**Hampton Oaks Business Park, 5904 Hampton Oaks Parkway, Suite F**
**Tampa, Florida 33610**
**United States**
**www.ghd.com**

**May 2, 2024**

**Our reference:** 12637954
**Your reference:** Task Order No. 6

**Fort Lauderdale Executive Airport**
6000 NW 21st Avenue
Fort Lauderdale, Florida 33309

**Attn: Mr. Rufus James**
Airport Director

**Soil Screening Report**
**Fort Lauderdale Executive Airport**
Fort Lauderdale, Broward County, Florida

Dear Mr. James:

GHD Services, Inc (GHD) is pleased to submit this Soil Screening Report which describes recent soil sampling and screening completed at the Fort Lauderdale Executive Airport (FXE) in Broward County, Florida (**Figure 1**). The soil screening was conducted to identify possible lead concentrations in onsite soils within four (4) Areas of Concern (AOCs) identified by FXE personnel as having the highest potential for lead impacts to the shallow surface soils. The AOCs were chosen because these areas are used by pilots as "run up" areas where pre-flight checks are performed, including engine verification. The AOCs are illustrated in **Figure 2**. This work was completed under City of Fort Lauderdale (City) Task Order No. 6 pursuant to the General Environmental Engineering Consulting Services Contract No. 12355-106 between the City and GHD.

# Scope of Work

Prior to mobilizing to the site, GHD prepared and Health and Safety Plan (HASP) for use by field personnel. The purpose of the HASP is to provide information on site and project safety protocols, emergency response actions, and potential chemical exposures. The HASP is reviewed in the field by all personnel to assure adherence to safety protocols. A copy of the complete HASP is included as **Appendix A**.

GHD personnel mobilized to the site on April 9, 2024, to begin soils screening and completed field activities on April 12, 2024. Soil samples were collected at 76 locations (SB001 through SB076) within the 4 AOCs using a fully decontaminated stainless steel hand auger. Samples were collected within each boring at two depth intervals, from ground surface to 0.5 feet below land surface (ft bls) and from 0.5 to 2.0 ft bls in accordance with Florida Department of Environmental Protection (FDEP) SOP FS 3000 for Soil Sampling. The two sample intervals are commonly used by FDEP to evaluate the exposure potential of potential contaminants to residents and workers in different scenarios. Each soil sample was placed in a clean plastic bag (i.e., Ziploc or equivalent) and the soils mixed to create a

homogenous sample. The samples were then screened in the field using an X-Ray Fluorescence (XRF) Analyzer calibrated for lead. The XRF allows for non-destructive testing to identify an element in a given sample based upon its response to an X-Ray source. The XRF data are read in parts per million (ppm), which is equivalent to the milligrams per kilogram (mg/kg) units used in the FDEP standard.

The borings installed and their associated AOC are shown in the following table:

| | |
|---|---|
| 1 | SB001 – SB024 |
| 2 | SB025 – SB043 |
| 3 | SB044 – SB056 |
| 4 | SB057- SB076 |

Boring locations are illustrated in **Figure 3** through **Figure 6**, while XRF screening data are detailed on **Table 1** through **Table 4**. The XRF lead concentrations data were compared to the Soil Cleanup Target Level (SCTL) established in Chapter 62-777 Florida Administrative Code (FAC) for both Commercial (1,400 mg/kg) and Residential (400 mg/kg) properties. The data indicated that lead concentrations, where detected in the soil samples from within the designated AOCs, are all below the more strident Residential SCTL. It should be noted that because the FXE property operates as a commercial/industrial property, soil lead concentrations would be compared to the Commercial SCTL for regulatory enforcement purposes.

A total of 152 samples were screened with the XRF. Of these 86 samples are listed as Not Detected (ND), or do not have a lead concentration quantifiable above the sample specific detection limit. Sixty-six (66) samples have a quantifiable lead concentration, with the highest lead concentration measured at 43 ppm in the shallow sample at boring SB048 located within AOC #3. The average or mean lead concentration for the 66 quantified samples is 9.4 ppm, while the median concentration is calculated at 6.5 ppm.

As a basis of comparison, the US Geological Survey has compiled background lead soil concentration data from sites within all 48 conterminous States. These data, collected from 2007 to 2010, provide a compilation of data by state which can be used for comparison to site specific data. The comparison of FXE data with the background information, as well as the SCTLs, allows users to evaluate the potential for lead exposure and impacts to site workers. A comparison of the FXE data with the USGS background data is shown in the following table:

| Data Source | Number of Samples | Minimum | Maximum | Mean | Median |
|---|---|---|---|---|---|
| USGS (FL Specific) | 88 | 0.3 | 16.3 | 6.2 | 4.7 |
| FXE | 66 | 4.2 | 43 | 9.4 | 6.5 |

This comparison indicates that soil lead concentrations at FXE trend slightly higher than the background concentrations compiled for the State of Florida. However, this is anticipated given the use of the airport and that the sample locations chosen at FXE were intended to provide potential worst-case concentrations.

## Conclusions and Considerations

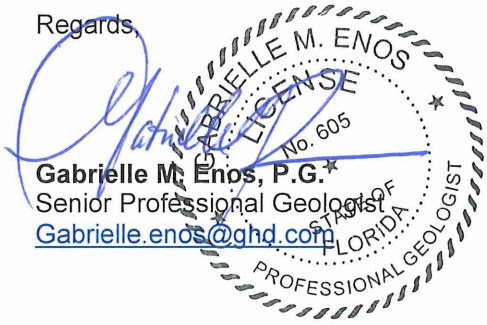
The soil screening data collected at Fort Lauderdale Executive Airport indicates that soil lead concentrations do not exceed regulatory levels established by FDEP. A comparison and evaluation of the FXE data with the USGS compiled background data for Florida shows that lead minimum, maximum, mean (average) and median concentrations trend slightly higher at FXE. However, as stated above, this is anticipated given the sampling locations chosen at FXE. As a result of the soil screening and evaluation, GHD does not recommend additional soil sampling at this time.

We are currently evaluating the US EPA, "*2020 National Emissions Inventory: Aviation Component*" Report which summarizes emissions data from airports based on source classification codes (SCC). This report provides a modeled estimation of the pounds of lead emitted by airports, including FXE. Once GHD has completed our evaluation of the report and compared the 2020 data with the data compiled by the EPA in 2017, we will issue a separate supplemental report.

It should be noted that the distribution of lead in the built (not natural or undisturbed state) environment is due to many factors including past use of lead additives in vehicular (i.e., automobile) fuels, paints, waste incineration, lead solder in pipes and other manufacturing processes. This report is intended to provide an evaluation of the current soil lead concentrations within the FXE property, at locations which should represent the most probable source(s) of lead.

We appreciate the opportunity to work with the City of Fort Lauderdale and the Airport. Please contact the undersigned at 813-257-0625 if you require further information or clarification.

Regards,




**Gabrielle M. Enos, P.G.**
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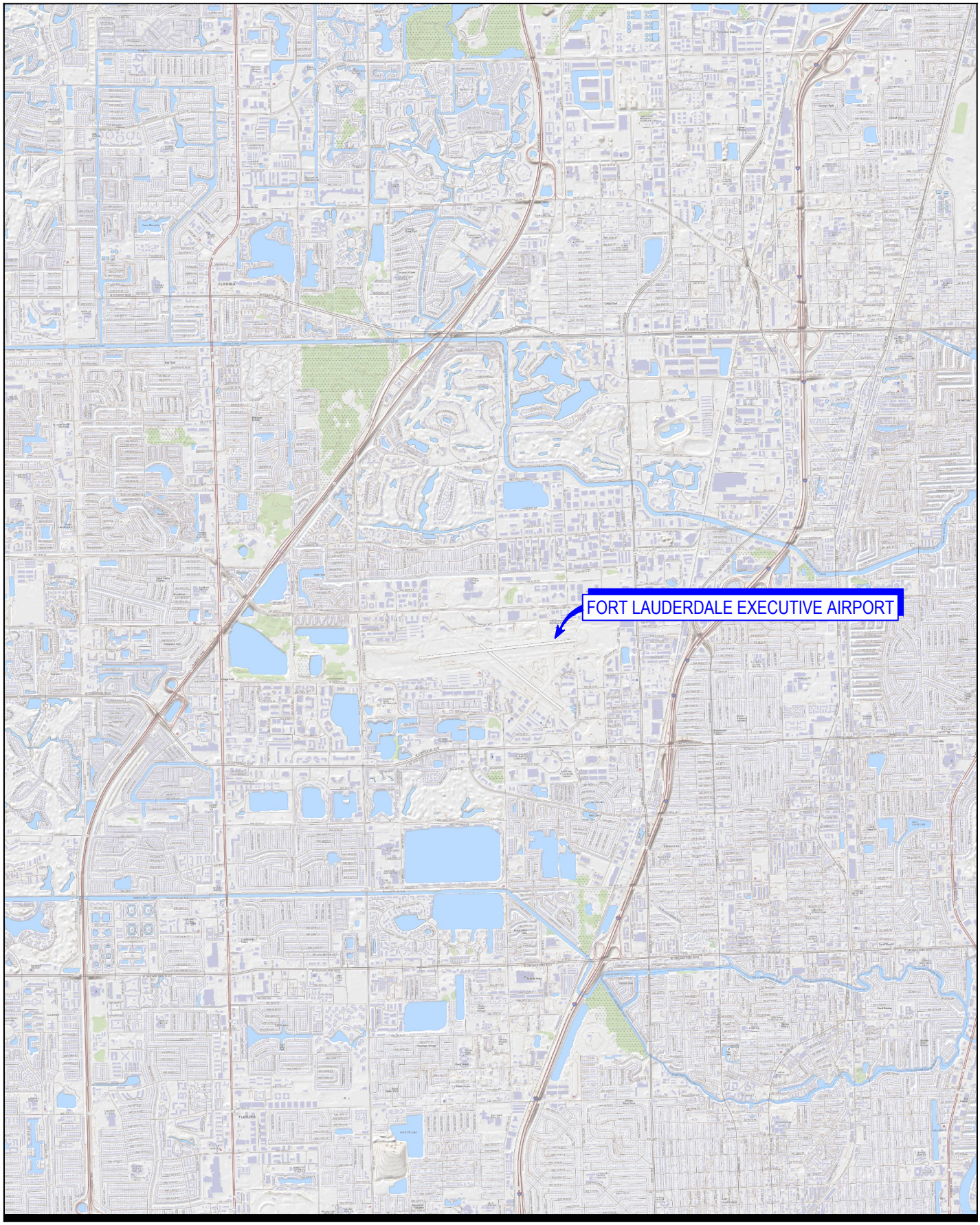
Gabrielle.enos@ghd.com

# Figures




0 2500 5000 ft

1" = 5000 ft

Coordinate System:
FL83-EF

N

GHD

**FORT LAUDERDALE EXECUTIVE AIRPORT (FXE)**
**6000 N.W. 21ST AVE., FORT LAUDERDALE, FL**

Project No. **12637954**
Date **April 2024**

**SITE LOCATION MAP**

**FIGURE 1**

Filename: N:\US\West Palm Beach\Projects\565\12637954\Digital_Design\ACAD\Figures\RPT001\12637954-GHD-00-00-RPT-EN-D101_WA-001.dwg
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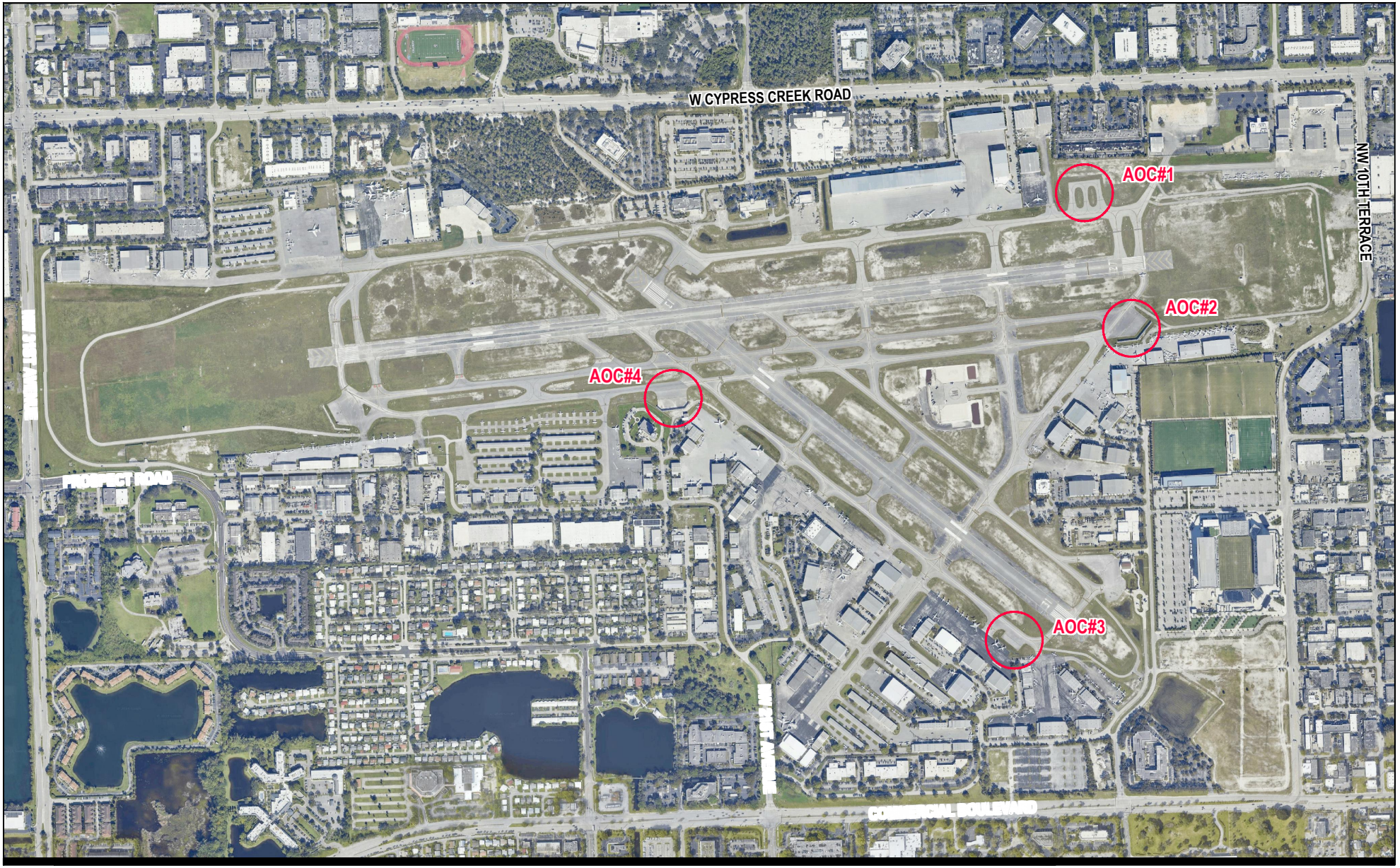
Data Source: Plex-Earth - Image from Google Maps




0 500 1000 ft

1" = 1000 ft

Coordinate System:
FL83-EF

N

GHD

**FORT LAUDERDALE EXECUTIVE AIRPORT (FXE)**
**6000 N.W. 21ST AVE., FORT LAUDERDALE, FL**

Project No. **12637954**
Date **April 2024**

**FXE AREAS OF CONCERN**

**FIGURE 2**

Filename: N:\US\West Palm Beach\Projects\565\12637954\Digital_Design\ACAD\Figures\RPT001\12637954-GHD-00-00-RPT-EN-D102_WA-001.dwg
Plot Date: 22 April 2024 1:50 PM

Data Source: Plex-Earth - Image from Google Maps, 11/4/2023


LEGEND

■ SOIL BORING LOCATION

0 30 60 ft

1" = 60 ft

Coordinate System: FL83-EF

N

GHD

**FORT LAUDERDALE EXECUTIVE AIRPORT (FXE)**
**6000 N.W. 21ST AVE., FORT LAUDERDALE, FL**

Project No. **12637954**
Date **April 2024**

**FXE - AREA OF CONCERN #1**

# FIGURE 3

Filename: N:\US\West Palm Beach\Projects\565\12637954\Digital_Design\ACAD\Figures\RPT001\12637954-GHD-00-00-RPT-EN-D103_WA-001.dwg
Plot Date: 22 April 2024 3:10 PM


LEGEND

■ SOIL BORING LOCATION

0 30 60 ft

1" = 60 ft

Coordinate System: FL83-EF

N

GHD

**FORT LAUDERDALE EXECUTIVE AIRPORT (FXE)**
**6000 N.W. 21ST AVE., FORT LAUDERDALE, FL**

Project No. **12637954**
Date **April 2024**

**FXE - AREA OF CONCERN #2**

# FIGURE 4

Filename: N:\US\West Palm Beach\Projects\565\12637954\Digital_Design\ACAD\Figures\RPT001\12637954-GHD-00-00-RPT-EN-D103_WA-001.dwg
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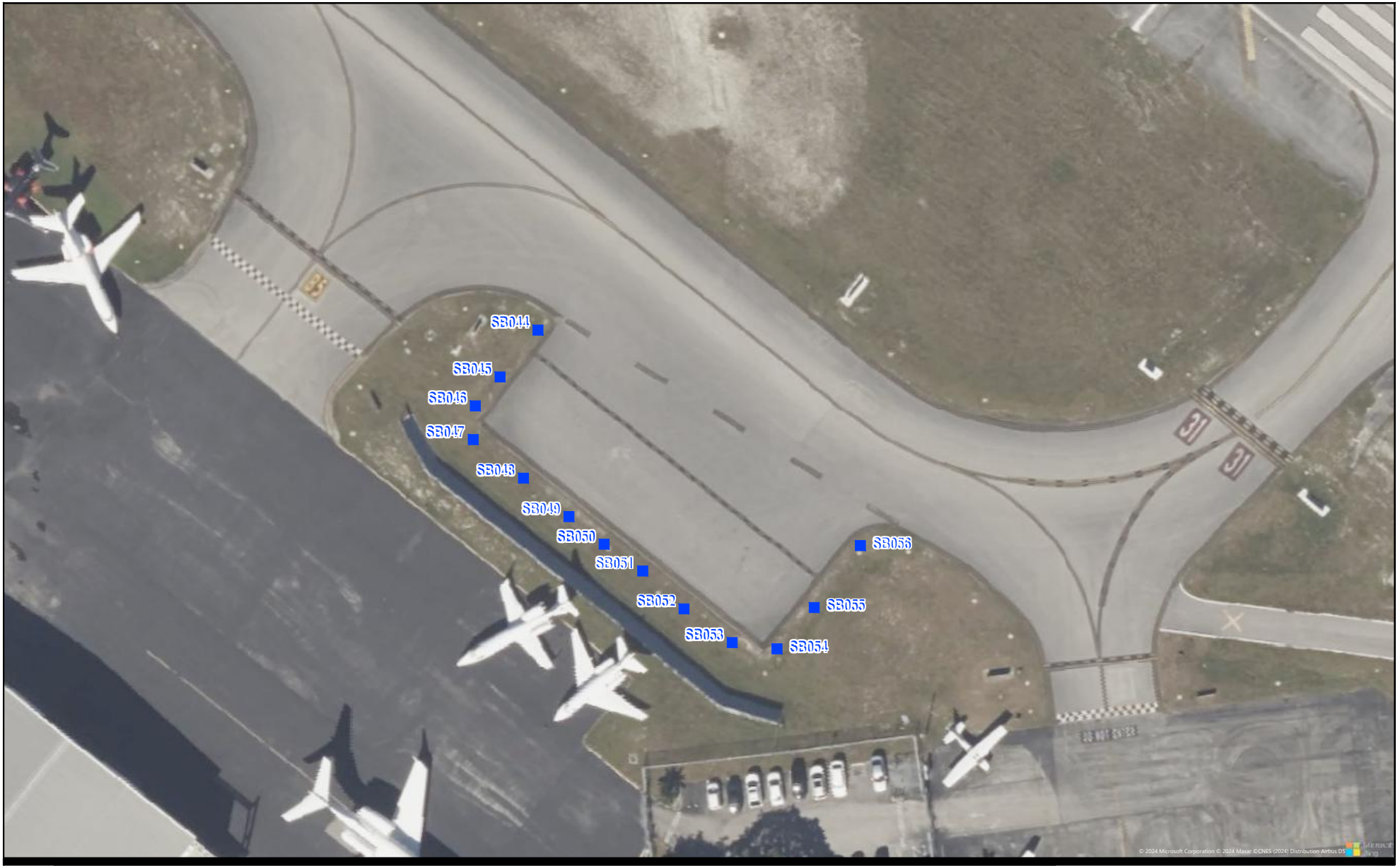



