E+07	-	-	-	-	-	-	9.49E+00	9.49E+00	9.49E+00 sat
Molybdenum	-	9.81E+07	-	-	-	-	1.70E+03	-	-	1.70E+03	1.70E+03 nc
Nickel Soluble Salts	-	9.81E+07	-	-	1.16E+05	1.16E+05	6.79E+03	-	8.24E+04	6.27E+03	6.27E+03 nc
Selenium	-	9.81E+07	-	-	-	-	1.70E+03	-	8.24E+06	1.70E+03	1.70E+03 nc
Strontium, Stable	-	9.81E+07	-	-	-	-	6.79E+05	-	-	6.79E+05	6.79E+05 max
Thallium (Soluble Salts)	-	9.81E+07	-	-	-	-	1.36E+01	-	-	1.36E+01	1.36E+01 nc
Vanadium and Compounds	-	9.81E+07	-	-	-	-	3.39E+03	-	4.12E+04	3.14E+03	3.14E+03 nc
Zinc and Compounds	-	9.81E+07	-	-	-	-	1.02E+05	-	-	1.02E+05	1.02E+05 max

Site-specific

Construction Worker Risk for Soil - Other Construction Activities

Chemical	Ingestion SF (mg/kg-day) $^{-1}$	SFO Ref	Inhalation Unit Risk (ug/m ^{3})$^{-1}$	IUR Ref	Subchronic RfD (mg/kg-day)	Subchronic RfD Ref	Subchronic RfC (mg/m ^{3})	Subchronic RfC Ref	GIABS	ABS	RBA	Volatilization Factor (m ^{3}/kg)	Soil Saturation Concentration (mg/kg)
Arsenic, Inorganic	1.50E+00	I	4.30E-03	I	3.00E-04	I	1.50E-05	C	1	0.03	0.6	-	-
Barium	-		-		2.00E-01	A	5.00E-03	H	0.07	-	1	-	-
Beryllium and compounds	-		2.40E-03	I	5.00E-03	H	2.00E-05	I	0.007	-	1	-	-
Chromium(III), Insoluble Salts	-		-		1.50E+00	H	5.00E-03	A	0.013	-	1	-	-
Cobalt	-		9.00E-03	P	3.00E-03	P	2.00E-05	P	1	-	1	-	-
Copper	-		-		1.00E-02	A	-		1	-	1	-	-
Mercury (elemental)	-		-		-		3.00E-04	H	1	-	1	7.53E+03	3.13E+00
Molybdenum	-		-		5.00E-03	H	-		1	-	1	-	-
Nickel Soluble Salts	-		2.60E-04	C	2.00E-02	H	2.00E-04	A	0.04	-	1	-	-
Selenium	-		-		5.00E-03	H	2.00E-02	C	1	-	1	-	-
Strontium, Stable	-		-		2.00E+00	A	-		1	-	1	-	-
Thallium (Soluble Salts)	-		-		4.00E-05	S	-		1	-	1	-	-
Vanadium and Compounds	-		-		1.00E-02	A	1.00E-04	A	0.026	-	1	-	-
Zinc and Compounds	-		-		3.00E-01	A	-		1	-	1	-	-
*Total Risk/HI	-		-		-		-		-	-	-	-	-