LEGEND

■ SOIL BORING LOCATION

0 30 60 ft

1" = 60 ft

Coordinate System: FL83-EF

N

GHD

**FORT LAUDERDALE EXECUTIVE AIRPORT (FXE)**
**6000 N.W. 21ST AVE., FORT LAUDERDALE, FL**

Project No. **12637954**
Date **April 2024**

**FXE - AREA OF CONCERN #3**

**FIGURE 5**

Filename: N:\US\West Palm Beach\Projects\565\12637954\Digital_Design\ACAD\Figures\RPT001\12637954-GHD-00-00-RPT-EN-D103_WA-001.dwg
Plot Date: 22 April 2024 3:09 PM


LEGEND

■ SOIL BORING LOCATION

0 30 60 ft

1" = 60 ft

Coordinate System: FL83-EF

N

GHD

**FORT LAUDERDALE EXECUTIVE AIRPORT (FXE)**
**6000 N.W. 21ST AVE., FORT LAUDERDALE, FL**

Project No. **12637954**
Date **April 2024**

**FXE - AREA OF CONCERN #4**

# FIGURE 6

Filename: N:\US\West Palm Beach\Projects\565\12637954\Digital_Design\ACAD\Figures\RPT001\12637954-GHD-00-00-RPT-EN-D103_WA-001.dwg
Plot Date: 22 April 2024 3:09 PM

# Tables

**TABLE 1**
**SUMMARY OF SOIL XRF SCREENING - AOC #1**
**Fort Lauderdale Executive Airport**
**6000 N.W. 21st Avenue**
**Fort Lauderdale, Broward County, Florida**

| Boring ID | Depth (ft bls) | Lead (ppm) | Lead (+/-) | Date | Time (24 hour) | AOC # | Comment | Easting | Northing |
|---|---|---|---|---|---|---|---|---|---|
| **SCTL Commercial (mg/kg)** | | **1,400** | | | | | | | |
| **SCTL - Residential (mg/kg)** | | **400** | | | | | | | |
| SB001S | 0.0-0.5 | ND | <5.0 | 4/9/2024 | 14:18 | 1 | | 930123.3006 | 679444.057 |
| SB001D | 0.5-2.0 | ND | <3.6 | 4/9/2024 | 14:20 | 1 | | | |
| SB002S | 0.0-0.5 | ND | <4.6 | 4/9/2024 | 14:22 | 1 | | 930115.3785 | 679497.9913 |
| SB002D | 0.5-2.0 | ND | <3.9 | 4/9/2024 | 14:24 | 1 | | | |
| SB003S | 0.0-0.5 | 6.1 | 3.5± | 4/9/2024 | 14:26 | 1 | | 930115.8736 | 679546.9776 |
| SB003D | 0.5-2.0 | 4.9 | 3.1± | 4/9/2024 | 14:28 | 1 | | | |
| SB004S | 0.0-0.5 | ND | <4.6 | 4/9/2024 | 14:30 | 1 | | 930109.4368 | 679607.3446 |
| SB004D | 0.5-2.0 | ND | <3.3 | 4/9/2024 | 14:32 | 1 | | | |
| SB005S | 0.0-0.5 | ND | <4.2 | 4/9/2024 | 14:34 | 1 | | 930104.9806 | 679648.4139 |
| SB005D | 0.5-2.0 | ND | <3.6 | 4/9/2024 | 14:36 | 1 | | | |
| SB006S | 0.0-0.5 | 8.2 | 3.1± | 4/9/2024 | 14:38 | 1 | | 930141.765 | 679654.867 |
| SB006D | 0.5-2.0 | 4.8 | 2.8± | 4/9/2024 | 14:40 | 1 | | | |
| SB007S | 0.0-0.5 | ND | <4.8 | 4/9/2024 | 14:42 | 1 | | 930199.696 | 679664.2684 |
| SB007D | 0.5-2.0 | ND | <4.1 | 4/9/2024 | 14:44 | 1 | | | |
| SB008S | 0.0-0.5 | ND | <4.0 | 4/9/2024 | 14:46 | 1 | | 930247.2291 | 679667.7321 |
| SB008D | 0.5-2.0 | ND | <3.0 | 4/9/2024 | 14:48 | 1 | | | |
| SB009S | 0.0-0.5 | 6.9 | 3.4± | 4/9/2024 | 14:50 | 1 | | 930305.1602 | 679673.175 |
| SB009D | 0.5-2.0 | ND | <3.5 | 4/9/2024 | 14:52 | 1 | | | |
| SB010S | 0.0-0.5 | ND | <4.2 | 4/9/2024 | 14:54 | 1 | | 930357.1496 | 679682.0816 |
| SB010D | 0.5-2.0 | ND | <3.0 | 4/9/2024 | 14:56 | 1 | | | |
| SB011S | 0.0-0.5 | 5.5 | 3.3± | 4/9/2024 | 14:58 | 1 | | 930403.3621 | 679684.5557 |
| SB011D | 0.5-2.0 | ND | <3.2 | 4/9/2024 | 15:00 | 1 | | | |
| SB012S | 0.0-0.5 | ND | <4.2 | 4/9/2024 | 15:02 | 1 | | 930412.1922 | 679641.0123 |
| SB012D | 0.5-2.0 | ND | <3.5 | 4/9/2024 | 15:04 | 1 | | | |
| SB013S | 0.0-0.5 | 6.7 | 2.8 | 4/9/2024 | 15:06 | 1 | | 930420.5271 | 679594.5001 |
| SB013D | 0.5-2.0 | ND | <3.2 | 4/9/2024 | 15:08 | 1 | | | |
| SB014S | 0.0-0.5 | 5.4 | 3± | 4/9/2024 | 15:10 | 1 | | 930429.9347 | 679547.9879 |
| SB014D | 0.5-2.0 | 4.8 | 2.8± | 4/9/2024 | 15:12 | 1 | | | |
| SB015S | 0.0-0.5 | 4.3 | 3.4± | 4/9/2024 | 15:14 | 1 | | 930439.3423 | 679512.8563 |
| SB015D | 0.5-1.5 | 4.2 | <2.7 | 4/9/2024 | 15:16 | 1 | | | |
| SB016S | 0.0-0.5 | ND | <4.4 | 4/9/2024 | 15:18 | 1 | | 930456.6721 | 679479.7039 |
| SB016D | 0.5-2.0 | 5.4 | 3.3± | 4/9/2024 | 15:20 | 1 | | | |
| SB017S | 0.0-0.5 | ND | <4.3 | 4/9/2024 | 15:22 | 1 | | 930359.6252 | 679476.2403 |
| SB017D | 0.5-2.0 | ND | <3.5 | 4/9/2024 | 15:24 | 1 | | | |
| SB018S | 0.0-0.5 | ND | <4.3 | 4/9/2024 | 15:26 | 1 | | 930356.6544 | 679509.8874 |
| SB018D | 0.5-2.0 | ND | <3.1 | 4/9/2024 | 15:28 | 1 | | | |
| SB019S | 0.0-0.5 | ND | <3.8 | 4/9/2024 | 15:30 | 1 | | 930354.1787 | 679540.5657 |
| SB019D | 0.5-2.0 | ND | <3.1 | 4/9/2024 | 15:32 | 1 | | | |
| SB020S | 0.0-0.5 | ND | <3.4 | 4/9/2024 | 15:34 | 1 | | 930345.2663 | 679574.7076 |
| SB020D | 0.5-2.0 | ND | <3.6 | 4/9/2024 | 15:36 | 1 | | | |
| SB021S | 0.0-0.5 | 5.7 | 3.3± | 4/9/2024 | 15:38 | 1 | | 930229.8993 | 679457.4375 |
| SB021D | 0.5-2.0 | 4.6 | 2.7± | 4/9/2024 | 15:40 | 1 | | | |
| SB022S | 0.0-0.5 | ND | <3.7 | 4/9/2024 | 15:42 | 1 | | 930220.4917 | 679489.1053 |
| SB022D | 0.5-1.5 | 5.4 | 2.9± | 4/9/2024 | 15:44 | 1 | refusal at 1.5 | | |
| SB023S | 0.0-0.5 | ND | <4.4 | 4/9/2024 | 15:46 | 1 | | 930218.016 | 679517.8044 |
| SB023D | 0.5-2.0 | ND | <3.7 | 4/9/2024 | 15:48 | 1 | | | |
| SB024S | 0.0-0.5 | 7.1 | 3.5± | 4/9/2024 | 15:50 | 1 | | 930220.4917 | 679550.9567 |
| SB024D | 0.5-2.0 | 7.2 | 4.9± | 4/9/2024 | 15:52 | 1 | | | |

Notes:
ft bls = feet below land surface
ppm = parts per million (equivalent to milligrams per kilogram, mg/kg)
AOC = Area of Concern (see Figures 3 -6)
SCTL - Commercial (mg/kg) = Soil Cleanup Target Level established in Chapter 62-777 FAC for Commercial/Industrial properties
SCTL - Residential (mg/kg) = Soil Cleanup Target Level established in Chapter 62-777 FAC for Residential properties
SCTL - Leachability (mg/kg) = Soil Cleanup Target Level established in Chapter 62-777 FAC for leachability based on Groundwater criteria;
*** = leachability criteria derived using SPLP analyses to calculate site specific SCTL

**TABLE 2**
**SUMMARY OF SOIL XRF SCREENING - AOC #2**
**Fort Lauderdale Executive Airport**
**6000 N.W. 21st Avenue**
**Fort Lauderdale, Broward County, Florida**

| Boring ID | Depth (ft bls) | Lead (ppm) | Lead (+/-) | Date | Time (24 hour) | AOC # | Comment | Easting | Northing |
|---|---|---|---|---|---|---|---|---|---|
| **SCTL - Commercial (mg/kg)** | | **1,400** | | | | | | | |
| **SCTL - Residential (mg/kg)** | | **400** | | | | | | | |
| SB025S | 0.0-0.5 | 5.3 | 2.7± | 4/10/2024 | 13:47 | 2 | | 930657.8682 | 678692.1905 |
| SB025D | 0.5-2.0 | ND | <3.3 | 4/10/2024 | 13:49 | 2 | | | |
| SB026S | 0.0-0.5 | 7.9 | 2.9± | 4/10/2024 | 13:51 | 2 | | 930673.5947 | 678674.4465 |
| SB026D | 0.5-2.0 | ND | <3.5 | 4/10/2024 | 13:53 | 2 | | | |
| SB027S | 0.0-0.5 | ND | <3.8 | 4/10/2024 | 13:56 | 2 | | 930691.3504 | 678659.7443 |
| SB027D | 0.5-2.0 | ND | <3.4 | 4/10/2024 | 13:59 | 2 | | | |
| SB028S | 0.0-0.5 | 4.6 | 2.6± | 4/10/2024 | 14:01 | 2 | | 930709.6135 | 678649.0979 |
| SB028D | 0.5-2.0 | ND | <3.5 | 4/10/2024 | 14:03 | 2 | | | |
| SB029S | 0.0-0.5 | 10 | 3.3± | 4/10/2024 | 14:05 | 2 | | 930724.8327 | 678635.9166 |
| SB029D | 0.5-2.0 | ND | <3.8 | 4/10/2024 | 14:07 | 2 | | | |
| SB030S | 0.0-0.5 | 5.8 | 2.7± | 4/10/2024 | 14:09 | 2 | | 930744.1104 | 678620.7074 |
| SB030D | 0.5-2.0 | ND | 3.1± | 4/10/2024 | 14:11 | 2 | | | |
| SB031S | 0.0-0.5 | 13 | 3.4± | 4/10/2024 | 14:13 | 2 | | 930734.9788 | 678597.3867 |
| SB031D | 0.5-2.0 | ND | <4.7 | 4/10/2024 | 14:15 | 2 | | | |
| SB032S | 0.0-0.5 | 8.9 | 3± | 4/10/2024 | 14:17 | 2 | | 930721.2816 | 678577.6147 |
| SB032D | 0.5-2.0 | 7.2 | 3.1± | 4/10/2024 | 14:19 | 2 | | | |
| SB033S | 0.0-0.5 | 13 | 3.2± | 4/10/2024 | 14:21 | 2 | | 930707.077 | 678558.3498 |
| SB033D | 0.5-2.0 | 6 | 3.1± | 4/10/2024 | 14:23 | 2 | | | |
| SB034S | 0.0-0.5 | 12 | 3.1± | 4/10/2024 | 14:25 | 2 | | 930688.3066 | 678537.057 |
| SB034D | 0.5-2.0 | ND | <4.1 | 4/10/2024 | 14:27 | 2 | | | |
| SB035S | 0.0-0.5 | 6.1 | 2.8± | 4/10/2024 | 14:29 | 2 | | 930677.1459 | 678515.2572 |
| SB035D | 0.5-2.0 | 4.4 | 2.9± | 4/10/2024 | 14:31 | 2 | | | |
| SB036S | 0.0-0.5 | 8.4 | 3.1± | 4/10/2024 | 14:33 | 2 | | 930652.2878 | 678492.9504 |
| SB036D | 0.5-2.0 | 5.4 | 2.8± | 4/10/2024 | 14:35 | 2 | | | |
| SB037S | 0.0-0.5 | 4.5 | 3.1± | 4/10/2024 | 14:37 | 2 | | 930627.4299 | 678484.8388 |
| SB037D | 0.5-2.0 | ND | <3.5 | 4/10/2024 | 14:39 | 2 | | | |
| SB038S | 0.0-0.5 | 8.2 | 2.9± | 4/10/2024 | 14:41 | 2 | | 930590.9038 | 678483.3179 |
| SB038D | 0.5-2.0 | 4.5 | 2.7± | 4/10/2024 | 14:43 | 2 | | | |
| SB039S | 0.0-0.5 | 5.3 | 2.8± | 4/10/2024 | 14:45 | 2 | | 930555.3923 | 678478.2482 |
| SB039D | 0.5-2.0 | 6 | 2.8± | 4/10/2024 | 14:47 | 2 | | | |
| SB040S | 0.0-0.5 | 9.6 | 3.2± | 4/10/2024 | 14:49 | 2 | | 930525.9686 | 678476.2203 |
| SB040D | 0.5-2.0 | 4.4 | 2.6± | 4/10/2024 | 14:51 | 2 | | | |
| SB041S | 0.0-0.5 | 15 | 3.6± | 4/10/2024 | 14:53 | 2 | | 930502.1251 | 678471.6575 |
| SB041D | 0.5-2.0 | 6.8 | 2.8± | 4/10/2024 | 14:55 | 2 | | | |
| SB042S | 0.0-0.5 | 5.3 | 2.7± | 4/10/2024 | 14:57 | 2 | | 930475.7452 | 678471.6575 |
| SB042D | 0.5-2.0 | ND | <3.3 | 4/10/2024 | 14:59 | 2 | | | |
| SB043S | 0.0-0.5 | ND | <3.9 | 4/10/2024 | 15:01 | 2 | | 930450.8872 | 678470.1366 |
| SB043D | 0.5-2.0 | ND | <3.2 | 4/10/2024 | 15:03 | 2 | | | |

Notes:

ft bls = feet below land surface

ppm = parts per million (equivalent to milligrams per kilogram, mg/kg)

AOC = Area of Concern (see Figures 3 -6)

SCTL - Commercial (mg/kg) = Soil Cleanup Target Level established in Chapter 62-777 FAC for Commercial/Industrial properties

SCTL - Residential (mg/kg) = Soil Cleanup Target Level established in Chapter 62-777 FAC for Residential properties

SCTL - Leachability (mg/kg) = Soil Cleanup Target Level established in Chapter 62-777 FAC for leachability based on Groundwater criteria;

*** = leachability criteria derived using SPLP analyses to calculate site specific SCTL

**TABLE 3**
**SUMMARY OF SOIL XRF SCREENING - AOC #3**
**Fort Lauderdale Executive Airport**
**6000 N.W. 21st Avenue**
**Fort Lauderdale, Broward County, Florida**

| Boring ID | Depth (ft bls) | Lead (ppm) | Lead (+/-) | Date | Time (24 hour) | AOC # | Comment | Easting | Northing |
|---|---|---|---|---|---|---|---|---|---|
| **SCTL - Commercial (mg/kg)** | | **1,400** | | | | | | | |
| **SCTL - Residential (mg/kg)** | | **400** | | | | | | | |
| SB044S | 0.0-0.5 | 4.8 | 3± | 4/10/2024 | 15:05 | 3 | | 929690.9839 | 676316.5453 |
| SB044D | 0.5-2.0 | ND | <3.9 | 4/10/2024 | 15:07 | 3 | | | |
| SB045S | 0.0-0.5 | 4.4 | 2.6± | 4/10/2024 | 15:09 | 3 | | 929674.2392 | 676295.8563 |
| SB045D | 0.5-2.0 | ND | <3.6 | 4/10/2024 | 15:11 | 3 | | | |
| SB046S | 0.0-0.5 | 4.6 | 2.6± | 4/10/2024 | 15:13 | 3 | | 929663.2789 | 676283.0779 |
| SB046D | 0.5-2.0 | ND | <3.4 | 4/10/2024 | 15:15 | 3 | | | |
| SB047S | 0.0-0.5 | 22 | 3.8± | 4/10/2024 | 15:17 | 3 | | 929662.3656 | 676268.1697 |
| SB047D | 0.5-2.0 | ND | <3.2 | 4/10/2024 | 15:19 | 3 | | | |
| SB048S | 0.0-0.5 | 43 | 4.9± | 4/10/2024 | 15:21 | 3 | | 929684.5904 | 676251.1317 |
| SB048D | 0.5-2.0 | ND | <3.4 | 4/10/2024 | 15:23 | 3 | | | |
| SB049S | 0.0-0.5 | 16 | 3.4± | 4/10/2024 | 15:25 | 3 | | 929704.6841 | 676234.0937 |
| SB049D | 0.5-2.0 | ND | <3.5 | 4/10/2024 | 15:27 | 3 | | | |
| SB050S | 0.0-0.5 | 19 | 3.5± | 4/11/2024 | 13:42 | 3 | | 929720.211 | 676221.9238 |
| SB050D | 0.5-2.0 | ND | <3.2 | 4/11/2024 | 13:44 | 3 | | | |
| SB051S | 0.0-0.5 | 27 | 4.2± | 4/11/2024 | 13:46 | 3 | | 929737.2603 | 676210.058 |
| SB051D | 0.5-2.0 | ND | <2.5 | 4/11/2024 | 13:48 | 3 | | | |
| SB052S | 0.0-0.5 | 25 | 4.1± | 4/11/2024 | 13:50 | 3 | | 929755.5272 | 676193.3243 |
| SB052D | 0.5-2.0 | ND | <3.2 | 4/11/2024 | 13:52 | 3 | | | |
| SB053S | 0.0-0.5 | 22 | 3.8± | 4/11/2024 | 13:54 | 3 | | 929776.8387 | 676178.4161 |
| SB053D | 0.5-2.0 | ND | <3.4 | 4/11/2024 | 13:56 | 3 | | | |
| SB054S | 0.0-0.5 | 13 | 3.3± | 4/11/2024 | 13:58 | 3 | | 929796.6279 | 676175.6779 |
| SB054D | 0.5-2.0 | ND | <3.5 | 4/11/2024 | 14:00 | 3 | | | |
| SB055S | 0.0-0.5 | 14 | 3.3± | 4/11/2024 | 14:02 | 3 | | 929813.0682 | 676193.9328 |
| SB055D | 0.5-2.0 | ND | <2.7 | 4/11/2024 | 14:04 | 3 | | | |
| SB056S | 0.0-0.5 | 15 | 3.4± | 4/11/2024 | 14:06 | 3 | | 929833.4664 | 676221.3153 |
| SB056D | 0.5-2.0 | ND | <3.3 | 4/11/2024 | 14:08 | 3 | | | |

Notes:

ft bls = feet below land surface

ppm = parts per million (equivalent to milligrams per kilogram, mg/kg)

AOC = Area of Concern (see Figures 3 -6)

SCTL - Commercial (mg/kg) = Soil Cleanup Target Level established in Chapter 62-777 FAC for Commercial/Industrial properties

SCTL - Residential (mg/kg) = Soil Cleanup Target Level established in Chapter 62-777 FAC for Residential properties

SCTL - Leachability (mg/kg) = Soil Cleanup Target Level established in Chapter 62-777 FAC for leachability based on Groundwater criteria;

*** = leachability criteria derived using SPLP analyses to calculate site specific SCTL

**TABLE 4**
**SUMMARY OF SOIL XRF SCREENING - AOC #4**
**Fort Lauderdale Executive Airport**
**6000 N.W. 21st Avenue**
**Fort Lauderdale, Broward County, Florida**

| Boring ID | Depth (ft bls) | Lead (ppm) | Lead (+/-) | Date | Time (24 hour) | AOC # | Comment | Easting | Northing |
|---|---|---|---|---|---|---|---|---|---|
| **SCTL Commercial (mg/kg)** | | **1,400** | | | | | | | |
| **SCTL - Residential (mg/kg)** | | **400** | | | | | | | |
| SB057S | 0.0-0.5 | 5.6 | 2.9± | 4/11/2024 | 14:10 | 4 | | 927358.4416 | 678086.3018 |
| SB057D | 0.5-2.0 | ND | <3.6 | 4/11/2024 | 14:12 | 4 | | | |
| SB058S | 0.0-0.5 | ND | <4.4 | 4/11/2024 | 14:14 | 4 | | 927355.9878 | 678063.313 |
| SB058D | 0.5-2.0 | ND | <3.7 | 4/11/2024 | 14:16 | 4 | | | |
| SB059S | 0.0-0.5 | ND | <4.1 | 4/11/2024 | 14:18 | 4 | | 927358.4416 | 678036.0329 |
| SB059D | 0.5-2.0 | ND | <3.5 | 4/11/2024 | 14:20 | 4 | | | |
| SB060S | 0.0-0.5 | 7.4 | 3± | 4/11/2024 | 14:22 | 4 | | 927357.2147 | 678015.8027 |
| SB060D | 0.5-2.0 | ND | <3.4 | 4/11/2024 | 14:24 | 4 | | | |
| SB061S | 0.0-0.5 | ND | <3.6 | 4/11/2024 | 14:26 | 4 | | 927104.171 | 678066.0716 |
| SB061D | 0.5-2.0 | ND | <3.1 | 4/11/2024 | 14:28 | 4 | | | |
| SB062S | 0.0-0.5 | 16 | 3.6± | 4/11/2024 | 14:30 | 4 | | 927119.2003 | 678038.1785 |
| SB062D | 0.5-2.0 | ND | <3.5 | 4/11/2024 | 14:32 | 4 | | | |
| SB063S | 0.0-0.5 | 6.2 | 2.8± | 4/11/2024 | 14:34 | 4 | | 927123.1877 | 678004.1551 |
| SB063D | 0.5-2.0 | ND | 3.3± | 4/11/2024 | 14:36 | 4 | | | |
| SB064S | 0.0-0.5 | ND | <3.3 | 4/11/2024 | 14:38 | 4 | | 927121.3473 | 677979.6336 |
| SB064D | 0.5-2.0 | 4.3 | 2.8± | 4/11/2024 | 14:40 | 4 | | | |
| SB065S | 0.0-0.5 | 6.1 | 2.8± | 4/11/2024 | 14:42 | 4 | | 927132.6959 | 677967.373 |
| SB065D | 0.5-2.0 | 6.3 | 2.7± | 4/11/2024 | 14:44 | 4 | | | |
| SB066S | 0.0-0.5 | 10 | 3.2± | 4/11/2024 | 14:46 | 4 | | 927154.7797 | 677952.0471 |
| SB066D | 0.5-2.0 | ND | <4.0 | 4/11/2024 | 14:48 | 4 | | | |
| SB067S | 0.0-0.5 | ND | <4.6 | 4/11/2024 | 14:50 | 4 | | 927179.3173 | 677937.3342 |
| SB067D | 0.5-2.0 | ND | <4.4 | 4/11/2024 | 14:52 | 4 | | | |
| SB068S | 0.0-0.5 | ND | <3.6 | 4/11/2024 | 14:54 | 4 | | 927200.1742 | 677938.8668 |
| SB068D | 0.5-2.0 | ND | <3.6 | 4/11/2024 | 14:56 | 4 | | | |
| SB069S | 0.0-0.5 | 13 | 3.5± | 4/12/2024 | 10:01 | 4 | | 927221.3379 | 677940.0929 |
| SB069D | 0.5-2.0 | 6.7 | 2.9± | 4/12/2024 | 10:03 | 4 | | | |
| SB070S | 0.0-0.5 | ND | <3.6 | 4/12/2024 | 10:05 | 4 | | 927240.9679 | 677944.3841 |
| SB070D | 0.5-2.0 | ND | <3.5 | 4/12/2024 | 10:07 | 4 | | | |
| SB071S | 0.0-0.5 | ND | <3.2 | 4/12/2024 | 10:09 | 4 | | 927259.9846 | 677945.9167 |
| SB071D | 0.5-2.0 | ND | <3.2 | 4/12/2024 | 10:11 | 4 | | | |
| SB072S | 0.0-0.5 | ND | <3.6 | 4/12/2024 | 10:13 | 4 | | 927280.5348 | 677948.3689 |
| SB072D | 0.5-2.0 | ND | <3.2 | 4/12/2024 | 10:15 | 4 | | | |
| SB073S | 0.0-0.5 | ND | <3.8 | 4/12/2024 | 10:17 | 4 | | 927302.6186 | 677951.434 |
| SB073D | 0.5-2.0 | ND | <3.7 | 4/12/2024 | 10:19 | 4 | | | |
| SB074S | 0.0-0.5 | 24 | 4.5± | 4/12/2024 | 10:21 | 4 | | 927329.9166 | 677956.3383 |
| SB074D | 0.5-2.0 | ND | <3.5 | 4/12/2024 | 10:23 | 4 | | | |
| SB075S | 0.0-0.5 | ND | <3.9 | 4/12/2024 | 10:25 | 4 | | 927348.6266 | 677969.8251 |
| SB075D | 0.5-2.0 | ND | <3.5 | 4/12/2024 | 10:27 | 4 | | | |
| SB076S | 0.0-0.5 | ND | <3.8 | 4/12/2024 | 10:29 | 4 | | 927364.5759 | 677990.3618 |
| SB076D | 0.5-2.0 | ND | <3.1 | 4/12/2024 | 10:31 | 4 | | | |

Notes:

ft bls = feet below land surface

ppm = parts per million (equivalent to milligrams per kilogram, mg/kg)

AOC = Area of Concern (see Figures 3 -6)

SCTL - Commercial (mg/kg) = Soil Cleanup Target Level established in Chapter 62-777 FAC for Commercial/Industrial properties

SCTL - Residential (mg/kg) = Soil Cleanup Target Level established in Chapter 62-777 FAC for Residential properties

SCTL - Leachability (mg/kg) = Soil Cleanup Target Level established in Chapter 62-777 FAC for leachability based on Groundwater criteria;

*** = leachability criteria derived using SPLP analyses to calculate site specific SCTL

# Appendix A

## HASP

# Site-Specific Health and Safety Plan

## Ft. Lauderdale Executive Airport Soil Screening

The City of Fort Lauderdale

March 29 2024
12637954|01|01
Approval Date: 3-29-2024

# HEALTH AND SAFETY PLAN

## Signature page

**This HASP was electronically signed by the Project Manager and Safety Group within the HASP Builder Software. Fully approved HASP is printed without a DRAFT watermark.**

**Project Name:** Ft. Lauderdale Executive Airport Soil Screening

**Project Manager Approval Date:** Gabrielle Enos, 3-29-2024
**Safety Group Approval Date:** Alan Gallaway, 3-29-2024

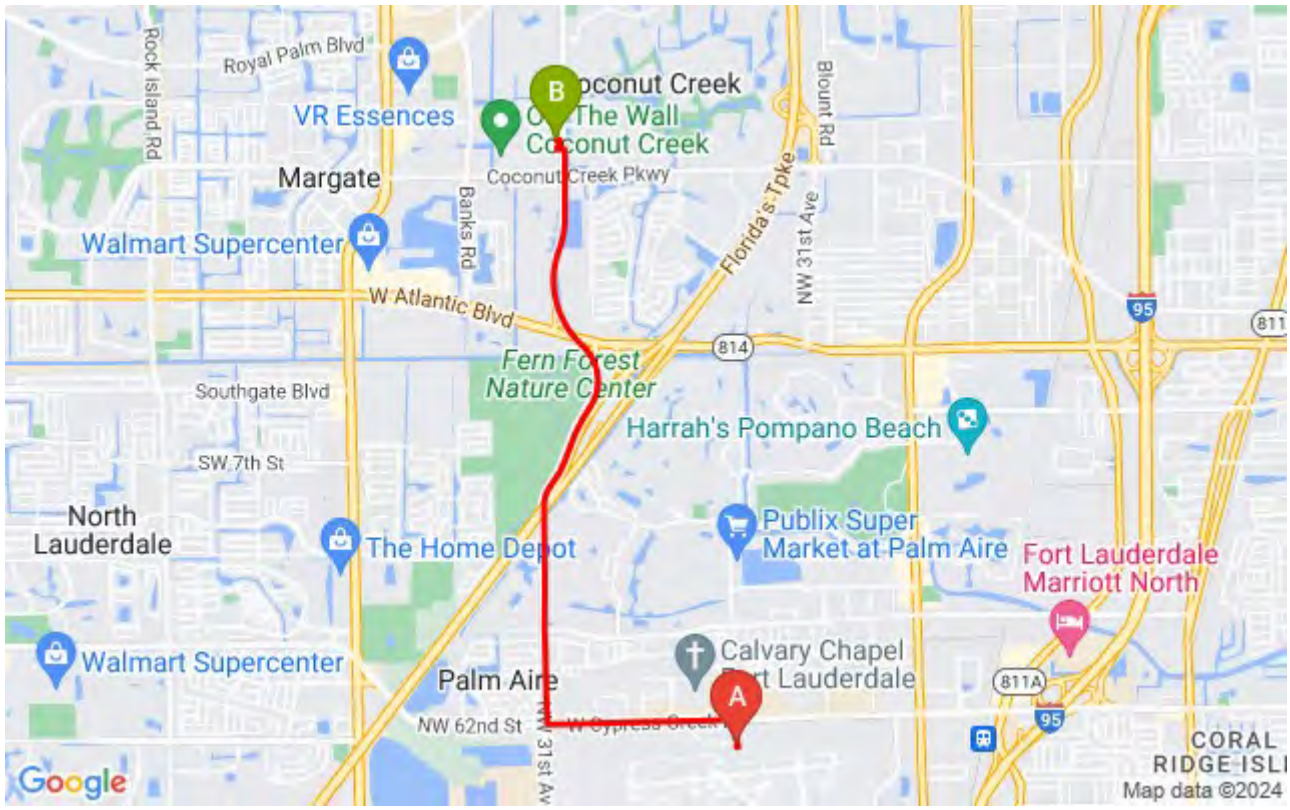
**Project Number:** 12637954

# Emergency Information

6000 NW 21st Avenue  Fort Lauderdale

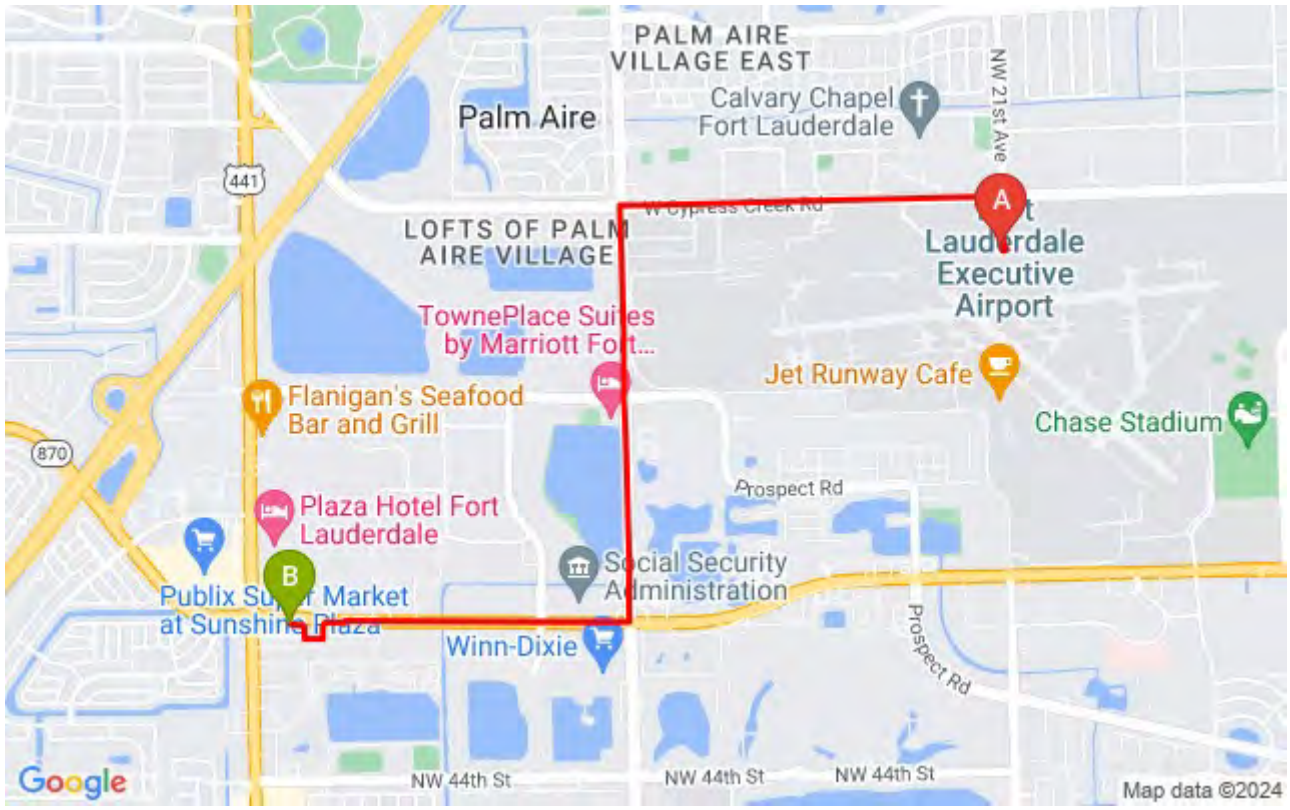
<table>
<tr><th>Contact</th><th>Phone Number</th><th></th></tr>
<tr><td>Local Police<br><br>Broward County Sheriff's Office<br>701 SW 71st Avenue<br>North Lauderdale, Florida<br>United States 33068</td><td>911<br>954-722-5800</td><td rowspan="5">Hospital Directions<br><br>Directions:<br><br>1. Head south toward NW 62nd St/W Cypress Creek Rd<br>2. Turn left toward NW 21st Ave<br>3. Turn right onto NW 21st Ave<br>4. Turn left onto NW 62nd St/W Cypress Creek Rd<br>5. Turn right onto NW 31st Ave<br>6. Continue onto SW 46th Ave<br>7. Continue onto Lyons Rd<br>8. Turn left<br>9. Turn right<br>10. Turn right at NW 15th St<br>11. Turn left<br>Destination will be on the left<br><br>Driving Time: 11 mins<br><br>Driving Distance: 4.5 mi</td></tr>
<tr><td>Fire Department<br><br>City of Ft. Lauderdale Fire Station No. 53<br>2200 Executive Airport Way<br>Fort Lauderdale, Florida<br>United States 33309</td><td>911<br>954-828-6700</td></tr>
<tr><td>Ambulance</td><td>911</td></tr>
<tr><td>Local Hospital<br><br>Coconut Creek Medical Center<br>1301 Lyons Rd<br>Coconut Creek, Florida<br>United States 33063</td><td>911<br>954-971-2266</td></tr>
<tr><td>National Poison Center</td><td>800-222-1222<br>911</td></tr>
<tr><td>Project Manager<br><br>Gabrielle Enos</td><td>Work: 813-257-0625<br>Cell: 813-257-0625</td><td rowspan="8">GHD - HSE Help Line<br><br>Please call (866) 529-4886 and provide:<br><br>• Name and location of caller<br>• Description of incident<br>• Name of injured person(s)<br>• Description of injuries<br>• Phone number for return call</td></tr>
<tr><td>Site Supervisor<br><br>William Ouchie</td><td>Work: 469-540-5955<br>Cell:  469-540-5955</td></tr>
<tr><td>GHD Regional S&H Manager<br><br>Alan Gallaway</td><td>Work: 813-257-0769<br>Cell:  770-295-9104</td></tr>
<tr><td>Client Contact<br><br>Rufus A. James</td><td>954-828-4968</td></tr>
<tr><td>Client Site Contact</td><td></td></tr>
<tr><td>Other Contact</td><td></td></tr>
<tr><td>Site Health Officer</td><td>Phone:</td></tr>
<tr><td>Person to verify hospital route:</td><td colspan="2">Signature:</td></tr>
</table>

# Hospital Driving Directions




1. Head **south** toward **NW 62nd St/W Cypress Creek Rd**
2. Turn **left** toward **NW 21st Ave**
3. Turn **right** onto **NW 21st Ave**
4. Turn **left** onto **NW 62nd St/W Cypress Creek Rd**
5. Turn **right** onto **NW 31st Ave**
6. Continue onto **SW 46th Ave**
7. Continue onto **Lyons Rd**
8. Turn **left**
9. Turn **right**
10. Turn **right** at **NW 15th St**
11. Turn **left**
    Destination will be on the left

# Medical Clinic Driving Directions




1. Head **south** toward **NW 62nd St/W Cypress Creek Rd**
2. Turn **left** toward **NW 21st Ave**
3. Turn **right** onto **NW 21st Ave**
4. Turn **left** onto **NW 62nd St/W Cypress Creek Rd**
5. Turn **left** onto **NW 31st Ave**
6. Keep **right** to stay on **NW 31st Ave**
7. Continue straight to stay on **NW 31st Ave**
8. Turn **right** onto **NW 50th St/W Commercial Blvd**
9. Keep **right** to continue on **FL-870 W/NW 50th St/W Commercial Blvd**
10. Turn **left** onto **NW 38th Terrace**
11. Turn **right**
12. Turn **right**
13. Turn **left**
    Destination will be on the left

# Table of Contents


1. Introduction ..... 4

1.1 GHD Values and Integrity Management Policy ..... 4
1.2 Purpose ..... 4
1.3 Stop Work Authority ..... 4
1.4 Short Service Employee ..... 5
1.5 Project Management And Safety Organization ..... 5
1.6 Site Safety And Health Officer ..... 7
1.7 Recordkeeping ..... 7
1.8 Site HASP Amendments ..... 8
1.9 Training Requirements ..... 8
1.10 Site Specific Training ..... 8
1.11 Safety Meeting/ HASP Review ..... 9
1.12 Fatigue Management ..... 9
1.13 Management Of Change ..... 10
1.14 Field Notes ..... 10