Output generated 22MAR2016:15:16:25

Site-specific

Construction Worker Risk for Soil - Other Construction Activities

Chemical	Particulate Emission Factor (m^3/kg)	Concentration (mg/kg)	Ingestion Risk	Dermal Risk	Inhalation Risk	Carcinogenic Risk	Ingestion HQ	Dermal HQ	Inhalation HQ	Noncarcinogenic HI
Arsenic, Inorganic	9.81E+07	2.40E+01	8.72E-07	1.40E-07	3.43E-09	1.02E-06	0.1414286	0.0226736	0.0038829	0.1679851
Barium	9.81E+07	8.30E+02	-	-	-	-	0.0122277	-	0.0004029	0.0126305
Beryllium and compounds	9.81E+07	3.50E+00	-	-	2.79E-10	2.79E-10	0.0020625	-	0.0004247	0.0024872
Chromium(III), Insoluble Salts	9.81E+07	3.50E+01	-	-	-	-	0.0000688	-	0.000017	0.0000857
Cobalt	9.81E+07	2.80E+01	-	-	8.38E-09	8.38E-09	0.0275	-	0.0033976	0.0308976
Copper	9.81E+07	5.70E+01	-	-	-	-	0.0167946	-	-	0.0167946
Mercury (elemental)	9.81E+07	2.10E+00	-	-	-	-	-	-	0.2213331	0.2213331
Molybdenum	9.81E+07	1.70E+00	-	-	-	-	0.0010018	-	-	0.0010018
Nickel Soluble Salts	9.81E+07	1.90E+01	-	-	1.64E-10	1.64E-10	0.0027991	-	0.0002305	0.0030297
Selenium	9.81E+07	2.40E+00	-	-	-	-	0.0014143	-	2.9122E-7	0.0014146
Strontium, Stable	9.81E+07	1.90E+02	-	-	-	-	0.0002799	-	-	0.0002799
Thallium (Soluble Salts)	9.81E+07	1.70E+00	-	-	-	-	0.1252232	-	-	0.1252232
Vanadium and Compounds	9.81E+07	9.50E+01	-	-	-	-	0.0279911	-	0.0023055	0.0302966
Zinc and Compounds	9.81E+07	1.10E+02	-	-	-	-	0.0010804	-	-	0.0010804
**Total Risk/HI*	-	-	*8.72E-07*	*1.40E-07*	*1.23E-08*	*1.02E-06*	*0.3598719*	*0.0226736*	*0.2319945*	*0.61454*

Output generated 22MAR2016:15:16:25

Site-specific

Recreator Equation Inputs for Soil

Variable	Value
TR (target cancer risk) unitless	1.0E-6
THQ (target hazard quotient) unitless	1
SA_{rec-c} (skin surface area - child) cm^2/day	2373
SA_{rec-a} (skin surface area - adult) cm^2/day	6032
SA_{0-2} (skin surface area - mutagenic) cm^2/day	2373
SA_{2-6} (skin surface area - mutagenic) cm^2/day	2373
SA_{6-16} (skin surface area - mutagenic) cm^2/day	6032
SA_{16-30} (skin surface area - mutagenic) cm^2/day	6032
SA_{rec-a} (skin surface area - adult) cm^2/day	6032
LT (lifetime - recreator) year	70
$IFS_{rec-adj}$ (age-adjusted soil ingestion factor) mg/kg	11550
$DFS_{rec-adj}$ (age-adjusted soil dermal factor) mg/kg	32494
$IFSM_{rec-adj}$ (mutagenic age-adjusted soil ingestion factor) mg/kg	52433.333
$DFSM_{rec-adj}$ (mutagenic age-adjusted soil dermal factor) mg/kg	134596
EF_{0-2} (exposure frequency) day/year	110
EF_{2-6} (exposure frequency) day/year	110
EF_{6-16} (exposure frequency) day/year	110
EF_{16-30} (exposure frequency) day/year	110
EF_{rec-c} (exposure frequency - child) day/year	110
EF_{rec-a} (exposure frequency - adult) day/year	110
EF_{rec-a} (exposure frequency - adult) day/year	110
EF_{rec} (exposure frequency - recreator) day/year	110
IRS_{0-2} (soil intake rate) mg/day	200
IRS_{2-6} (soil intake rate) mg/day	200
IRS_{6-16} (soil intake rate) mg/day	100
IRS_{16-30} (soil intake rate) mg/day	100
IRS_{rec-c} (soil intake rate - child) mg/day	200
IRS_{rec-a} (soil intake rate - adult) mg/day	100
IRS_{rec-a} (soil intake rate - adult) mg/day	100
ED_{0-2} (exposure duration) year	2
ED_{2-6} (exposure duration) year	4
ED_{6-16} (exposure duration) year	10
ED_{16-30} (exposure duration) year	10

Output generated 21MAR2016:14:44:13

Site-specific

Recreator Equation Inputs for Soil

Variable	Value
ED_{rec-c} (exposure duration - child) year	6
ED_{rec-a} (exposure duration - adult) year	20
ED_{rec-a} (exposure duration - adult) year	20
ED_{rec} (exposure duration - recreator) year	26
ET_{0-2} (exposure time) hr/day	1
ET_{2-6} (exposure time) hr/day	1
ET_{6-16} (exposure time) hr/day	1
ET_{16-30} (exposure time) hr/day	1
ET_{rec-c} (exposure time - child) hr/day	1
ET_{rec-a} (exposure time - adult) hr/day	1
ET_{rec-a} (exposure time - adult) hr/day	1
ET_{rec} (exposure time - recreator) hr/day	1
BW_{0-2} (body weight) kg	15
BW_{2-6} (body weight) kg	15
BW_{6-16} (body weight) kg	80
BW_{16-30} (body weight) kg	80
BW_{rec-c} (body weight - child) kg	15
BW_{rec-a} (body weight - adult) kg	80
BW_{rec-a} (body weight - adult) kg	80
AF_{0-2} (skin adherence factor) mg/cm ^{2}	0.2
AF_{2-6} (skin adherence factor) mg/cm ^{2}	0.2
AF_{6-16} (skin adherence factor) mg/cm ^{2}	0.07
AF_{16-30} (skin adherence factor) mg/cm ^{2}	0.07
AF_{rec-c} (skin adherence factor - child) mg/cm ^{2}	0.2
AF_{rec-a} (skin adherence factor - adult) mg/cm ^{2}	0.07
AF_{rec-a} (skin adherence factor - adult) mg/cm ^{2}	0.07
City (Climate Zone) PEF Selection	Default
A_c (acres)	.5
Q/C_{wp} (g/m^2-s per kg/m^3)	93.77
PEF (particulate emission factor) m ^{3}/kg	1359344438
A (PEF Dispersion Constant)	16.2302
B (PEF Dispersion Constant)	18.7762
C (PEF Dispersion Constant)	216.108

Output generated 21MAR2016:14:44:13

Site-specific

Recreator Equation Inputs for Soil

Variable	Value
V (fraction of vegetative cover) unitless	0.5
U_m (mean annual wind speed) m/s	4.69
U_t (equivalent threshold value)	11.32
F(x) (function dependant on U_m/U_t) unitless	0.194
City (Climate Zone) VF Selection	Default
A_c (acres)	.5
Q/C_{vol} (g/m^2-s per kg/m^3)	68.18
foc (fraction organic carbon in soil) g/g	0.006
ρ$_b$ (dry soil bulk density) g/cm^3	1.5
ρ$_s$ (soil particle density) g/cm^3	2.65
n (total soil porosity) L_{pore}/L_{soil}	0.43396
θ$_a$ (air-filled soil porosity) L_{air}/L_{soil}	0.28396
θ$_w$ (water-filled soil porosity) L_{water}/L_{soil}	0.15
T (exposure interval) s	819936000
A (VF Dispersion Constant)	11.911
B (VF Dispersion Constant)	18.4385
C (VF Dispersion Constant)	209.7845
City (Climate Zone) VF_{ml} Selection	Default
VF_s (volitization factor) m^3/kg	.
Q/C_{vol} (g/m^2-s per kg/m^3)	68.18365
A_c (acres)	.5
T (exposure interval) yr	26
d_c (depth of source) m	.
ρ$_b$ (dry soil bulk density) g/cm^3	1.5
A (VF Dispersion Constant - Mass Limit)	11.911
B (VF Dispersion Constant - Mass Limit)	18.4385
C (VF Dispersion Constant - Mass Limit)	209.7845

Site-specific

Recreator Screening Levels (RSL) for Soil

ca=Cancer, nc=Noncancer, ca* (Where nc SL < 100 x ca SL),
ca** (Where nc SL < 10 x ca SL), max=SL exceeds ceiling limit (see User's Guide), sat=SL exceeds csat,
Smax=Soil SL exceeds ceiling limit and has been substituted with the max value (see User's Guide),
Ssat=Soil inhalation SL exceeds csat and has been substituted with the csat