2. History & Scope ..... 11

2.1 Site History/Background ..... 11
2.2 Scope of Work Tasks ..... 11

3. Chemical Hazards ..... 12

3.1 Introduction To Chemical Hazards ..... 12
3.2 Control Measures ..... 12
3.3 Safety Data Sheets ..... 12
3.4 Container Labels ..... 13
3.5 Workers Training ..... 13

4. Physical Hazards ..... 14

4.1 Introduction To Physical Hazards ..... 14
4.2 Drilling Equipment ..... 14
4.3 Utility Clearances - OSHA ..... 14
4.4 Material Handling ..... 16
4.5 Noise ..... 17
4.6 Electrical Safety ..... 17
4.7 Control Of Hazardous Energy (Loto) ..... 18
4.8 Heat Stress ..... 18
4.9 Cold Stress ..... 21
4.10 Hand And Power Tools ..... 22
4.11 Slip, Trip, Hit, Fall ..... 22
4.12 Aggressive Or Menacing Behavior ..... 23
4.13 Adverse Weather Conditions ..... 23
4.14 Flammable & Combustible Liquids ..... 24

5. Biological Hazards ..... 25

5.1 Infection Control ..... 25
5.2 Introduction To Biological Hazards ..... 26
5.3 Wildlife ..... 27
5.4 Poisonous Plants ..... 29

6. Personal Protective Equipment ..... 30

6.1 Introduction To PPE ..... 30

6.2 Types of Personal Protective Equipment (PPE) ..... 30
6.3 Types Of Protective Material ..... 31
6.4 Respiratory Protection ..... 32
6.5 Respirator Cleaning ..... 32
6.6 Levels Of Protection ..... 33

7. Air Monitoring ..... 34

7.1 Introduction To Air Monitoring ..... 34
7.2 Types Of Devices ..... 34
7.3 Monitoring Frequency ..... 35
7.4 Safety And Health Action Levels ..... 35

8. Site Control ..... 36

8.1 Introduction To Site Control ..... 36
8.2 Two-Person Crew/Buddy System ..... 37
8.3 Communication ..... 38
8.4 Decontamination And Hygiene ..... 38
8.5 Social Protection ..... 39
8.6 Site Security ..... 41

9. Emergency Procedures ..... 42

9.1 Introduction Emergency Procedures ..... 43
9.2 Incident, Injury, Illness Reporting And Investigation ..... 44
9.3 Emergency Equipment/First Aid ..... 45
9.4 Emergency Procedures For Contaminated Personnel ..... 45
9.5 Site Evacuations ..... 45
9.6 Spill And Release Contingencies ..... 46

10. Environmental Control Program ..... 47

10.1 Introduction ..... 47
10.2 Weather Monitoring ..... 47
10.3 Tornado Safety Policy And Procedures ..... 47
10.4 Rain And Snow ..... 48
10.5 Temperature ..... 48
10.6 Wind ..... 49
10.7 Lightning & Thunder ..... 49
10.8 Outdoor Precautions During Severe Weather ..... 49
10.9 Indoor Precautions During Severe Weather ..... 50
10.10 Flash Flooding ..... 50

# Appendix

Chemical Table

Appendix A - GHD Mandatory Documents

Tailgate Safety Meeting - Large
Tailgate Safety Meeting - Small
QSF-006 - Management of Change
Q1559 Underground Utilities Checklist
HASP Amendment Form
HASP Acknowledgement Sheet
Figure 1.pdf
Figure 2.pdf
Figure 3.pdf
Figure 4.pdf

Figure 5.pdf

Appendix B - JSAs

Environmental-Soil Sampling
Environmental-Decontamination of Sampling Equipment and Personnel (PPE Level D)
Motor Vehicle - Driving
Mobilization-Demobilization
Environmental-Site Recon and Walkthrough

Appendix C - Safety Data Sheets (SDS)

Alconox SDS

Appendix D - Training Records

Record of Training Form

# 1. Introduction

## 1.1 GHD Values and Integrity Management Policy

At GHD, we commit to safe, ethical and respectful business behaviour in regard to both the internal conduct of our business and our engagement with external stakeholders and the public. The core values of Safety, Teamwork, Respect and Integrity will guide all of our activities. We will only seek work and participate in business transactions under high standards of corporate ethics and with complete integrity. Our projects will be undertaken in a manner that places safety as the top priority, with each of our employees empowered with Stop Work Authority throughout the execution of project work. GHD expects that all of its projects will be undertaken in an environment of teamwork and mutual respect, free from discrimination, harassment, bullying or other inappropriate behavior. We foster an open environment in which our people can report any improper practices or behaviour without fear of reprisal. All reported incidents will be investigated promptly with appropriate and equitable follow-up. GHD's integrity management policy and guidelines are available at http://www.ghdcanada.com/global/about-us/integrity-management.

## 1.2 Purpose

The purpose of this site specific health and safety plan (HASP) is to provide guidelines and establish procedures for reducing and controlling hazard exposure to the public, property, and personnel. The HASP is a living document and must continually evolve as site conditions and knowledge of the site activities develop.

This document has been developed to meet or exceed the requirements set forth by federal, state, and provincial legislation. If any procedure outlined in this plan conflicts with federal, state/provincial, and/or municipal law, prescribed standards, or client requirements, then the most stringent set of standards applies.

## 1.3 Stop Work Authority

All employees are empowered and expected to stop the work of coworkers, subcontractors, client employees, or other contractors if any person's safety or the environment are at risk. No repercussions will result from this action. Reporting of unsafe acts/condition (UA or UC) or Stop Work Authority (SWA) is completed with BWise and/or the GHD HSE app. Unsafe acts, conditions, stop work authority are now reported via the GHD HSE app.

**The discovery of any condition that would suggest the existence of a situation more hazardous than anticipated results in the removal of site personnel from that area and re-evaluation of the hazard and the levels of protection.**

## 1.4 Short Service Employee

The Employee is considered a Short Service Employee (SSE) if he/she has less than 6 months experience with his/her present employee, or in his/her present role. The individual is required to wear a fluorescent orange hardhat, as an obvious indicator of SSE status. Training and mentoring allows them to gain knowledge and experience in procedures and methods. In order for a new employee to work in the field, the following minimum training requirements must be met:

1. GHD New Employee Safety & Health Orientation training (on-line).
2. GHD HAZCOM (US)/WHIMIS (Canada)(on-line).
3. On-boarding completed with Human Resources.
4. Compliance training defined on the QSF-20 as it applies to field work to be conducted.
5. Client specific safety training.

A SSE's primary mentor is their direct Supervisor. GHD Supervisors are responsible for ensuring that a SSE completes the safety, field method, and quality training as appropriate to the work they are assigned. A SSE requires an On-site Mentor for all fieldwork. The On-site Mentor must have experience in the work they are mentoring and they are responsible for the close monitoring of the SSE.

Project team SSE make-up requirements are:

- A one-person project team cannot be a SSE.
- A two-person to four-person project team can have only one SSE.
- A five-person or more project team cannot have more than 20 percent SSE without a written variance from the GHD Corporate Manager of Safety & Health.

New hire employees that can provide sufficient documentation supporting previous experience in working under HSE program(s) similar to GHD's may be exempt from GHD's SSE program These exemptions are handled on a case-by-case basis and must be authorized by one of the following staff: the Corporate Manager of Safety & Health or a Senior Regional Safety & Health Manager. Details of the exemptions are covered in the full SSE Policy.

Clients may define specific SSE requirements for work at their facility or on their project. It is the responsibility of the Project Manager to communicate a client's specific requirements to the appropriate staff within GHD and project subcontractors. Client-specific SSE standards shall be posted on the Safety & Health Portal SSE Folder.

## 1.5 Project Management And Safety Organization

**Project Manager – GHD – Gabrielle Enos**

The GHD Project Manager (PM) is responsible for the overall implementation, review, and approval of the HASP, and for ensuring that all safety and health (S&H) responsibilities are carried out. The PM will also ensure that appropriate resources are provided to support the project.

**Site Supervisor – GHD – William Ouchie**

The Site Supervisor (SS) is responsible for:

- Ensuring that the HASP is reviewed, approved, and implemented.
- Communicating site requirements to site project personnel and subcontractors through site orientation.
- Consulting with the client/site representative regarding appropriate changes to the HASP.

- Conducting a daily pre-start/tailgate safety meeting that communicates the site specific hazards. This meeting must be documented on the HSE097 Pre-Start/Tailgate Safety Meeting form in the appendix.
- Ensuring that all necessary cleanup and maintenance of safety equipment is conducted by project personnel.
- Verifying emergency phone numbers and services, including hospital and clinic locations.
- Completing, filing, and correctly submitting the forms attached to the HASP, including daily pre-start/tailgate meetings, job safety analysis, and daily inspection checklists.
- Implementing risk-based safety procedures on all activities and enforcing safe work practices for project employees
- Observing ill effects on any crew member, especially those symptoms caused by cold/heat stress or chemical exposure.
- Overseeing the safety of visitors who enter the site.
- Maintaining communication with the client/site representative(s) and/or government inspectors/agencies.
- Providing and enforcing the use of safety equipment, personal protective equipment (PPE), and other items necessary for employee or community safety.
- Conducting job site inspections as a part of quality assurance for safety and health.
- Ordering the immediate shutdown of site activities in case of a medical emergency, unsafe condition, or unsafe practice.
- Reporting safety and health concerns to site and/or project management as necessary.

**Regional HSE Manager GHD – Alan Gallaway**

The Regional HSE Manager is a full time GHD employee who is trained as a safety and health professional and serves in a consulting role to the PM and SS regarding potential safety and health issues. The HSE Manager or trained designee must review, coordinate required changes with PM and provide the final approval of the HASP prior to work beginning on site.

**Site personnel**

All employees have a role in GHD's HSE program and a responsibility to implement the program. GHD personnel are responsible for:

- Engaging in all aspects of their tasks and jobs when they are prepared to do the job safely, well rested, and mentally prepared for work.
- Utilizing the STAR process before initiating work.
- Implementing Stop Work Authority for any operations that may cause injury, illness, or unsafe conditions to employees, subcontractors, or others.
- Assisting in the development and revision of Job Safety Analysis (JSA) forms that are appropriate to their current scope of work.
- Use, inspect and maintain PPE as required by JSA and site conditions.
- Preparing, submitting and reviewing safety observations using the GHD HSE app or appropriate forms
- Inspecting tools and other equipment before each use or as manufacturer dictates and documenting any defects.
- Correcting job site hazards when possible without endangering life or health.
- Reporting safety and health concerns to the SS, PM, HSE Manager, or SHO (if appointed).

**Subcontractors**

Subcontractors are responsible for:

- Developing and implementing their own HASP and complying with its contents.
- Attending an initial site orientation and subsequent safety meetings.
- Ensuring that their employees adhere to all site personnel requirements.
- Submitting required documentation to the SS regarding federal, state, or provincial requirements before beginning any work.

- Obtaining approval for the use of GHD's equipment.
- Observing and obeying all GHD/client requirements as well as any specific direction given by GHD's management team.
- Wearing any personal protective equipment required by their HASP and GHD at all times.
- Meeting all governing legislation/regulation/industry standards for equipment used on GHD projects.
- Verifying that all subcontractor employees have required training, medical clearance, and substance abuse testing as required by project.
- Not being in possession or under the influence of alcohol, incapacitating drugs, or medications.

In the event of conflicting safety procedures or requirements, personnel must implement those safety practices that afford the highest level of safety and protection. In addition, noncompliance with safety and health policies and procedures may subject the subcontractor to disciplinary action up to and including termination of their contract with GHD.

**Equipment Operators**

All equipment operators must meet all the requirements of site personnel listed above and are responsible for the safe operation of heavy equipment. Operators are responsible for conducting documented daily inspections on their equipment to ensure safe performance. Brakes, hydraulic lines, backup alarms, and fire extinguishers must be inspected routinely throughout the project. Equipment will be taken out of service if an unsafe condition occurs. Daily inspections must be provided to the GHD site supervisor prior to the equipment being used.

**Authorized Visitors**

Authorized visitors, as approved by **Gabrielle Enos**, are provided with all relevant information regarding site operations and hazards as applicable to the purpose of their visit. Visitors may be required to be accompanied by authorized personnel.

## 1.6 Site Safety And Health Officer

The site safety and health officer (SHO) is responsible for assisting in the communication of site requirements to site project personnel and subcontractors and for carrying out the health and safety responsibilities include the ones listed under the site supervisor. The SHO has prior experience in working at similar sites. The SHO operates under the supervision of the PM, SS, and HSE Manager.

## 1.7 Recordkeeping

The SS shall establish and maintain records of all necessary and prudent monitoring activities as described below:

- Name and job classification of the employees involved on specific tasks.
- Air monitoring/sampling results and instrument calibration logs.
- Records of training acknowledgment forms (site specific training, toolbox meetings, etc.).
- Documentation of site inspections, results of inspections, and corrective actions implemented.
- Emergency reports describing any incidents or accidents.

## 1.8 Site HASP Amendments

Any change to the scope of work must be evaluated for its impact on the overall health and safety of the project and associated personnel. A minor change is one that adjusts already-documented hazards within the HASP and does not expose site personnel to chemicals above exposure limits, such as the introduction of a new JSA, or PPE that does not involve a change in respiratory protection. Amendments must be documented on the Site Health and Safety Plan Amendment Form located in Appendix, in addition to notifications to key personnel.

Significant changes to the scope of work require a rewrite by the PM and review/approval of the HASP by a HSE Manager.

## 1.9 Training Requirements

All personnel conducting work at this site shall have completed the appropriate safety and health training, as applicable to their job/task duties as it relates to the GHD Tiered Training System. The required training is referenced throughout the HASP and identified on each JSA form

## 1.10 Site Specific Training

An initial site specific training session or briefing shall be conducted by the PM or SS prior to commencement of work activities. During this initial training session, employees shall be instructed on the following topics:

- Personnel responsibilities
- Content and implementation of the HASP
- Site hazards and controls
- Site specific hazardous procedures (e.g., drilling, excavations, etc.)
- Training requirements
- PPE requirements
- Emergency information, including local emergency response team phone numbers, route to nearest hospital, incident reporting procedures, and emergency response procedures
- Instruction in the completion of required inspections and forms
- Location of safety equipment, such as portable eyewash, first aid kit, fire extinguishers, etc.

The various components of the project HASP will be presented, followed by an opportunity to ask questions to ensure that each attendee understands the HASP. Personnel will not be permitted to enter or work in potentially contaminated areas of the site until they have completed the site specific training session. Personnel successfully completing the training session shall sign the HASP Acknowledgement Form, which is presented as an Appendix.

In addition to the initial site briefing conducted at the commencement of the project, supplemental brief safety meetings shall be conducted by the SS to discuss potential safety and health hazards associated with upcoming tasks and necessary precautions to be taken.

## 1.11 Safety Meeting/ HASP Review

"Pre-Start/Tailgate Safety Meetings" will take place each day prior to beginning the day's work. All site personnel will attend these safety meetings conducted by the SS. The safety meetings will cover specific safety and health issues, including the appropriate JSAs, site activities, changes in site conditions, and a review of topics covered in the site specific pre-entry briefing. The safety meetings will be documented each day with written sign in sheets containing a list of topics discussed. To assist with the compliance of documentation of the tailgate safety meetings, there is a HSE097 Pre-Start/Tailgate Safety Meeting form located in the Appendix.

## 1.12 Fatigue Management

GHD employees and subcontractors are responsible for ensuring they are both physically and mentally fit to perform their job functions safely as part of GHD's Fatigue Management Program. GHD will use the following control measures to minimize fatigue during the project:

- Alter the work schedule to reduce the overall time a worker will perform physically demanding work.
- Monitoring employee behaviors for signs of fatigue.
- Eliminate or reduce where practicable the need to work extended hours, night shifts, or overtime.
- Use work-rest patterns during repetitive tasks to control fatigue and increase mental fitness.

GHD's work/rest balance requirements are referenced based on weight of the vehicle. Less than 10,000 lbs/4536 kg (passenger cars, pickup trucks, SUV) will follow the following guidelines:

- Maximum working time and/or driving and working time within one work day: 14 hours (extendable up to 16 hours if drive time < 4 hours and/or airplane travel is involved; this approach can be taken three times in a 7 day period)
- Maximum continuous drive time: 3 hours followed by a 15 minute break
- Maximum drive time per day: 9 hours (extendable up to 10 hours twice in 7 day period)

Employees that drive vehicles greater than 10,000 lbs/4,536 kg must meet the requirements of the transportation agency for which they work and travel.

Management, as represented by an employee's manager, Project Manager or any Principal, may grant a documented variance to the standard work/rest balance for specific employees for a period covering no longer than one week. Additional variances can be issued after for each week. For further information see Fatigue Management Program on the portal.

## 1.13 Management Of Change

Safety incidents are known to occur when key changes are not communicated to all stakeholders related to a project. Management of Change is covered by the GHD Quality Manual Section 7.3.7 Control of Project Changes and is documented using QSF-006 Management of Change Form (see Appendix ).

The types of changes that are to be documented and communicated are:

- Project management/Resources (key personnel)
- Equipment
- Safety – this would not include daily changes to JSA when dirtied in the field.
- Field Operations/SOP

Form QSF-006 is the tool to document and communicate the change. The completed QSF-006 is to be filed in the GHD field folder of the project file.

## 1.14 Field Notes

All activities undertaken in the field must be correctly and completely recorded in bound field books, Quality System Field Data Record forms (QSF 200, QSF 400 , and QSF 500 Series D), or in some other GHD approved format (i.e., electronically, loose paper). All records will be kept in the GHD approved format specified for the activities undertaken. The formats have been established to ensure completeness and to provide consistency amongst the field staff regardless of which office they are from. Refer to Section 7 - Control of Monitoring and Measuring Equipment of the GHD Quality System Manual and Section 3.4.1 – Field Notes of the GHD Field Training Manual for more information regarding field note content requirements.

These field notes may be called as evidence in a court of law.

In addition to the formal field notes, field personnel are expected to keep running tables that summarize the field activities so that when questioned at any time during the project, a detailed status of the work completed and that yet to be done can be provided. These lists also serve as checklists to confirm that the correct number and sequence of samples, wells, boreholes, etc. have been collected or completed.

Upon completion of each project, all of the field documentation is brought back and suitably stored at the GHD office in which the field staff who performed the field work are located.

> *GHD demands that all field note entries are factual and accurate. Everyone recognizes that errors and omissions will be made on occasion. While GHD does not condone a level of effort that is incomplete or inaccurate, it is recognized that it may happen and most of our clients will understand these situations. However, anyone who is caught falsifying any record, no matter how small, will be immediately dismissed.*

# 2. History & Scope

## 2.1 Site History/Background

The Fort Lauderdale Executive Airport ("FXE") was identified in a US Environmental Protection Agency ("USEPA") study as potentially impacted by lead due to the use of aviation gasoline (Avgas) at the site. The purpose of this project is to screen soils at FXE for the potential presence of lead, deliver a technical report evaluating screening data against State established target levels, and provide recommendations for a path forward.

Four (4) areas of concern (AOCs) have been Identified within FXE boundaries for soil sample collection.

## 2.2 Scope of Work Tasks

This HASP covers the specific site activities that will be conducted by GHD personnel and their subcontractors. These activities are as follow:

- Mobilization of personnel, materials, and equipment to and from the site
- Site reconnaissance activities
- Collect soil samples via hand-auger in accordance with FDEP SOPs
- Site restoration
- Decontamination of personnel and equipment
- Demobilization of personnel, equipment, and materials

GHD will complete 75 of soil borings for sample collection. Soil samples will be collected from ground surface to 0.5 feet below land surface (ft bls), and from 0-5-2.0 ft bls at each boring location.

This HASP covers the specific site activities that will be conducted by GHD personnel and their subcontractors. These activities listed here, and in the attached JSAs cover the tasks being performed onsite.

Driving, Site Reconnaissance and Walk through Activities, Mob/Demob of personnel, material, and equipment, Collection of Soil Samples, Decontamination of Sampling Equipment and Personnel

If site operations are altered or if additional tasks are assigned, an addendum to this HASP shall be developed to address the specific hazards associated with these changes.

All addendums will be required to be developed in conjunction with project management and a GHD safety professional.

# 3. Chemical Hazards

## 3.1 Introduction To Chemical Hazards

This section identifies and evaluates the potential chemical hazards that may be encountered during the completion of this project. These hazards and the anticipated initial exposure levels are based on client data, historical data, etc.

Chemical exposures occur via four major routes of entry: absorption, inhalation, ingestion, and injection. A listing of the chemical contaminants of concern is found in the **Chemical Table** (Table 1) and The **Safety Data Sheets (SDSs),** for chemical products used on site, are also included in the Appendices. Both the Chemical Table and SDSs include exposure limits, signs and symptoms of exposure, chemical properties, and physical characteristics.

## 3.2 Control Measures

Before the proper control(s) can be selected, GHD personnel conduct a hazard evaluation of the process, activity, or material. A hazard evaluation may include reviewing information from a chemical container label, SDS, manufacturer, National Institute for Occupational Safety and Health (NIOSH) website, and other resources as needed; identifying route(s) of exposure; and evaluating the process/activity to determine if an exposure evaluation is needed. If necessary, a HSE Manager conducts and documents exposure evaluations.

Exposure to potential on site contaminants/chemicals, such as those listed in Table 1.0 and SDSs, include the following methods:

- Engineering controls such as wetting methods, ventilation, elimination, or substation.
- Administrative controls such as work rotation, training, or proper hygiene practices (washing facilities).
- Monitoring air concentrations with appropriate equipment in the breathing zone.
- Selecting and using personal protective equipment (PPE) such as gloves or respiratory protection.

JSAs are developed and revised to list the associated hazard controls on a task-specific basis.

## 3.3 Safety Data Sheets

SDSs are documents created by the chemical manufacturer that describe the substance. Some information found on an SDS includes: hazardous and physical characteristics, handling requirements, storage and disposal information, and signs and symptoms of exposure.

When working with hazardous chemicals, readily available and up-to-date SDSs are required for each chemical. GHD personnel and its subcontractors are responsible for obtaining and maintaining SDSs for their controlled products and for products that they are bringing onto site. All projects maintain an inventory of SDS and are made readily available to all employees and visitors.

## 3.4 Container Labels

All hazardous materials, hazardous waste, chemical containers, and chemical storage areas are appropriately labeled indicating the chemical identity, hazards present, and any relevant regulatory requirements. Labeling of all chemical containers assists emergency personnel and others in identifying hazards if a spill occurs or emergency situation arises.

Chemical container labeling is the responsibility of the individual who fills and/or uses the chemicals. All containers into which chemicals are transferred are legibly labeled in the language that can be understood by the employees who work with or in proximity (English, French, Spanish, etc.) and include the name of the chemical and appropriate hazard warnings.

## 3.5 Workers Training

All employees who may work in proximity to controlled products has and maintains current applicable training as appropriate to client, state, provincial or federal requirements, which may include: HAZCOM, WHMIS, TDG, or DOT. Records of training are readily available upon request.

# 4. Physical Hazards

## 4.1 Introduction To Physical Hazards

Physical Hazards are factors within the environment that can harm the body without necessarily touching it. Vibration and noise are examples of physical hazards. Physical hazards for this site have been identified in the following section. If the hazards change due to site conditions or additions to the scope of work, a Stop Work must be implemented and the conditions identified to the PM and RHSM.

In addition, personnel must be aware that the protective equipment identified in the JSA may limit dexterity and visibility and may increase the difficulty of performing some tasks.

## 4.2 Drilling Equipment

GHD field staff should minimize time spent in close proximity to an operating drill rig, including during set-up/teardown time. It is critical to maintain a safe work distance from the drill rig crew to allow them the necessary room to perform their tasks. GHD field personnel should only be near the drill rig when their work activity, such as air monitoring, soil sampling, and confirmation of borehole locations, dictates.

Drill staff are responsible for all activities related to drill rig setup and operations. The drilling contractor briefs GHD personnel and crew during the pre-start/tailgate safety meeting on the rig's critical safety features and identifies known hazards when working near the rig.

The GHD site supervisor ensures the following:

- All PPE and protective hazard mitigation is in place prior to work starting.
- JSAs are reviewed and applied.
- The Daily Pre-Use Inspection checklist is completed by the operator to ensure that the equipment is functioning as intended.
- The emergency switches are functional and verified to be operational during the documented daily equipment check.
- **The QSF-019 Property Access/Utility Clearance Data Sheet is signed and that all utility clearances are obtained, reviewed, understood, and confirmed before drilling activities begin.**
- No rig operators are wearing any loose fitting clothing, including untied shoe/boot laces, drawstrings, etc., due to the potential of being caught in rotating machinery.
- Overhead hazards including utility lines are checked .
- Before the mast of a drill rig is raised, the drill rig is first leveled and stabilized with leveling jacks and/or cribbing, the drill rig is re-leveled if settling occurs after initial setup, the mast is lowered only when the leveling jacks are down, and the leveling jack pads remain deployed until the mast is lowered completely.
- The work area is properly demarcated with rope, caution tape, and fencing, and marked or posted to keep the area clear of pedestrian traffic or spectators.
- Before leaving the controls, the operator shifts the transmission controlling the rotary drive into neutral and places the feed lever in the neutral position.
- Before leaving the vicinity of the drill, the operator shuts down the drill engine.

## 4.3 Utility Clearances - OSHA

Extreme caution is needed when working around electrical power lines. Electricity flows through

metal, wood, and many other conducting materials, including human beings. Elevated equipment such as drill rigs, backhoes, scaffolding, ladders, etc must remain the required distance away according to the local/state/provincial regulations.

These minimum requirements are:

**Occupational safety and health act 1926.550(a)(15)**

| Operating voltage of overhead power | Operating voltage of overhead power safe limit of approach distance for persons and equipment |
|---|---|
| <50 kv | 10 feet |
| >50 kv | 20 feet |

For lines rated over 50 kv, minimum clearance between the lines and any part of the crane or load shall be 10 feet plus 0.4 inch for each 1 kv, over 50 kv, or twice the length of the line insulator, but never less than 10 feet.

- If any part of a machine may encroach these parameters, SWA is implemented, a review of the SOW is conducted with the PM and RHSM, and a spotter is used.
- If the client has requirements that exceed the above minimums, then the client requirements are used.

**Underground Utilities**

Underground utilities, if present, are to be clearly marked and identified prior to commencement of work. Follow applicable regulations and client requirements with regards to utility-locating requirements (e.g., One Call).

Personnel involved in intrusive work will:

- Confirm proposed excavation(s) and heavy truck routes are not in the area of subsurface utilities. This meeting is to be documented.
- Review and adhere to GHD's Subsurface Utility Clearance Protocol SOP at a minimum. Use air knifing or vacuum truck digging techniques inside 5 feet of the outside edge of an underground facility.
- Pre-clear holes to 120% of the drill diameter to a minimum depth of 5 feet below ground surface. Consider pre-clearing to greater depths in close proximity to process piping such as loading racks
- Locate boreholes a minimum distances of 5 feet perpendicular from utility mark-out lines
- **Complete the Property Access/Utility Clearance Data Sheet (QSF 019) prior to initiating excavation activities.**
- On private property, request that the owner of the service, locate and mark the service.
- If a service may pose a hazard and cannot be shut off or disconnected, request that the owner of the service supervise the uncovering of the service during the work.
- Identify the work that can be conducted with the assistance of the locator line service, coordinate document/drawing review, and inspect the site for manholes, catch basins, valve boxes, etc. that may indicate the direction/depth of underground installations. Marking indicates only the approximate location of buried lines.

*The following are the Uniform Color Codes for utility locates*

white proposed excavation
pink temporary survey marking
red electrical power lines,cables, conduit and lighting cables
yellow gas,oil, steam,petroleum or gaseous material
orange communication, alarm or signal lines,cables or conduit
blue potable water
purple reclaimed water, irrigation and slurry lines
green sewers and drain lines

## 4.4 Material Handling

Material handling and storage practices are conducted at the project site. Proper lifting reduces the hazard out of moving objects. No one person should handle, lift, or move 50 pounds or more by themself. Even if the object weighs less than 50 pounds, the configuration or shape of the object should be evaluated to see if two people should be used to lift the object.

**Manual Lifting**

Consider the following prior to a lift.

- Establish that you can lift the load safely.
- Inspect route to be travelled, confirming sufficient clearance.
- Look for any obstructions or spills.
- Inspect the object to determine how it should be grasped.
- Select and use containers with handles where practical.
- Look for any sharp edges, slivers, or other things that may cause personal injury.
- Do not move any object that will obstruct your field of vision when transporting the load.
- When lifting objects, use proper lifting techniques. Position the body so that the weight of the body is centered over the feet, which provides a more powerful line of thrust and ensures better balance. Start the lift with a thrust of the rear foot. Do not twist.

**General Storage Practices**

Storage of materials and supplies must not create a hazard. General storage area practices include the following:

- Bags, containers, bundles, etc. stored in tiers must be stacked, blocked, interlocked, and limited in height so that they are stable and secure against sliding or collapse.
- All stacked materials, cargo, etc. must be examined for sharp edges, protrusions, signs of damage, or other factors likely to cause injury to persons handling these objects. Defects are to be corrected as they are detected.
- Storage areas must be kept free from accumulation of materials that constitute hazards from tripping, fire, explosion, or pest harborage.
- Storage areas have provisions to minimize manual lifting and carrying. Aisles and passageways provide for the movement of mechanical lifting and conveyance devices.
- Stored materials do not block or obstruct access to emergency exits, fire extinguishers, alarm boxes, first aid equipment, lights, electrical control panels, or other control boxes.
- Hazardous materials are stored in accordance with the details outlined in the MSDS, or accepted guidelines from reputable agencies. Guidelines include details about the materials reactivity, corrosivity, flammability, etc., as well as appropriate signage.

## 4.5 Noise

Hearing protection is required for project activities when working in close proximity to machinery, drilling operations, or impact/power tools where noise levels may exceed the decibel range of 85 dBA.

When hearing a coworker at normal conversation distance is difficult or the noise level is approaching or exceeding 85 dBA, hearing protection such as earplugs or muffs must be available/worn by all site personnel and visitors that may be exposed to elevated levels of noise. Individuals who wear hearing protection are to be adequately trained in the safe use and handling of hearing PPE.

GHD employees who have the potential to be exposed to noise exceeding 85dba in the work environment will be enrolled in the GHD Hearing Conservation Program.

## 4.6 Electrical Safety

Employees do not accept unnecessary exposure to hazards, such as working on energized electrical installations. When possible, circuits are de - energized according to the GHD Lockout/Tagout program and client requirements to achieve safe working conditions. When it is not possible to de - energize circuits, the Workplace Electrical Safety Program (WESP) requirements ensure that safe conditions and work practices are implemented.

The WESP is the electrical safety program that covers all electrical work performed at GHD facilities and work performed by GHD at client facilities. It also provides mandatory program requirements and is used in conjunction with all other procedures and practices on the site to ensure that electrical work is accomplished safely.

To protect employees from shock and/or arc flash hazards, only individuals who are "qualified" in accordance with the NFPA 70E or CSA Z462 Standards will be allowed to perform Arc Flash Hazards Analysis, LOTO, diagnostic testing, work on live electrical circuits or perform electrical work on equipment. The term "qualified" does not relate to a job title or job assignment, but rather to the activity being performed. Employees who perform electrical work must successfully complete the “Electrical Safety for Qualified Persons” training to be authorized as “qualified”. Only persons who have received this training and are knowledgeable in the construction and operation of equipment or a specific work method, and are trained to recognize and avoid the electrical hazards that may be present with respect to that equipment or work practice are allowed to perform this type of work. Consult the GHD Workplace Electrical Safety Program for additional program requirements and permits.

## 4.7 Control Of Hazardous Energy (Loto)

Hazardous energy sources may be encountered during the servicing and maintenance of machines and equipment, in which the unexpected energization or start-up of the machines or equipment could cause injury to employees.

The minimum performance requirements to control hazardous energy requires that employers develop and implement an energy control program. The elements of an energy control program are as follows:

- Lockout/tagout
- Employee protection
- Energy control procedure
- Protective materials and hardware
- Periodic inspections
- Training and communication
- Energy isolation
- Employee notification

Project personnel who are required to conduct operations and maintenance activities that will require the isolation of an energy hazard through the use of a lockout/tagout device shall follow the GHD program requirements and written procedures for that operation. The program requirements can be located in the Appendix.

**Employee Training**

Employees authorized to attach and remove lockout/tagout devices shall be provided with initial training regarding the safe application, usage, and removal of such devices. Each authorized employee will receive training in the recognition of applicable hazardous energy sources, the type and magnitude of the associated energy, and the methods necessary for energy isolation and control.

All authorized employees will be provided with refresher training annually, or at more frequent intervals whenever the following conditions apply:

- A job assignment change.
- A change in machinery or equipment, or a process change that presents new hazards.
- A change in the energy control procedures.
- Possible deficiencies in the employee's understanding of the following:
  - The hazards associated with the energy that controls the machinery or equipment in the employee's work area.
  - Application and removal procedures for lockout/tagout devices.

Employees who work in areas where lockout/tagout procedures are used shall receive initial and annual refresher training in the purpose and use of lockout/tagout devices and principles behind their use.

## 4.8 Heat Stress

Heat stress is one of the most common illnesses faced by project personnel when working in elevated temperatures and/or humidity.

**Prevention**

The following procedures will be carried out to reduce heat stress:

- Heat stress monitoring.
- Acclimatization.
- Sun exposures.
- Work/rest regimes (schedule of breaks) in accordance with Occupational Health Clinics for Ontario Workers (OHCOW).
- Humidex Heat Stress Response Plan – mandatory breaks scheduled in summer months or during high risk activities for heat stress (based on ACGIH)
- Heat stress safety PPE (e.g., cool vests, bandanas)
- Cool potable water available
- Use of buddy system
- Seek shade - Shade is a good source of protection, but keep in mind that shade structures (e.g., trees, umbrellas, canopies) do not offer complete sun protection.

| **OHCOW Humidex Heat Stress Response Plan** | | |
|---|---|---|
| **°F** | **°C** | **Response** |
| 77-84°F | 25-29°C | •supply water to workers on an "as needed" basis |
| 86-91°F | 30-33°C | •post "heat stress alert" notice<br>•encourage workers to drink extra water<br>•start recording hourly temperature and relative humidity |
| 93-98°F | 34 37°C | •post "heat stress warning" notice<br>•notify workers that they are drinking extra water<br>•ensure workers are trained to recognize symptoms |
| 100-102°F | 38 39°C | •provide 15 minutes relief per hour<br>•provide adequate cool (10 15°C) water, at least 1 cup (240 ml) of water every 20 minutes<br>•workers with symptoms should seek medical attention |
| 104-107°F | 40 42°C | •provide 30 minutes relief per hour in addition to the provisions listed previously |
| 109-111°F | 43 44°C | •if feasible provide 45 minutes relief per hour in addition to the provisions listed above<br>•if a 75% relief period is not feasible then stop work until the humidex is 42°C or less |
| 113°F | 45°C or over | •stop work until the humidex is 44°C or less |
| Note: Humidex plan is a simplified way of protecting workers from heat stress which is based on the 2007 ACGIH heat stress TLV® (threshold limit value®) which uses wet bulb globe temperatures (WBGT) to estimate heat strain. These WBGT's were translated into humidex | | |

**Sun Exposure**

Overexposure to sunlight is a common concern when field activities occur during warm weather

conditions. Overexposure can occur on clear, sunny days, as well as on overcast and cloudy days. The following steps should be taken to protect against overexposure to sunlight:

- Always use sunscreen on exposed body parts.
- Cover up.
- Wear safety rated sunglasses.
- Limit time in the midday sun.

## 4.9 Cold Stress

Cold stress is similar to heat stress in that it is caused by a number of interacting factors including environmental conditions, clothing, and workload, as well as the physical and conditioning characteristics of the individual.

**Prevention**

A variety of measures can be implemented to prevent or reduce the likelihood of employees developing cold related ailments and disorders.

- Acclimatization.
- Fluid and electrolyte replenishment.
- Eat a well-balanced diet.
- Wear warm clothing.
- Follow work/rest regimes.

The parts of the body most important to keep warm are the feet, hands, head, and face. As much as 40 percent of body heat can be lost when the head is exposed.

**TLVs Work/Warm Up Schedule for 4 Hour Shift**

**THRESHOLD LIMIT VALUES WORK/WARM-UP SCHEDULE FOR FOUR-HOUR SHIFT***

| Air Temperature Sunny Sky | | No Noticeable Wind | | 5 mph Wind | | 10 mph Wind | | 15 mph Wind | | 20 mph Wind | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| °C (approx) | °F (approx) | Max. Work Period | No. of Breaks | Max. Work Period | No. of Breaks | Max. Work Period | No. of Breaks | Max. Work Period | No. of Breaks | Max. Work Period | No. of Breaks |
| -26° to -28° | -15° to -19° | (Norm breaks) 1 | | (Norm breaks) 1 | | 75 min. | 2 | 55 min. | 3 | 40 min. | 4 |
| -29° to -31° | -20° to -24° | (Norm breaks) 1 | | 75 min. | 2 | 55 min. | 3 | 40 min. | 4 | 30 min. | 5 |
| -32° to -34° | -25° to -29° | 75 min. | 2 | 55 min. | 3 | 40 min. | 4 | 30 min. | 5 | Non-emergency work should cease ↓ | |
| -35° to -37° | -30° to -34° | 55 min. | 3 | 40 min. | 4 | 30 min. | 5 | Non-emergency work should cease ↓ | | | |
| -38° to -39° | -35° to -39° | 40 min. | 4 | 30 min. | 5 | Non-emergency work should cease ↓ | | | | | |
| -40° to -42° | -40° to -44° | 30 min. | 5 | Non-emergency work should cease ↓ | | | | | | | |
| -43° to below | -45° & below | Non-emergency work should cease | | | | | | | | | |

*2014 TLVs and BEIs - Threshold Limit Values for Chemical Substances and Physical Agents and Biological Exposure Indices. Cincinnati: American Conference of Governmental Industrial Hygienists (ACGIH), 2014

## 4.10 Hand And Power Tools

### Hand Tools

- Hand tools must meet the manufacturer's safety standards.
- Hand tools are not to be altered in any way.
- At a minimum, appropriate eye and face protection that meets current applicable standards (ANSI/CSA) must be used.
- Wrenches, including adjustable, pipe, end, and socket wrenches, are not used when jaws are sprung to the point that slippage occurs.
- Impact tools such as drift pins, wedges, and chisels are kept free of mushroom heads.
- Wooden handles are free of splinters or cracks and secured tightly to the tool.
- Any damaged or defective tools are immediately removed from service and tagged for destruction.

### Power Tools

- All power tools must be inspected regularly and used in accordance with the manufacturer's instructions and the tool's capabilities.
- Electric tools are not used in areas subject to fire or explosion hazards, unless they are approved for that purpose.
- Corded portable electric tools are connected to a ground fault circuit interrupter (GFCI) when working in wet areas.
- Coiled cords/extension cords are uncoiled when plugged in to allow for dissipation of heat.
- Cords/extension cords rated appropriately for the temperature are used.
- Appropriate eye and face protection that meets current applicable standards (ANSI/CSA) are used.
- Personnel are trained in the proper use of the tool.
- Any damaged or defective power tools must be immediately tagged and removed from service.
- Repairs to hand or power tools are only made by qualified individuals and in accordance with the manufacturer’s standards.
- Field or shop modifications to tools or equipment are only made by qualified individuals and in accordance with either manufacturer or engineer-approved specifications.