Chemical	CAS Number	Mutagen?	VOC?	Ingestion SF (mg/kg-day) $^{-1}$	SFO Ref	Inhalation Unit Risk (ug/m ^{3})$^{-1}$	IUR Ref	Subchronic RfD (mg/kg-day)	Subchronic RfD Ref	Subchronic RfC (mg/m ^{3})	Subchronic RfC Ref
Arsenic, Inorganic	7440-38-2	No	No	1.50E+00	I	4.30E-03	I	3.00E-04	I	1.50E-05	C
Barium	7440-39-3	No	No	-		-		2.00E-01	A	5.00E-03	H
Beryllium and compounds	7440-41-7	No	No	-		2.40E-03	I	5.00E-03	H	2.00E-05	I
Chromium(III), Insoluble Salts	16065-83-1	No	No	-		-		1.50E+00	H	5.00E-03	A
Cobalt	7440-48-4	No	No	-		9.00E-03	P	3.00E-03	P	2.00E-05	P
Copper	7440-50-8	No	No	-		-		1.00E-02	A	-	
Manganese (Non-diet)	7439-96-5	No	No	-		-		2.40E-02	S	5.00E-05	I
Mercury (elemental)	7439-97-6	No	Yes	-		-		-		3.00E-04	H
Molybdenum	7439-98-7	No	No	-		-		5.00E-03	H	-	
Nickel Soluble Salts	7440-02-0	No	No	-		2.60E-04	C	2.00E-02	H	2.00E-04	A
Selenium	7782-49-2	No	No	-		-		5.00E-03	H	2.00E-02	C
Strontium, Stable	7440-24-6	No	No	-		-		2.00E+00	A	-	
Thallium (Soluble Salts)	7440-28-0	No	No	-		-		4.00E-05	S	-	
Vanadium and Compounds	7440-62-2	No	No	-		-		1.00E-02	A	1.00E-04	A
Zinc and Compounds	7440-66-6	No	No	-		-		3.00E-01	A	-	

Site-specific

Recreator Screening Levels (RSL) for Soil

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ca** (Where nc SL < 10 x ca SL), max=SL exceeds ceiling limit (see User's Guide), sat=SL exceeds csat,
Smax=Soil SL exceeds ceiling limit and has been substituted with the max value (see User's Guide),
Ssat=Soil inhalation SL exceeds csat and has been substituted with the csat

Chemical	GIABS	ABS	RBA	Volatilization Factor (m^3/kg)	Soil Saturation Concentration (mg/kg)	Particulate Emission Factor (m^3/kg)	Ingestion SL TR=1.0E-6 (mg/kg)	Dermal SL TR=1.0E-6 (mg/kg)	Inhalation SL TR=1.0E-6 (mg/kg)	Carcinogenic SL TR=1.0E-6 (mg/kg)
Arsenic, Inorganic	1	0.03	0.6	-	-	1.36E+09	2.46E+00	1.75E+01	6.78E+04	2.15E+00
Barium	0.07	-	1	-	-	1.36E+09	-	-	-	-
Beryllium and compounds	0.007	-	1	-	-	1.36E+09	-	-	1.21E+05	1.21E+05
Chromium(III), Insoluble Salts	0.013	-	1	-	-	1.36E+09	-	-	-	-
Cobalt	1	-	1	-	-	1.36E+09	-	-	3.24E+04	3.24E+04
Copper	1	-	1	-	-	1.36E+09	-	-	-	-
Manganese (Non-diet)	0.04	-	1	-	-	1.36E+09	-	-	-	-
Mercury (elemental)	1	-	1	3.47E+04	3.13E+00	1.36E+09	-	-	-	-
Molybdenum	1	-	1	-	-	1.36E+09	-	-	-	-
Nickel Soluble Salts	0.04	-	1	-	-	1.36E+09	-	-	1.12E+06	1.12E+06
Selenium	1	-	1	-	-	1.36E+09	-	-	-	-
Strontium, Stable	1	-	1	-	-	1.36E+09	-	-	-	-
Thallium (Soluble Salts)	1	-	1	-	-	1.36E+09	-	-	-	-
Vanadium and Compounds	0.026	-	1	-	-	1.36E+09	-	-	-	-
Zinc and Compounds	1	-	1	-	-	1.36E+09	-	-	-	-

Site-specific

Recreator Screening Levels (RSL) for Soil

ca=Cancer, nc=Noncancer, ca* (Where nc SL < 100 x ca SL),
ca** (Where nc SL < 10 x ca SL), max=SL exceeds ceiling limit (see User's Guide), sat=SL exceeds csat,
Smax=Soil SL exceeds ceiling limit and has been substituted with the max value (see User's Guide),
Ssat=Soil inhalation SL exceeds csat and has been substituted with the csat