## 4.11 Slip, Trip, Hit, Fall

Slip/trip/hit/fall injuries are the most frequent of all injuries to workers. They occur for a wide variety of reasons, but can be minimized by the following prudent practices:

- Spot-check the work area to identify hazards and communicate hazards to on site personnel.
- Update/dirty the JSA to reflect changes.
- Keep work areas clean and free of clutter, especially in storage areas and walkways.
- Secure all loose clothing and ties, and remove jewelry that may pose an entanglement hazard.
- Establish, maintain, and utilize walkways that are free of slip and trip hazards.
- Utilize/install appropriate lighting for walking paths and working areas.
- Beware of slip/trip hazards such as wet floors, slippery floors, and uneven surfaces or terrain.
- Carry only loads you can see over (Refer to Material Handling for additional information).
- Refrain from the use of portable communication devices (cell phones, two-way radios) while traversing the site.
- Keep a safe buffer zone between workers using equipment and tools.

## 4.12 Aggressive Or Menacing Behavior

When confronted by an individual whose behavior becomes aggressive or menacing, remain as calm as possible. Avoid arguing with or physically confronting the individual. Attempt to distance yourself from the individual. Advise others in the area to leave the scene and request police assistance by having someone call the emergency number listed on the Emergency Contact Sheet. Use the team approach. A staff member who is physically unable to break away from an attacker should shout for help.

The use of physical force is justified when a person believes that such force is necessary to protect himself or herself against the use or imminent use of unlawful physical force by another person.

Should an aggressor only be interested in the taking or damaging of property, do not interfere. Obtain a description of the individual to provide to local authorities, including height, weight, race, sex, clothing, accent, unusual markings such as tattoos, piercings, scars, hair color, and weapon, if any.

Contact the HSE Help Line and file an incident report with your immediate supervisor as soon as it's safe to do so.

## 4.13 Adverse Weather Conditions

Adverse weather is the existence of or impending weather conditions such as heavy rain, freezing rain, sleet, snow, high winds (50km/30mph), dust storms, tornadoes, hurricanes, lightning, or any combination of weather that is either not reasonable or not safe for employee exposure. Stop Work Authority (SWA) is executed prior to these conditions as reasonably possible. The site is evacuated according to the emergency plan developed and listed in this Health and Safety Plan.

Based on their expertise and knowledge of manufacturer’s recommendations for the equipment being operated, heavy equipment operators such as crane and drill rigs are responsible for advising the site supervisor whether it is safe to continue operations.

The site supervisor decides on the continuation or discontinuation of work based on current and pending weather conditions, the equipment manufacturer recommendations, and the equipment operator’s recommendations.

## 4.14 Flammable & Combustible Liquids

The storage, dispensing, and handling of flammable and combustible liquids must be in accordance with industry standards such as National Fire Protection Agency (NFPA) guidelines. The specific flammable or combustible liquids used at the site may include gasoline, diesel, kerosene, oils, and solvents.

Flammable and combustible liquids are classified according to flash point. This is the temperature at which the liquid gives off sufficient vapors to readily ignite. Flammable liquids have flash points below 100 ºF (37.8ºC). Combustible liquids have flash points above 100 ºF (37.8 ºC) and below 200 ºF (93.3 ºC).

**Storage**

Many flammables can ignite at temperatures at or below room temperature. They are far more dangerous than combustibles when they are heated. As a result, these products must be handled very carefully. At normal temperatures, these liquids can release vapors that are explosive and hazardous to employee health. Exposure to heat can cause some of these liquids to break down into acids, corrosives, or toxic gases. For this reason, flammable and combustible liquids should be stored in cool, well ventilated areas away from any source of ignition. Always consult the MSDS of the product for specific information.

Flammable and combustible liquids must be stored in designated areas. Such areas must be isolated from equipment and work activity that may produce flames, sparks, heat, or any form of ignition, including smoking. The most practical method is the use of one or more approved (commercially available) flammable/combustible liquid storage cabinets.

Cabinets must be labeled "Flammable – Keep Fire Away." Doors must be kept closed and labeled accordingly. Containers must be kept in the cabinet when not in use.

**General Requirements:**

- Keep containers of flammable/combustible liquids closed when not in use.
- Keep flammable/combustible liquids in designated areas and approved cabinets.
- Do not allow use of unapproved containers for transfer or storage. Use only approved safety cans (5 gallon maximum) with a spring closing lid and spout cover, designated to safely relieve internal pressure when exposed to heat or fire.
- Use only approved self closing spigots, faucets, and manual pumps when drawing flammable/combustible liquids from larger containers/barrels.
- Use only approved metal waste cans with lids for disposal of shop towels/oily rags.
- Designate "Smoking" and "No Smoking" areas.
- Designate fueling areas.
- Observe all signs indicating "No Smoking," "No Flames," and "No Ignition."

**Transferring Flammable/Combustible Liquids**

This seemingly routine task can be hazardous if certain precautions are not followed. Grounding and bonding must be observed at all times to prevent the accumulation of static electricity when transferring containers/barrels/drums one to another.

- Drums should be grounded to a grounding rod using a #4 copper conductor.
- Bonding is necessary between conductive containers (e.g., a barrel/drum and a 5 gallon container).

# 5. Biological Hazards

## 5.1 Infection Control

**Infection Control**

During an infectious outbreak (e.g., epidemic, or pandemic virus), all persons experiencing flu-like symptoms must stay home and away from the workplace to protect themselves, co-workers and the community. Persons, who believe they have been exposed to another illustrating symptoms or developed symptoms themselves, must notify their Supervisor, Project Manager, People Team or HSE Team member for advice and completion of a risk assessment when applicable.

In the event of an infectious outbreak in the community the GHD Standard Operating Procedure HSE Infection Control HSE339 will be initiated along with the activation of the local Crisis Management Team. Should the above occur, both office and field employees will be required to:

· Know the symptoms

· Adhere to local government Public Health and GHD protocols

· Complete personal health screening (including GHD vendors and/or visitors) as required

· Not attend work if they exhibit any of the symptoms

· Sneeze and cough into their sleeve or a tissue which is then disposed of

· If air borne transmission is confirmed, wear appropriate respiratory protection (surgical style or cloth mask)

· Carry and use infection control cleaning/disinfection supplies and PPE (e.g. nitrile gloves, etc.)

· Wash their hands with soap and water for at least 20 seconds followed by alcohol-based hand sanitizer that contains > 60% alcohol

· Maintain physical distancing of 2 meter/6 feet at all times from others

· Discontinue face-to-face meetings

· Avoid close contact exposure defined as:

- Greater than 15 minutes face to face less than 2meter/6 feet apart without the use of face mask/covering
- Sharing of a closed space with suspected/confirmed case(s)

**Note:** This is not the exhaustive list. Further protective measures will be included in the HASP should Public Health Authorities provide additional guidance specific to the biological hazard.

## 5.2 Introduction To Biological Hazards

GHD employees conduct numerous project activities where they may encounter biological hazards such as listed in the following table. This section identifies the problems associated with these biological hazards and the precautions to be taken if these hazards are encountered.

The biological hazards identified are applicable to this site. If you are bitten, stung, or attacked by any of the listed hazards, contact the GHD HSE Help Line at 1-866-529-4886

## 5.3 Wildlife

| | | |
|---|---|---|
| Tick and Chiggers | •Wear light colored clothing •Keep clothing buttoned or zipped •Keep socks tucked in •Apply repellent containing DEET or Permethrin to clothing and exposed skin •Check hair and clothing periodically using buddy system | •Remove tick with tweezers or fingers and tissue •Grab tick as close as possible to attachment site and pull firmly •Inspect tick to ensure that no parts remain in attachment site •Apply AfterBite containing antiseptic to affected areas •Call GHD HSE Help Line |
| Flying, Stinging, Biting Insects: Bees, Wasps | •Avoid wearing perfume, hairspray, cologne, and scented deodorant while working outside •If eating outside, keep all food and drinks covered; sweet foods and strong scents attract stinging insects •Never swat or swing at the insect; wait for it to leave, softly blow it away, or gently brush it aside •Inspect areas carefully as bees, wasps, and hornets can nest both in the ground and above ground •If the nests pose a threat, have them professionally removed | •Apply AfterBite containing antiseptic to affected areas or place an ice cube or ice pack over the sting to reduce pain •Remove the stinger with tweezers or scratch with a credit card (catch barbs with card and pull out) •Seek medical attention when the reaction to a sting includes swelling, itching, dizziness, and shortness of breath •Call GHD HSE Help Line |
| Mosquitoes | •Wear light colored clothing •Keep your body covered as much as possible; wear a hat or mosquito screen •Apply repellent containing DEET or Permethrin to clothing and exposed skin | •Apply AfterBite containing antiseptic to affected areas •If moderate to extreme itchiness is experienced, use over the counter antihistamines |
| Venomous Snakes | •Watch where you step, sit, or put your hands •Wear appropriate clothing, boots, and snake chaps •Stay on your feet as much as possible or clear work area before starting | •Call 911 or the local emergency number •Wash the wound •Keep injured area still and lower than the heart •Do not apply ice •Do not apply suction •Do not apply a tourniquet •Call GHD HSE Help Line |

| | | |
|---|---|---|
| Fire Ants | •Be cautious around large open areas •Avoid applying strongly scented lotions •Keep an eye on the ground to watch for ant activity; stay in the shade and cooler areas, as fire ants prefer sunny locations •If you notice the pinch of a fire ant bite, brush the ant off quickly before it has a chance to sting •Always wear high socks, boots, pants, and gloves when working; it may help to tape the pant cuff to the boot •Inspect all vehicles, including cars and UTVs, to ensure no ants are inside •Inspect clothing and equipment used on site to ensure no ants are attached •Check area you are standing in and do not stay in one spot for prolonged periods •Shake out clothing and shoes before getting dressed •Practice good housekeeping skills •Exercise care when handling materials that have been undisturbed for some time; wear leather gloves •Check voids and dark cluttered areas before inserting hands •Always wear gloves | •Move away from the nest to prevent more bites •Remove all clothes as soon as you can, as ants may still be in them •Wash the affected area with cold soapy water •Ice the affected area to calm swelling •Use alcohol to disinfect the area •Be careful not to open the bite blisters •Retain specimen of ant if possible •Apply AfterBite containing antiseptic to affected areas •Call GHD HSE Help Line |
| Threatening Dogs | •Stop walking, face the dog, and be relaxed •Keep the dog in your peripheral vision as it circles •If it tries to bite – yell "NO" in a loud stern voice •If you have an item such as a briefcase or field book, keep it between you and the dog •If the dog continues to nip or attacks, fight back; protect your throat and if possible hit the dog in the nose, or kick it in the rib cage, which may stun it and deter it from continuing the attack | •If bitten and the skin is not broken, clean with antiseptic •Notify Supervisor/PM •If skin is broken, clean with antiseptic, cover, and seek medical attention •Notify Supervisor/PM •Call GHD HSE Help Line |

## 5.4 Poisonous Plants

| | | |
|---|---|---|
| Poison Ivy/Poison Oak | •Learn to identify poison ivy and poison oak (leaves of three, let them be) •Urushiol oil is in the wood portion of the plant and is active all year long •Wear proper PPE in known areas (gloves, long sleeves, long pants, safety glasses) •Proper hygiene extremely important to prevent ingestion and eye contact | •You may only have 30 minutes to get the oil off skin before it absorbs, and less time in hotter climates •Rinse with cold water, as hot water will open your pores •Apply alcohol to dissolve oils •Watch for an itchy red skin rash, which is the most common reaction; over time, large blisters may form •Use topical cream to assist with the itching (consult your pharmacy) •In severe cases, contact your doctor •Call GHD HSE Help Line |
| Stinging Nettles | •Common plant found throughout North America •Silky hairs attach to the skin and cause pain and irritation •Wear proper PPE in known areas (gloves, long sleeves, long pants, safety glasses) | •Rinse area with cool water •Use tape to remove hairs if you can see them •Use mix of baking soda and water to create a paste and apply to inflicted area. •Obtain first aid/medical treatment if required •Call GHD HSE Help Line |
| Vegetation Overgrowth | •common weeds and tall grasses •increase in trip hazard, and entanglement •risk of fire during summer season •wear proper PPE, long pants, eye protection •increase in rodent, snake, stinging insect hazards | •discuss clearing area with management to reduce risks •use extra caution when walking due to unseen holes or trip hazards •watch for grass cuts on arms, contact GHD HSE Help Line if reaction occurs |

# 6. Personal Protective Equipment

## 6.1 Introduction To PPE

Controlling a hazard at the source is the best way to protect employees. When engineering, work practice, and administrative controls are not able to protect our employees, GHD provides personal protective equipment (PPE) to its employees and ensures that the PPE is used appropriately. PPE is equipment worn as a barrier to minimize exposure to a variety of hazards.

This section covers applicable PPE requirements, which include eye, face, hand, head, foot, and respiratory protection.

## 6.2 Types of Personal Protective Equipment (PPE)

The type of PPE required for work varies based on the task being performed. The specific PPE required for each individual task is documented in the appropriate task-specific JSA. The recommended minimum PPE for GHD site work is as follows:

- Shirts with a minimum 6-inch sleeve.
- Long pants made from suitable sturdy material .
- Grade 1 protective footwear meeting CSA Z195 M92 (Canada)/ ANSI Z41.1 (US), green patched (triangle), steel-toed/puncture-resistant and electric shock-resistant sole with a 6-inch cuff, fully laced and secured, in material appropriate for weather and task.
- Safety glasses or goggles (based on the type of hazard – dust, splash, etc.), meeting CSA Z94.3 (Canada) or ANSI Z87.1 (US) standards.
- Hand protection such as gloves meeting standards EN 388 and ANSI 105-2000 as appropriate for the task as per JSA, with selection based on the hazards (abrasion, blade cut, tearing, puncture, and impact) associated with the task being performed.
- Reflective garment meeting CSA Z96 02 or ANSI 107 (as required).
- Type 1 Class E hardhat, meeting either CSA Z94.1 05, Z94.1 92, ANSI Z89.1, or Z89.1.
- Hearing protection meeting CSA/ANSI approved NRR of at least 20 dBA if noise levels exceed 85 dBA.

Additional minimum requirements for PPE include:

- All PPE are maintained in good condition with no rips, tears, or damage that compromise integrity.
- PPE is not loose fitting as to avoid entanglement issues.
- All PPE is disposed of and/or decontaminated at the conclusion of each workday. The most contaminated PPE is decontaminated first.
- All disposable equipment is removed before meal breaks and at the conclusion of the workday, and replaced with new equipment prior to commencing work.
- Reusable equipment (safety glasses, hard hats, goggles, etc.) is cleaned and sanitized according to GHD and/or manufacturer guidelines.
- Eating, drinking, chewing gum or tobacco, and smoking are prohibited while working in areas where the potential for chemical and/or explosive hazards may be present. Personnel must wash thoroughly before initiating any of the aforementioned activities.

## 6.3 Types Of Protective Material

No universal protective material exists. All materials will decompose, be permeated, or otherwise fail to protect under certain circumstances. Protective clothing can be constructed from a variety of materials for protection against exposure to specific physical, chemical, or biological hazards.

Fortunately, most manufacturers list guidelines for the use of their products. These guidelines usually concern gloves or coveralls and generally only measure rate of degradation, which is failure to maintain structure. A protective material may not necessarily degrade, but may allow a particular chemical to permeate its surface. For this reason, guidelines must be used with caution. When permeation tables are available, they are used in conjunction with degradation tables.

To obtain optimum usage from PPE, the following procedures are followed by all site personnel using PPE:

- When using disposable coveralls, don a clean, new garment after each rest break or at the beginning of each shift
- Inspect all clothing, gloves, and boots both prior to and during use for:
  - Imperfect seams
  - Non uniform coatings
  - Tears
  - Poorly functioning closures
- Inspect reusable garments, boots, and gloves both prior to and during use for:
  - Visible signs of chemical permeation
  - Swelling
  - Discoloration
  - Stiffness
  - Brittleness
  - Cracks
  - Any sign of puncture
  - Any sign of abrasion

Reusable gloves, boots, or coveralls exhibiting any of the characteristics listed above are discarded. PPE used in areas known or suspected to exhibit elevated concentrations of chemicals are not reused.

## 6.4 Respiratory Protection

Respiratory protection is sometimes required for personnel during project activities when action levels exceed the occupational exposure levels. When respirators are required, personnel identify and select the appropriate air purifying respirator and supporting cartridge medium, and follow the procedures and guidelines in their respective written Respiratory Protection program.

At a minimum, all personnel required to use this equipment are:

- Instructed in how to properly fit a respirator to achieve the required face piece to face seal for respiratory protective purposes.
- Medically cleared for the use of respiratory protection.
- Appropriately fitted for the selected respirator through established recognized fit testing methods (quantitative/qualitative), and documentation of fit is readily available.
- Free of beards, sideburns, eyeglasses, and upper or lower dentures that could affect the face seal.

Further regulations for the use of respiratory protection include:

- Cartridges are changed prior to breakthrough, daily, or when personnel begin to experience increased inhalation resistance or breakthrough of a chemical warning property.
- Respiratory equipment and other non disposable equipment are fully decontaminated.
- Appropriate action levels are established and documented based on the applicable occupational exposure limits.

***NOTE: This HASP is not intended for the use of supplied air operations. For supplied air operations, the project manager and a GHD safety professional conduct a review of the scope of work.***

GHD identifies the type of respirator and cartridge and documents on the applicable JSA for the affected tasks and on Table 2.

## 6.5 Respirator Cleaning

Respirator decontamination is conducted once daily at a minimum. Face pieces are disassembled, the cartridges are thrown away, and all other parts are placed in a cleansing solution. After an appropriate amount of time in the solution, the parts are removed and re seated with tap water.

Face pieces are allowed to air dry before being placed in sanitized bags and stored in a clean area.

## 6.6 Levels Of Protection

Protection levels provided by PPE selection are upgraded or downgraded based upon a change in site conditions or the review of the results of air monitoring or the initial exposure assessment monitoring program, if one was conducted.

When a significant change occurs, the hazards are reassessed. Some indicators of the need for reassessment are:

- Commencement of a new work phase.
- Change in job tasks during a work phase.
- Change of season/weather.
- Temperature extremes or individual medical considerations limiting the effectiveness of PPE.
- Chemicals other than those expected to be encountered are identified.
- Change in ambient levels of chemicals.
- Change in work scope that affects the degree of contact with areas of potentially elevated chemical presence MUST be re-evaluated.

All proposed changes to protection levels and PPE requirements are reviewed and approved prior to implementation by the SS.

# 7. Air Monitoring

## 7.1 Introduction To Air Monitoring

Inhalation hazards are caused from the intake of vapors and contaminated dust. Air monitoring shall be performed while intrusive activities are taking place to detect the presence and relative level of those air contaminants that are inhalation hazards. The purpose of air monitoring is to identify and quantify airborne contaminants in order to determine the level of worker protection needed. Initial screening for identification is often qualitative, but the determination of its concentration (quantification) must await subsequent testing.

All instruments will be calibrated on a daily basis in accordance with the manufacturer's guidelines. Records of all calibrations and real time measurements will be kept in a bound field logbook or documented via air monitoring and calibration log sheets.

Correction factors have been determined by the air monitoring equipment manufacturers that enable the user to quantify a large number of chemicals using only a single calibration gas, typically isobutylene for PIDs and methane for LEL. Applicable Correction Factors (CF) for either LEL or PIDs must be applied for known chemicals of concern. These CFs and how to apply them can be found in the air monitoring instrument operating manual or online from the manufacturers website under “Technical Notes”.

When air monitoring is required, the workers breathing zone(s) will be monitored and the results recorded. Additionally, when necessary, area samples at the following locations will be taken daily. Record time, location, and results of monitoring and actions taken based on the readings:

- Upwind of work areas to establish background concentrations.
- In support zone to check for contamination or migration of emissions.
- Downwind of work area to track any contaminants/emissions leaving the site.

The data collected throughout the monitoring effort shall be used to determine the appropriate levels of protection. **Action levels for upgrading or downgrading of PPE have been established on Table 2 and must be reviewed by your HSE Manager/Safety Professional**

## 7.2 Types Of Devices

Air monitoring equipment to be used during site activities shall consist of:

## 7.3 Monitoring Frequency

Monitoring will be conducted continuously during ground intrusive activities or during any activity where airborne hazards (e.g., organic vapors) may be present. The monitoring equipment listed in this HASP for the work activity, relates to the initial levels of protection listed on the TABLE 2. If the results of the first hour of monitoring indicates contaminant concentrations are non detect, and no differing site conditions are observed, then the monitoring frequency may be decreased.

Monitoring results will be legibly documented each work day. They will note project name/number, date, time, serial number, date of last calibration, and the name of person performing calibration, name of person performing monitoring, monitor location within the site, and monitoring results. Daily documentation will be kept with the SS and included in the project file.

## 7.4 Safety And Health Action Levels

An action level is a point at which increased protection or cessation of activities is required due to the concentration of contaminants in the work area. All activities shall be initiated as per JSA requirements. The appropriate actions are to be taken at designated action levels. The initial action level(s) for site work can be located in **Table 2**.

In addition to the action level, an upgrade to Level C is required if:

- Any symptoms occur, as described on the Table 1 Signs and Symptoms
- Requested by an individual performing the task
- Any irritation to eye, nose, throat, or skin occurs

A work stoppage and evacuation (cease and desist) at the specific work area is required if levels in the breathing zone exceed the protection factor of the respirator.

# 8. Site Control

## 8.1 Introduction To Site Control

The purpose of site control is to minimize potential contamination of workers and protect the public from hazards found on site. Site control also includes site security for the protection of GHD employee and subcontractor when working in public areas. Site Control is especially important in emergency situations.

Site control, work area demarcation, and site security will be achieved through posting of signage and placement of barricades and or personnel. All controlled areas will have the appropriate signage posted. Barricades and warning signs will be placed to warn personnel of potential hazards. A standby person (spotter) may be utilized in place of barricades, where appropriate. The following materials may be used to barricade the work area and protect both public and GHD:

- Warning Signs

Approved pedestrian and vehicle traffic paths will be determined during Pre-Start/Tailgate Safety Meetings based upon current site conditions and work locations. When applicable, one pathway should be established for heavy equipment and one for personnel decontamination.

The majority of site operations, as well as access to the site, could be controlled from the support zone. The support zone will provide for team communications, emergency response, and sanitary facilities. Appropriate safety and support equipment also will be located in this zone.

The support zone will be located upwind of site operations if possible, and would be used as a potential evacuation point if appropriate. No potentially contaminated personnel or materials are allowed in this zone.

## 8.2 Two-Person Crew/Buddy System

A Two-Person Crew or Buddy System shall be implemented to protect the employees and public when conducting high risk activies such as:

- Working near traffic
- Working ON or NEAR water
- Excessive noise to which hearing traffic or communication is difficult
- Confined or restricted spaces
- In an isolated area such as landfills or wooded areas
- Areas with high crime rates

When using the buddy system, visual contact must be maintained between crew members at all times, and crew members must observe each other for signs of chemical exposure, heat, or cold stress. Indications of adverse effects include, but are not limited to:

- Changes in complexion and skin coloration
- Changes in coordination
- Excessive salivation and pupillary response
- Changes in speech pattern.

Project personnel must also be aware of potential exposure to possible safety hazards, unsafe acts, or noncompliance with safety procedures. Individuals must inform their partners or fellow team members of non visible effects of exposure to toxic materials. The symptoms of such exposure may include:

- Headaches
- Dizziness
- Nausea
- Blurred vision
- Cramps
- Irritation of eyes, skin, or respiratory tract.

If protective equipment or noise levels impair communications, prearranged hand signals must be used for communication. Personnel must stay within line of sight of another team member.

## 8.3 Communication

Each member of the project team will be able to communicate with other team members at all times. Communications will be by way of:

- Cell Phones/Smart Phones
- Hand Signals

The primary means for external communication are telephones and radio. If telephone lines are not installed at a site, all team members should:

- Know the location of the nearest telephone
- Have the necessary telephone numbers readily available

**Note: The authorized use of cellular phones must be cleared by the client prior to entering site.**

The following procedures will be followed by all site workers when using a cell phone on site:

- No cell phone use while driving or operating equipment.
- No cell phone use while in the Exclusion Zone.
- If using a cell phone on site, find a location where you can safely use the phone. Do not walk around the site while using a cell phone.

Understanding of the following standard hand signals will be mandatory for all employees, regardless of other means of communication:

- Hand gripping throat — Cannot breathe
- Hands on top of head — Need assistance
- Thumbs up — OK, I'm alright, I understand
- Thumbs down — No, negative
- Gripping partner's wrist, or gripping both of your own hands on wrist (if partner is out of reach) – Leave area immediately

## 8.4 Decontamination And Hygiene

**Decontamination**

In general, everything that enters the site must either be decontaminated or properly discarded upon exit from the site. Prior to demobilization, potentially contaminated equipment will be decontaminated on a wash pad (decontamination pad), drum, or containment pad which then will be placed into appropriate container and labeled as hazardous waste and will be stored in a designated area until disposal arrangements are made.

The type of decontamination solution to be used is dependent on the type of chemical hazards. The decontamination solution for heavy equipment and for any reusable PPE is Alconox/Liqui nox soap. The MSDSs for Alconox/Liquinox will be located in the Appendix.

**Personnel Decontamination Procedures**

Personnel decontamination will be completed in accordance with the GHD Safety and Health Program for personnel decontamination. Wash water and sediments will be collected and stored with any runoff water collected for subsequent treatment/disposal. PPE, trash, etc. will be sent

off-Site for disposal. It will be kept separate from trash generated in clean areas of the Site.

All disposable equipment shall be doffed before meal breaks and at the conclusion of the workday and replaced with new equipment prior to commencing work.

Procedures for decontamination must be followed to prevent the spread of contamination and to eliminate the potential for chemical exposure.

Personnel - Decontamination will take place prior to exiting the contaminated work area.

Decontamination procedures are as follows:

Step 1 Remove all visible contamination and loose debris by washing with clean water.

Step 2 Remove all outer clothing that came in contact with the contamination (i.e., boot covers and outer gloves) and either dispose of in disposable container or wash in detergent solution and rinse.

Step 3 Remove protective clothing; dispose of in disposable container.

Step 4 Remove respirator, sanitize prior to reuse.

Step 5 Remove inner gloves, dispose of in disposable container.

Step 6 Wash and rinse hands.

**General Safety and Personnel Hygiene**

1. Eating at the site is prohibited, except in specifically designated areas. Designation of eating areas will be identified to each employee. The location of these areas may change over the duration of the project to maintain adequate separation from the active work area(s).
2. Smoking at the site is prohibited.
3. Individuals getting wet to the skin with effluent from the washing operation must wash the affected area immediately. If clothes in contact with skin are wet, then these must be changed.
4. Hands, face, neck, and other exposed areas must be washed with soap and water before eating, drinking, smoking, before using toilets, and before leaving the site.
5. All disposable coveralls and soiled gloves will be placed in covered containers at the end of every shift or sooner, if deemed necessary by the SHO. Wastes will be stored until proper disposal arrangements have been made.
6. Personnel working on site will not be permitted to wear facial hair that interferes with the mask to face seal on air purifying respirators.
7. All personnel performing or supervising work within the EZ must wear appropriate PPE, observe, and adhere to the personal hygiene related provisions of this section.
8. Personnel found to be disregarding the personal hygiene related provisions of this HASP will, at the discretion of the SHO, be barred from the site.

## 8.5 Social Protection

**Security Measures**

A site assessment should be made prior to performing work in high risk areas for violent crime. Additionally, it may be important to gather as much information as possible from the client, describing the location and social conditions of the area where work will be performed.

In the event it has been determined that this work will occur in an area of high risk, consideration

shall be given to providing on site security for the protection of the employee. This option may include services from a security agency, local law enforcement (if available), or the services of an off duty law enforcement officer. The Project Manager and/or Project Coordinator shall be contacted and provide authorization prior to making these arrangements.

Anti-social behavior means different things to different people – noisy neighbors who ruin the lives of those around them, 'crack houses' run by drug dealers, loitering by drunkards, people begging by cash points, abandoned cars, litter and graffiti, young people using airguns to threaten and intimidate or people using fireworks as weapons.

When in this situation, there is no single strategy that always works. Remember these tips when faced with work conditions in volatile neighborhoods:

**Street Precautions**

When walking to and from your vehicle, or in and around the work site:

- Be alert to your surroundings and the people around you, especially if you are alone or it is dark
- Whenever possible, travel with a colleague
- Stay in well lighted areas as much as possible
- Walk close to the curb; avoid doorways, bushes, and alleys where someone could hide
- Walk confidently, and at a steady pace; make eye contact with people when walking
- Do not respond to conversation from strangers on the street, continue walking

**Harm Reduction**

Do as much as you can to avoid a confrontation "anticipation and avoidance" are the key words.

- If you get caught up in a situation, try to talk to an aggressor without provoking them.
- Practice relaxation, as appearing fearful or stressed can actually provoke an attack.
- Remember that body language is important in aggressive situations, so maintain a comfortable distance between you and the aggressor.
- It may be more advisable to submit than to resist and risk severe injury or death. You will have to make this decision based on the circumstances. Be especially careful, if your attacker has a weapon.
- Avoid arguing with or physically confronting the individual. Attempt to distance yourself from the individual. Advise others in the area to leave the scene and request police assistance by having someone call the emergency number listed on the Emergency Contact Sheet. Use the team approach. A staff member who is physically unable to break away from an attacker should shout for help.
- Steady yourself if danger threatens. Panic can disable you, so again it's useful to learn how to keep control in a difficult situation.
- If you must fight back, adopt what police term the "bash and dash" approach. Primary targets are the eyes, nose, mouth, ears, throat, groin, knees, or shins; choose whichever is easiest to get to.
- Be aware that your attacker might be stronger than you, or may take what you are using in self defense and use it against you. It is often better just to shout loudly and run away.
- When confronted by an individual whose behavior becomes aggressive or menacing, remain as calm as possible. Avoid arguing with or physically confronting the individual. Attempt to distance yourself from the individual. Advise others in the area to leave the scene and request police assistance by having someone call the emergency number listed on the Emergency Contact Sheet. Use the team approach. If you are physically unable to break away from an attacker, shout for help.
- The use of physical force is justified when a person believes that such force is necessary to protect him or herself against the use or imminent use of unlawful physical force by another person. The use of physical force is also justified in the defense of another party, such as a co worker, who is being subjected to unlawful physical force. You can use any technique of legal self defense in order to halt or distract an attacker until law officers arrive on the scene.

- Should an aggressor only be interested in taking or damaging property, do not interfere. Obtain a description of the individual to provide to local authorities, including height, weight, race, sex, clothing, accent, unusual markings such as tattoos, facial piercing, scars, hair color, and weapon, if any.
- Shout 'fire' rather than 'help' – it can get more results.
- Stay alert and observant so that you can better describe your attacker and the assault to the police.
- Report the incident to the GHD Help Line and BWise and work with your PM and HSE Manager to complete the investigation

**Drug Activity**

The safe retrieval and disposal of used hypodermic needles and syringes:

- GHD employees must not handle or remove any hypodermic needles or syringes. You should contact the local Police Department, Fire Department, or Health Department for removal from the job site.
- If you are injured by a discarded needle you can receive a vaccination against Hepatitis B within 48 hours of the incident. Notify the GHD Help Line and seek medical attention, call 911 if necessary.
- If an accident occurs where a needle or other sharp object has punctured the skin, then the injured person should:
  - Encourage the wound to bleed gently
  - Wash well with soap under cold running water
  - Cover the wound with a waterproof dressing
  - Seek medical attention as soon as possible
  - Inform the SS and/or PM
  - Complete a GHD Incident Reporting Form

**Car Jacking**

You can help prevent yourself being a victim of car jacking by:

- Keeping your doors locked in built up areas, and trying to keep the windows wound up, especially at traffic lights
- Being aware of what people are doing around you
- Using the middle lane, if there is one, when waiting at junctions or lights, so that your car is harder to get to from the pavement
- Not stopping to help someone who has broken down (if you really want to help, pull over at the next garage or police station and call for help)
- Driving to the next garage or police station and reporting them if someone tries to pull you over for no reason

A car jackers may 'accidentally' bump into your car, aiming to get you out of the car so they can steal it. If this happens, you may choose not to get out of the car – especially if you do not think it is a genuine accident. Wind the window down a little bit to talk to them if you want to.

**Aggressive or Menacing Behavior**

Report to the GHD HSE Help Line, BWise and work with your PM and HSE Manager to complete the investigation.

## 8.6 Site Security

Site security is necessary to prevent the exposure of unauthorized, unprotected people to site hazards and to avoid interference with safe working procedures. Security shall be maintained outside of the actual work area(s) so as to prevent unauthorized entry into the work area(s). Members of the general public are to be protected from site hazards.

# 9. Emergency Procedures

## 9.1 Introduction Emergency Procedures

Emergencies can range from minor to serious conditions. Various procedures for responding to site emergencies are listed in this section. The PM or SS is responsible for contacting local emergency services, if necessary, for specific emergency situations. Various individual site characteristics will determine preliminary action to ensure that these entry procedures are successfully implemented in the event of an emergency. The project team will address necessary facility/client emergency protocols to ensure compatibility between this document and facility/client programs and expectations.

Field employees will identify the primary (on site) and secondary (off site) evacuation routes to muster locations prior to initiating work. A site map is provided in the Appendix.

At client facilities, site emergencies may be indicated by a fog horn or other loud audible sound. If an adjacent facility's alarm is activated, work will stop immediately, equipment will be de energized and/or secured as necessary for safety reasons and personnel will go immediately to the secondary evacuation location as indicated in pre-start/tailgate meetings.

Emergency evacuation drills will be conducted as deemed necessary by the SS, and documentation of the drills will be maintained by the SS in project file.

An Emergency Information Sheet containing the hospital location, directions, government agency phone numbers, emergency phone numbers, and a map with directions to the hospital is located in the Appendix.

## 9.2 Incident, Injury, Illness Reporting And Investigation

Any work related incident, injury, illness, exposure, vehicle accident, property loss and or security issues must be reported to your supervisor, the SS immediately. Stop Work Authority will be implemented. Provide care for any injured persons and secure the scene.

GHD will call the GHD PM and the GHD HSE Help Line. Personnel on site should maintain the work area as it was at the time of the incident until further directions are given by the GHD PM, a GHD Safety Professional. No GHD person on site has the authority to call a regulatory agency (environmental or OSHA); this shall be completed by GHD Leadership Team in conjunction with the client. Emergency medical care or support of fire departments is not a restricted call if immediately necessary to protect life and property.

The GHD PM and HSE Manager will coordinate with on site personnel to gather critical information. The GHD PM is responsible (or their designee) to enter the information into BWise within a 24 period from time of incident. The GHD PM is also responsible to contact the client, which a positive verbal contact is required. The GHD staff listed above will coordinate the completion of the investigation and placement of information into BWise. This same group of GHD staff will manage further communications with the client.

The report must be filed for the following circumstances:

- Incident, injury, illness, or exposure of an employee.
- Injury of a subcontractor.
- Damage, loss, or theft of property.
- Any motor vehicle accident, regardless of fault, which involves a company vehicle, rental vehicle, or personal vehicle while the employee is acting in the course of employment.
- Any sting, involving a puncture of the skin must immediately be reported to Work Care and follow all GHD reporting requirements
- Security Issues
- Environmental releases or loss of containment.

Occupational incidents resulting in employee injury or illness will be investigated by the SS. This investigation will focus on determining the cause of the incident and modifying future work activities to eliminate the hazard.

All employees have the right and obligation to report unsafe work conditions, previously unrecognized safety hazards, or safety violations of others. If you wish to make such a report, it may be made orally to your supervisor or other member of management, or you may submit your concern in writing, either signed or anonymously.

## 9.3 Emergency Equipment/First Aid

Safety equipment will be available for use by site personnel, located within 30 feet of the work area(s), and maintained at the site.

- First Aid kit(s), compliant with local jurisdictional requirements according to number of workers present
- Automated External Defibrillators (AEDs) are optional first aid response equipment for conditions related to heart stoppage. If a unit is on site, designated personnel must be trained in the specific AED unit in addition to First Aid and CPR certification, conduct monthly inspections, and contact listed AED Unit coordinator.
- Emergency eyewash bottles and/or an eyewash station lasting 15 minutes.
- Emergency alarms as a means to alert all personnel instantaneously for an emergency.
- Fire extinguisher (at a minimum, a 2A/10BC will be on site).

## 9.4 Emergency Procedures For Contaminated Personnel

Whenever possible, personnel should be decontaminated in the contamination reduction zone before administering first aid, without causing further harm to the patient.

- Skin Contact: Remove contaminated clothing, wash immediately with water, and use soap, if available.
- Inhalation: Remove victim from contaminated atmosphere. Remove any respiratory protection equipment. Initiate artificial respiration, if necessary. Transport to the hospital.
- Ingestion: Remove from contaminated atmosphere. Do not induce vomiting if victim is unconscious. Never induce vomiting when acids, alkalis, or petroleum products are suspected. Transport to the hospital, if necessary.

Any person transporting an injured/exposed person to a clinic or hospital for treatment should take with them directions to the hospital and a listing of the contaminants of concern to which they may have been exposed.

Any vehicle used to transport contaminated personnel will be cleaned or decontaminated, as necessary.

## 9.5 Site Evacuations

In the event of an emergency situation such as fire, explosion, or significant release of toxic gases, project personnel in the field will be notified by established communications to evacuate the area. In the event of an emergency, GHD personnel will gather at their primary mustering point for a head count. The SS will determine a primary and secondary muster point to be used as an assembly area in the event of an emergency. The secondary muster point will be located at least 90 degrees from the primary. These locations will be communicated to the work crew(s) during the Pre-Start/Tailgate Safety Meeting as part of the site specific training prior to commencement of work activities, weekly thereafter, and prior to the advent of potentially threatening weather. Muster points will be identified in the site map attached to the HASP.

## 9.6 Spill And Release Contingencies

If a spill has occurred, the first step is personal safety, then controlling the spread of contamination, if possible. GHD personnel will immediately contact site management to inform them of the spill and activate emergency spill procedures.

# 10. Environmental Control Program

## 10.1 Introduction

This section of the HASP outlines measures to be implemented at the site to prevent hazards associated with environmental conditions.

## 10.2 Weather Monitoring

The SS will be responsible for checking weather forecasts for the next day and week of work to provide advance notification of any severe weather conditions. Severe weather conditions (e.g., heavy rains) may cause unsafe conditions at the site and in some situations work may have to be stopped.

## 10.3 Tornado Safety Policy And Procedures

Tornadoes occur most frequently between April and October from 3:00 to 7:00 p.m. but can occur any time. In most cases, tornadoes move from a west/southwest direction. A typical tornado is a swirling storm of short duration with winds up to 300 miles per hour and a near vacuum at its center. It appears as a rotating funnel shaped cloud, from gray to black in color, extending towards the ground from the base of a thundercloud.

Tornadoes usually only cover a limited geographical area and give off a roaring sound. A tornado is the most concentrated and destructive potential weather event at the Site. Tornadoes are usually the result of the interaction of a warm, moist air mass with a cool or cold air mass. Secondary effects of tornadoes include flash flooding, electric power outages, transportation system and communication system disruption, and fires.