Chemical	Ingestion SL Child THQ=1 (mg/kg)	Dermal SL Child THQ=1 (mg/kg)	Inhalation SL Child THQ=1 (mg/kg)	Noncarcinogenic SL Child THI=1 (mg/kg)	Ingestion SL Adult THQ=1 (mg/kg)	Dermal SL Adult THQ=1 (mg/kg)	Inhalation SL Adult THQ=1 (mg/kg)	Noncarcinogenic SL Adult THI=1 (mg/kg)	Screening Level (mg/kg)
Arsenic, Inorganic	1.24E+02	1.05E+03	1.62E+06	1.11E+02	1.33E+03	6.29E+03	1.62E+06	1.10E+03	2.15E+00 ca*
Barium	4.98E+04	-	5.41E+08	4.98E+04	5.31E+05	-	5.41E+08	5.30E+05	4.98E+04 nc
Beryllium and compounds	1.24E+03	-	2.17E+06	1.24E+03	1.33E+04	-	2.17E+06	1.32E+04	1.24E+03 nc
Chromium(III), Insoluble Salts	3.73E+05	-	5.41E+08	3.73E+05	3.98E+06	-	5.41E+08	3.95E+06	3.73E+05 max
Cobalt	7.47E+02	-	2.17E+06	7.46E+02	7.96E+03	-	2.17E+06	7.93E+03	7.46E+02 nc
Copper	2.49E+03	-	-	2.49E+03	2.65E+04	-	-	2.65E+04	2.49E+03 nc
Manganese (Non-diet)	5.97E+03	-	5.41E+06	5.97E+03	6.37E+04	-	5.41E+06	6.30E+04	5.97E+03 nc
Mercury (elemental)	-	-	8.29E+02	8.29E+02	-	-	8.29E+02	8.29E+02	8.29E+02 sat
Molybdenum	1.24E+03	-	-	1.24E+03	1.33E+04	-	-	1.33E+04	1.24E+03 nc
Nickel Soluble Salts	4.98E+03	-	2.17E+07	4.98E+03	5.31E+04	-	2.17E+07	5.30E+04	4.98E+03 nc
Selenium	1.24E+03	-	2.17E+09	1.24E+03	1.33E+04	-	2.17E+09	1.33E+04	1.24E+03 nc
Strontium, Stable	4.98E+05	-	-	4.98E+05	5.31E+06	-	-	5.31E+06	4.98E+05 max
Thallium (Soluble Salts)	9.95E+00	-	-	9.95E+00	1.06E+02	-	-	1.06E+02	9.95E+00 nc
Vanadium and Compounds	2.49E+03	-	1.08E+07	2.49E+03	2.65E+04	-	1.08E+07	2.65E+04	2.49E+03 nc
Zinc and Compounds	7.47E+04	-	-	7.47E+04	7.96E+05	-	-	7.96E+05	7.47E+04 nc

Output generated 21MAR2016:14:44:13

Site-specific

Recreator Risk for Soil

Chemical	Ingestion SF (mg/kg-day) $^{-1}$	SFO Ref	Inhalation Unit Risk (ug/m ^{3})$^{-1}$	IUR Ref	Subchronic RfD (mg/kg-day)	Subchronic RfD Ref	Subchronic RfC (mg/m ^{3})	Subchronic RfC Ref	GIABS	ABS	RBA
Arsenic, Inorganic	1.50E+00	I	4.30E-03	I	3.00E-04	I	1.50E-05	C	1	0.03	0.6
Barium	-		-		2.00E-01	A	5.00E-03	H	0.07	-	1
Beryllium and compounds	-		2.40E-03	I	5.00E-03	H	2.00E-05	I	0.007	-	1
Chromium(III), Insoluble Salts	-		-		1.50E+00	H	5.00E-03	A	0.013	-	1
Cobalt	-		9.00E-03	P	3.00E-03	P	2.00E-05	P	1	-	1
Copper	-		-		1.00E-02	A	-		1	-	1
Manganese (Non-diet)	-		-		2.40E-02	S	5.00E-05	I	0.04	-	1
Mercury (elemental)	-		-		-		3.00E-04	H	1	-	1
Molybdenum	-		-		5.00E-03	H	-		1	-	1
Nickel Soluble Salts	-		2.60E-04	C	2.00E-02	H	2.00E-04	A	0.04	-	1
Selenium	-		-		5.00E-03	H	2.00E-02	C	1	-	1
Strontium, Stable	-		-		2.00E+00	A	-		1	-	1
Thallium (Soluble Salts)	-		-		4.00E-05	S	-		1	-	1
Vanadium and Compounds	-		-		1.00E-02	A	1.00E-04	A	0.026	-	1
Zinc and Compounds	-		-		3.00E-01	A	-		1	-	1
*Total Risk/HI	-		-		-		-		-	-	-

Output generated 21MAR2016:14:44:13

Site-specific

Recreator Risk for Soil

Chemical	Volatilization Factor (m^3/kg)	Soil Saturation Concentration (mg/kg)	Particulate Emission Factor (m^3/kg)	Concentration (mg/kg)	Ingestion Risk	Dermal Risk	Inhalation Risk	Carcinogenic Risk
Arsenic, Inorganic	-	-	1.36E+09	2.40E+01	9.76E-06	1.37E-06	3.54E-10	1.11E-05
Barium	-	-	1.36E+09	8.30E+02	-	-	-	-
Beryllium and compounds	-	-	1.36E+09	3.50E+00	-	-	2.88E-11	2.88E-11
Chromium(III), Insoluble Salts	-	-	1.36E+09	3.50E+01	-	-	-	-
Cobalt	-	-	1.36E+09	2.80E+01	-	-	8.65E-10	8.65E-10
Copper	-	-	1.36E+09	5.70E+01	-	-	-	-
Manganese (Non-diet)	-	-	1.36E+09	3.90E+01	-	-	-	-
Mercury (elemental)	3.47E+04	3.13E+00	1.36E+09	2.10E+00	-	-	-	-
Molybdenum	-	-	1.36E+09	1.70E+00	-	-	-	-
Nickel Soluble Salts	-	-	1.36E+09	1.90E+01	-	-	1.69E-11	1.69E-11
Selenium	-	-	1.36E+09	2.40E+00	-	-	-	-
Strontium, Stable	-	-	1.36E+09	1.90E+02	-	-	-	-
Thallium (Soluble Salts)	-	-	1.36E+09	1.70E+00	-	-	-	-
Vanadium and Compounds	-	-	1.36E+09	9.50E+01	-	-	-	-
Zinc and Compounds	-	-	1.36E+09	1.10E+02	-	-	-	-
**Total Risk/HI*	-	-	-	-	*9.76E-06*	*1.37E-06*	*1.26E-09*	*1.11E-05*

Site-specific

Recreator Risk for Soil

Chemical	Ingestion Child HQ	Dermal Child HQ	Inhalation Child HQ	Noncarcinogenic Child HI	Ingestion Adult HQ	Dermal Adult HQ	Inhalation Adult HQ	Noncarcinogenic Adult HI
Arsenic, Inorganic	1.93E-01	2.29E-02	1.48E-05	2.16E-01	1.81E-02	3.82E-03	1.48E-05	2.19E-02
Barium	1.67E-02	-	1.53E-06	1.67E-02	1.56E-03	-	1.53E-06	1.56E-03
Beryllium and compounds	2.81E-03	-	1.62E-06	2.81E-03	2.64E-04	-	1.62E-06	2.65E-04
Chromium(III), Insoluble Salts	9.38E-05	-	6.47E-08	9.38E-05	8.79E-06	-	6.47E-08	8.85E-06
Cobalt	3.75E-02	-	1.29E-05	3.75E-02	3.52E-03	-	1.29E-05	3.53E-03
Copper	2.29E-02	-	-	2.29E-02	2.15E-03	-	-	2.15E-03
Manganese (Non-diet)	6.53E-03	-	7.21E-06	6.54E-03	6.12E-04	-	7.21E-06	6.19E-04
Mercury (elemental)	-	-	2.53E-03	2.53E-03	-	-	2.53E-03	2.53E-03
Molybdenum	1.37E-03	-	-	1.37E-03	1.28E-04	-	-	1.28E-04
Nickel Soluble Salts	3.82E-03	-	8.78E-07	3.82E-03	3.58E-04	-	8.78E-07	3.59E-04
Selenium	1.93E-03	-	1.11E-09	1.93E-03	1.81E-04	-	1.11E-09	1.81E-04
Strontium, Stable	3.82E-04	-	-	3.82E-04	3.58E-05	-	-	3.58E-05
Thallium (Soluble Salts)	1.71E-01	-	-	1.71E-01	1.60E-02	-	-	1.60E-02
Vanadium and Compounds	3.82E-02	-	8.78E-06	3.82E-02	3.58E-03	-	8.78E-06	3.59E-03
Zinc and Compounds	1.47E-03	-	-	1.47E-03	1.38E-04	-	-	1.38E-04
**Total Risk/HI*	*4.97E-01*	*2.29E-02*	*2.58E-03*	*5.23E-01*	*4.66E-02*	*3.82E-03*	*2.58E-03*	*5.30E-02*

Appendix C

Non-Metal Soil and Groundwater Analytical Data Summary Tables

Table C-1 (page 1 of 1)
Groundwater Analytical Data - SVOCs, VOCs, Pesticides, and PCBs
Chapel Hill Police Department
Chapel Hill, North Carolina
H&H Job No. TCH-002

Monitoring Well ID	Sample Date	SVOCs	VOCs	Pesticides	PCBs
		SVOCs	VOCs	Pesticides	PCBs
2L Standards					
MW-1	5/3/2013	ND	ND	NA	NA
MW-2	6/20/2013 [1]	NA	NA	NA	NA
MW-3	2/5/2014	ND	ND	ND	ND
	2/5/2014 [2]	ND	ND	ND	ND
	8/15/2014 [3]	ND	ND	ND	ND
MW-3A	7/21/2015	ND	ND	ND	ND
MW-4	2/5/2014	ND	ND	ND	ND
	8/15/2014	ND	NA	NA	NA
MW-4A	7/21/2015	ND	ND	ND	ND
	7/21/2015 [4]	ND	ND	ND	ND

Notes:
All results in ug/L
Bold denotes above the 2L standards from Title 15A NCAC 2L .0202
ND - Not Detected; NA - Not Analyzed; NS - Not Specified
[1] Denotes sample labeled as "Well #1" in the lab report associated with the Limited Phase II ESA prepared by Falcon
[2] Denotes duplicate sample taken.
[3] Denotes sample labeled as "Well 1" in the lab report associated with the October 3, 2014 letter prepared by Falcon
[4] Denotes filtered samples
Analytical Methods
SVOCs = Semi-Volatile Organic Compounds by EPA Method 8270
VOCs = Volatile Organic Compounds by EPA Method 8260
Pesticides by Method 8081B
PCBs by 8082A

Table C-2 (page 1 of 1)
Soil and CCP Analytical Data - SVOCs, VOCs, TPH, VPH/EPH, Pesticides, and PCBs
Chapel Hill Police Department
Chapel Hill, North Carolina
H&H Job No. TCH-002

Sample ID	Sample Date	Material Sampled (Soil or CCP)	Depth (ft)	SVOCs	VOCs			TPH GRO/DRO		VPH/EPH		Pesticides	PCBs
				Benzoic acid	4-Isopropyltoluene	Acetone	Methyl Ethyl Ketone (2-Butanone)	TPH-GRO	TPH-DRO	VPH	EPH	Toxaphene	PCBs
S-1	4/29/2013	Soil	15	NA	NA	NA	NA	ND	8.0	NA	NA	NA	NA
S-4	4/29/2013	CCP	1	0.39	ND	ND	ND	ND	**27**	ND	ND	NA	NA
S-5	1/31/2014	CCP	0-4	ND	0.051	0.14	ND	NA	NA	NA	NA	ND	ND
S-6	1/31/2014	CCP	0-4	ND	ND	0.17	0.0086	NA	NA	NA	NA	ND	ND
S-7	1/31/2014	CCP	0-4	ND	0.024	0.11	ND	NA	NA	NA	NA	**0.17**	ND
PSRG - Protection of Groundwater				130	NS	24	16	--	--	--	--	0.046	0.1
PSRG - Residential				50,000	NS	12,000	5,400	--	--	--	--	0.49	NS
PSRG - Industrial				100,000	NS	100,000	38,000	--	--	--	--	2.1	NS
DEQ UST Section Action Level				--	--	--	--	10	10	--	--	NS	NS

Notes:
All results in mg/kg
PSRG - Preliminary Soil Remediation Goal
UST = Underground Storage Tank
Bold denotes above the protection of groundwater PSRG or UST Section action level
Blue shading indicates concentration above residential PSRG
Green shading indicates concentration above industrial PSRG
ND - Not Detected; NA - Not Analyzed; NS - Not Specified
Analytical Methods
SVOCs = Semi-Volatile Organic Compounds by EPA Method 8270
VOCs = Volatile Organic Compounds by EPA Method 8260
TPH-GRO = Total Petroleum Hydrocarbons - Gasoline Range Organics by EPA Method 8015C
TPH-DRO = Total Petroleum Hydrocarbons - Diesel Range Organics Method 8015C
EPH = Extractable Petroleum Hydrocarbons by MADEP Method; VPH = Volatile Petroleum Hydrocarbons by MADEP Method
MADEP = Massachusetts Department of Environmental Protection
PCBs = Polychlorinated Biphenyls