Whenever weather conditions develop that indicate tornadoes are expected, the National Weather Service will issue a tornado watch to alert people in a designated area for a specific time period (normally 6 hours) to remain alert for approaching storms. The tornado watch is upgraded to a tornado warning when a funnel cloud (tornado) is actually sighted or indicated by weather radar.

When a tornado is approaching, Site personnel will only have a short time to react. Therefore, Site personnel must be prepared to react during periods of severe weather. Memorize the following tornado danger signs:

i) Approaching clouds of debris can mark the location of a tornado even if a funnel cloud is not visible

ii) Before a tornado hits, the wind may die down and the air can become very still/calm

iii) It is not uncommon to see clear, sunlit skies behind a tornado as they usually occur at/near the trailing edge of thunderstorms.

**Tornado Evacuation Procedures**

GHD and contractor personnel monitor weather related information provided by National Weather Service. If the National Weather Service issues a tornado warning, Site supervisor will activate the emergency response plan.

The "take shelter" warning signal is a "slow wail" of the alarm system. GHD Site personnel will evacuate the work zone(s) when a tornado watch has been issued by the National Weather Service. Personnel will contact the Project Management team to inform them they are leaving the site and provide them a location of the muster point (shelter) they are going. The Site Supervisor are responsible for work areas, they will check remote areas of the work zone(s) to ensure personnel have reacted to the alert. Personnel must proceed to the Site mustering point (shelter) and wait for further instructions. If a tornado watch is upgraded to a tornado warning, personnel will proceed to the designated tornado shelters. Once inside the shelter, conduct a head count to ensure that personnel are accounted for. In general, stay away from all windows and doors that lead to the outside. Remain in the shelter until the "all clear" signal is given by the Site Supervisor.

The tornado shelter most accessible to GHD personnel should be noted on the site map attached to this HASP

Directions to the shelter are to be communicated to Site personnel during initial Site safety orientation and throughout the tornado season during subsequent safety meetings.

If unable to reach the designated shelter, the best protection in a tornado is usually an underground area. If an underground area is not available, consider small interior rooms on the lowest floor without windows, hallways on the lowest floor away from doors and windows, rooms constructed with reinforced concrete/brick/block with a heavy concrete floor and roof, and protected areas away from doors and windows.

## 10.4 Rain And Snow

Excessive amounts of precipitation may cause potential safety hazards for work tasks. The hazards that would be most commonly associated are slipping, tripping, or falling due to slippery surfaces.

Severe weather conditions will result in work stoppage and the implementation of further emergency measures.

## 10.5 Temperature

Site activities are expected to be conducted year round. Temperature extremes may be experienced which require measures to be implemented to prevent health and safety hazards from occurring. Potential hazards arising from temperature extremes are heat stress and cold exposure.

## 10.6 Wind

High winds may be encountered at the site and these can cause hazards that may affect site personnel health and safety. Preventative measures that will be implemented if necessary are as follows:

i) Restrict site activities.

ii) Batten down light equipment or building materials.

iii) Partially enclose work areas.

iv) Reduce or Stop Work activities.

## 10.7 Lightning & Thunder

Light travels at a faster speed than sound, you can see a lightning bolt before the sound of thunder reaches you.

To judge how close lightning is, count the seconds between the flash and the thunder clap. Each second represents about 328 yards/300 meters. If you can count less than 30 seconds between the lightning strike and the thunder, the storm is less than 6.2 miles/10 km away and there is an 80 percent chance the next strike will happen within that 6.2 miles/10 kilometers.

Lightning may strike several miles/kilometers away from the parent cloud and therefore precautions should be taken even if the thunderstorm is not directly overhead.

If you hear thunder or see lightning, stop work immediately and seek safe shelter.

Remain sheltered for 30 minutes after hearing the last thunder before returning to work.

## 10.8 Outdoor Precautions During Severe Weather

- Keep a safe distance from tall objects, such as trees, hilltops, and telephone poles.
- Avoid projecting above the surrounding landscape. Seek shelter in low lying areas such as valleys, ditches, and depressions, but also be aware of flooding.
- Stay away from water. Don't go boating if a storm threatens. Move to land as quickly as possible if you are on the water. Lightning can strike the water and travel some distance from its point of contact. Don't stand in puddles even if you are wearing rubber boots.
- Stay away from objects that conduct electricity, such as tractors, metal fences, motorcycles, lawnmowers, and tall metal objects.
- Avoid being the highest point in an open area. Holding a conductive tool, holding an umbrella, can make you the tallest object and a target for lightning.
- You are safe inside a car during lightning, but don't park near or under trees or other tall objects, which may topple over during a storm. Be aware of downed power lines, which may be touching your car.
- In a forest, seek shelter in a low lying area under a thick growth of small trees or bushes.
- Be alert for flash floods, which are sometimes caused by heavy rainfall, if seeking shelter in a ditch or low lying area.
- If caught in a level field far from shelter and you feel your hair stand on end, lightning may be about to hit you. Kneel on the ground immediately, with feet together, place your hands on your knees and bend forward. Don't lie flat.
- If you are in a group in the open, spread out, keeping people several yards/meters apart.

## 10.9 Indoor Precautions During Severe Weather

- Before the storm hits, disconnect electrical appliances including radios and television sets. Do not touch them during the storm.
- Don't go outside unless absolutely necessary.
- Stay away from doors, windows, fireplaces, and anything that will conduct electricity, such as radiators, stoves, sinks, and metal pipes. Keep as many walls as possible between you and the outside.
- Don't handle electrical equipment or telephones. Use battery operated appliances only.

## 10.10 Flash Flooding

Floods are one of the most common hazards in low lying areas, however not all floods are alike. Some floods develop slowly, while others such a flash floods, can develop in just a few minutes and without visible signs of rain. Additionally, floods can be local, impacting a neighborhood or community, or very large, affecting entire river basins and multiple states.

Flash floods can occur within a few minutes or hours of excessive rainfall, a dam or levee failure, or a sudden release of water held by an ice jam. Flash floods often have a dangerous wall of roaring water carrying rocks, mud and other debris.
Be aware of flood hazards no matter where you live or work, but especially if you are in low-lying areas, near water, behind a levee or downstream from a dam. Even very small streams, gullies, creeks, culverts, dry streambeds or low-lying ground that appear harmless in dry weather can flood.

During the flood

- If any possibility of a flash flood, move immediately to higher ground. Do not wait for instructions to move.
- Be aware of stream, drainage channels, canyons and other areas known to flood suddenly.

If you must prepare to evacuate, you should do the following:

- Do not walk through moving water. Six inches of moving water can make you fall.
- If you have to walk in water, walk where the water is not moving. Use a stick to check the firmness or depth of the ground in front of you.
- Do not drive into flooded areas. If floodwaters rise around your car, abandon the car and move to higher ground if you can do so safely.
- Observe weather in the distance, rain in the hills can cause flooding in the valleys..Do not park your vehicle along streams, rivers or creeks, particularly during threatening conditions.

# APPENDIX DOCUMENTS

**Chemical Table**

| Chemical/CAS # | Chemical Name (Synonyms) | Exposure Limits | Routes Of Entry | Symptoms/Health Effects | Chemical Properties | Physical Characteristics | Concentration at Site |
|---|---|---|---|---|---|---|---|
| Lead (metal) CAS-7439-92-1 | Lead (metal) CAS-7439-92-1 | TLV: 0.05 mg/m3 PEL: 0.05 mg/m3 STEL: NE IDLH: 100 mg/m3 | Inhalation Ingestion Skin contact Eye contact | ACUTE: Lead is a cummulative poison, however, it may cause eye and skin irritation. CHRONIC: Effects blood, bone marrow, CNS, PNS and kidneys resulting in anemia, convulsions, peripheral nerve disease and kidney impairment. Toxicity to human reproduction or development. | (FP) NA (VP) NA (IP) NA (UEL) NA (LEL) NA | A heavy, ductile, soft, gray solid. Turns tarnished on exposure to air. | Unknown |

# Tailgate Safety Meeting Form
# Large Group Format - Single Day

| | | | | | |
|---|---|---|---|---|---|
| Date: | | Time: | | Project No.: | |
| Presenter: | | | Project Name: | | |

Safety topics/items discussed:

| |
|---|
| |
| |
| |
| |

Emergency preparedness:

| | | | |
|---|---|---|---|
| First Aid Provider(s): | | Muster Point: | |
| | | Method of Communication: | |
| AED Responder: | | Fire Extinguisher Location: | |
| First Aid Kit Location: | | Eye Wash Location: | |

Site personnel in attendance:

| Print Name: | Signature: | Company: |
|---|---|---|
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# Tailgate Safety Meeting Form
# Small Group Format - Multiple Days

| | | | | | |
|---|---|---|---|---|---|
| Date: | | Time: | | Project No.: | |
| Presenter: | | Project Name: | | | |

Safety topics/items discussed:

| |
|---|
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| |
| |

Emergency preparedness:

| | | | |
|---|---|---|---|
| First Aid Provider(s): | | Muster Point: | |
| | | Method of Communication: | |
| AED Responder: | | Fire Extinguisher Location: | |
| First Aid Kit Location: | | Eye Wash Location: | |

| Print Name | Signature | Company |
|---|---|---|
| | | |
| | | |
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| | | | | | |
|---|---|---|---|---|---|
| Date: | | Time: | | Project No.: | |
| Presenter: | | Project Name: | | | |

Safety topics/items discussed:

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|---|
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Emergency preparedness:

| | | | |
|---|---|---|---|
| First Aid Provider(s): | | Muster Point: | |
| | | Emergency Communication: | |
| AED Responder: | | Fire Extinguisher Location: | |
| First Aid Kit Location: | | Eye Wash Location: | |

| Print Name | Signature | Company |
|---|---|---|
| | | |
| | | |
| | | |
| | | |

# Management of Change Form (QSF-006)



Form initiated by: _____ Date initiated: _____

Initiator's role/responsibility: _____ Project number: _____

Affected location(s): _____

Client's management of change documentation attached, if required or applicable: ☐ Yes ☐ N/A

Type of change:

- ☐ Field operations/SOPs
- ☐ Equipment
- ☐ Safety
- ☐ Project management/resources

Duration of change:

- ☐ Permanent
- ☐ Temporary (specify how long change will be in place): _____
- ☐ Emergency

Describe the change:

Describe the procedure/task(s) required to complete the change:

Who needs to know about the change and how will you communicate this to them?

Is additional training for GHD people required as a result of this change? ☐ Yes ☐ No

If yes, please describe training needs and those who require it:

Coordination with Business School Learning Centre underway: ☐ Yes ☐ No

Identify any associated risks/hazards/impacts as a result of this change:



This completed form is a quality record

Does the change need to be approved by a client? ☐ Yes ☐ No

If Yes, state client's name: _____

Client role/responsibility: _____

Date authorized by client: _____
(mm/dd/yyyy)

Change approved by project manager: _____
(please print)

_____ _____
(signature) (approval date – mm/dd/yyyy)

**Summary:**

| Item | Completion date | Confirmed by |
|---|---|---|
| 1. Task(s) to execute change have been completed | | |
| 2. Those who need to know have been notified | | |
| 3. Additional training has been completed | | |
| 4. Risk(s) have been mitigated | | |
| 5. Change has been approved by all required parties | | |

**Notes:**

Scope: GHD may use the Management of Change Form (QSF-006) to identify and record project additions, revisions, changes, or updates regarding field operations, field SOPs, equipment, safety, resources, or project management.

Detail: The level of detail to a documented project change is ultimately determined by the project manager and/or any client expectations.

File location: Correspondence folder of the project file.

# Q1559

# Underground Utilities Checklist

**Pre-Drilling/Excavation Checklist and Utility Clearance Log**

To be completed when GHD is conducting and/or overseeing subsurface activities

| | | | |
|---|---|---|---|
| **Project number:** | | **Project name:** | |
| **Date:** | | **Project location:** | |
| **Public utility locator:** | | **Public utility locator phone number:** | |
| **Date of public utility locator request:** | | **Public locator call reference number:** | |
| **Private utility locator (if applicable):** | | **Private utility locator phone number:** | |

**Utilities (indicate that location/utility presence was checked)**

**Instructions:** This checklist is to be completed by GHD personnel prior to initiation of field activities as a safety measure, to ensure that all underground utility lines, other underground structures, and above-ground power lines are clearly marked in the area selected for boring or excavation.

| Borehole/ Excavation location | Date (mm/dd/yyyy) | Telephone | Water | Storm sewer | Sanitary sewer | Process sewer | Gas | Electrical | Cable | Overhead utilities | Other (i.e., Fiber Optics) | Comments/ Warnings |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Utility owner | | | | | | | | | | | | |
| | | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | | |
| | | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | | |
| | | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | | |
| | | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | | |
| | | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | | |
| | | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | | |
| | | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | | |
| | | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | | |
| | | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | | |
| | | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | | |
| | | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | | |

**Notes:**

| | | | |
|---|---|---|---|
| **Client:** | | | |
| **Phone number:** | | | |
| **Client representative:** | | | |
| **Client, property owner, or authorized agent acknowledgement of utility clearance:** | | **Signature:** | |
| **Subcontractor or subcontractor representative acknowledgement of utility clearance:** | | **Signature:** | |
| **GHD field representative name:** | | **Signature:** | |
| **GHD project manager s review/confirmation of locate completion:** | | | |

In the event that client or property owner acknowledgement cannot be obtained, it is strongly encouraged that all boreholes be hydro vacuumed and the costs passed on to the client.
Attach any clearance documentation from utility owner/operator to this document.

Drilling or excavation work may not proceed if any of the questions answered below are answered "No." Implement stop work authority and contact the GHD project manager to discuss and resolve any concerns or issues. Document the reason for a "No" answer in the comments section below.

| Yes | No | N/A | Pre Mobilization |
|---|---|---|---|
| ☐ | ☐ | ☐ | 1. Has a utility locator request been completed within the last 30 days (verify time limit with state or provincial law)? If no, stop work and comment below. |
| ☐ | ☐ | ☐ | 2. Is a scaled site plan, map or drawing showing the proposed borehole locations attached to this form? |
| ☐ | ☐ | ☐ | 3. Does each borehole and excavation location allow for clear entry and exit, adequate workspace, and a clear path for raising the mast (or boom) and operating the drill rig and all support equipment? Ensure that the minimum OSHA/state/provincial utility clearance requirements between the mast or boom and the power line(s) are met. For instance, OSHA requires a minimum approach distance of 10 feet for systems below 50 kV and an increase of 4" for every 10 kV over 50 kV. Confirm if additional permits are required if the boom or mast will be working 5 meters (15 feet) or less from the electrical lines. |
| ☐ | ☐ | ☐ | 4. Are all of the proposed borehole and excavation locations at least 1.0 meters (3 feet) from any subsurface or above-ground utilities shown on client's building plans? Check here ☐ if plans not provided by client (therefore not applicable to this job). |
| ☐ | ☐ | ☐ | 5. Are all of the proposed borehole and excavation locations at least 1.0 meters (3 feet) from any subsurface or above-ground utilities shown on public right-of-way street improvement or other public property plan or site map? |
| ☐ | ☐ | ☐ | 6. Has the site representative, familiar with the site, indicated no knowledge of any subsurface or above-ground utilities within 3 metres (10 feet) of the proposed borehole and excavation locations? (Review locations with site representative) |
| ☐ | ☐ | ☐ | 7. Are all of the proposed borehole and excavation locations at least 1.0 meters (3 feet) from any subsurface utilities identified during a geophysical survey? Check here ☐ if no geophysical survey has been completed (therefore not applicable to this job). |
| ☐ | ☐ | ☐ | 8. Have all utility locating service providers, notified by the public line locator, marked out their facilities in the vicinity of the borehole and excavation locations or otherwise notified us that they do not have any facilities near the proposed locations? (Attached confirmation and utility locate sheets from public locator) |
| ☐ | ☐ | ☐ | 9. Are all proposed borehole and excavation locations at least 1.5 meters (5 feet) from a visual line connecting two similar looking manhole covers? |
| ☐ | ☐ | ☐ | 10. Are all proposed borehole and excavation locations at least 1.5 meters (5 feet) from a visual line perpendicular to the street from the water, gas, and electrical meters? |
| ☐ | ☐ | ☐ | 11. Are all proposed boring and excavation locations clear of pavement joints, curbs, crash posts, or other engineered structures? |
| ☐ | ☐ | ☐ | 12. Does the ground surface/pavement lack signs of previous excavation (e.g., no pavement subsidence, no differences in pavement texture or relief, no pavement patching)? |
| **Yes** | **No** | **N/A** | **Pre Drilling and Excavation** |
| ☐ | ☐ | ☐ | 13. Has it been verified that the proposed drilling or excavation work will not affect any work currently in progress? |
| ☐ | ☐ | ☐ | 14. Has the drill rig or heavy equipment been inspected prior to use and documented? (See Drill Rig Inspection Checklist or Mobile Equipment Safety Inspection Checklist) |
| ☐ | ☐ | ☐ | 15. Have barricades been erected to prevent unauthorized access, where applicable? |
| ☐ | ☐ | ☐ | 16. Have all known live electrical or product lines within 3 meters (10 feet) of the dig path been visually verified? If no, comment below. |
| | | | 17. For boreholes that have not been cleared or are within 3 meters of a utility: |
| ☐ | ☐ | ☐ | a. Before drilling have you cleared a hole to 2.4 meters (8 feet) below grade using an air-knife, or equivalent, before drilling and is the diameter of this hole greater than the final outside diameter of the boring? If not required comment below. |
| ☐ | ☐ | ☐ | b. Does the soil you encountered in the hand-dug hole appear to be native material (i.e., free of clean gravel, clean sand, aggregate base [gravelly sand ~ 10% fines] or other non-native looking material)? If not required comment below. |

| | | | |
|---|---|---|---|
| **Have the above concerns been discussed with the GHD project manager?** | ☐ Yes | ☐ No | ☐ Not Applicable |
| **Has the start of subsurface work been communicated to the GHD project manager?** | ☐ Yes | ☐ No | ☐ Not Applicable |
| **Have the above concerns been discussed with the client?** | ☐ Yes | ☐ No | ☐ Not Applicable |
| **Has the scope of work been approved by the client?** | ☐ Yes | ☐ No | ☐ Not Applicable |

| | |
|---|---|
| **Comments:** | |

| | | | |
|---|---|---|---|
| **GHD field representative name:** | | **Date:** | |

# Site Health and Safety Plan Amendment Form

This document is to be completed for ANY changes that occur within the Site Health and Safety Plan (HASP). This document is to be sent to the Regional Safety & Health Manager (RSHM) for review, verification and sign off of the HASP.

| | |
|---|---|
| Amendment # | |
| Site Name/Project ID | |
| Date | |
| Client Contact (same/change) | |
| Reason for Amendment (SOW change, JSA addition, Chemical, etc.) | |
| Alternate or Additional Safeguard Procedures | |
| Required changes in PPE | |
| Additional Comments: | |

| | |
|---|---|
| Project Manager Notified | ☐ |
| RSHM Notified | ☐ |
| Client PM Notified (if necessary) | ☐ |

| | |
|---|---|
| | |
| Site HSE Officer (sign above) | Date |

The Project Manager is ultimately responsible for the accuracy of the information on this amendment and ensuring any changes to the original HASP is discussed with all affected site personnel prior to commencing work

This original form must be placed in the project file and a copy needs to be attached to the Site Health and Safety Plan (HASP).

# HASP Acknowledgment Sheet

Project Name:_____ Project Number: _____

This is to certify that I have received a pre-entry briefing regarding this HASP, and I understand its contents. My failure to follow and comply with the requirements contained in this plan may result in disciplinary action and/or termination.

| Print Name | Signature | Date |
|---|---|---|
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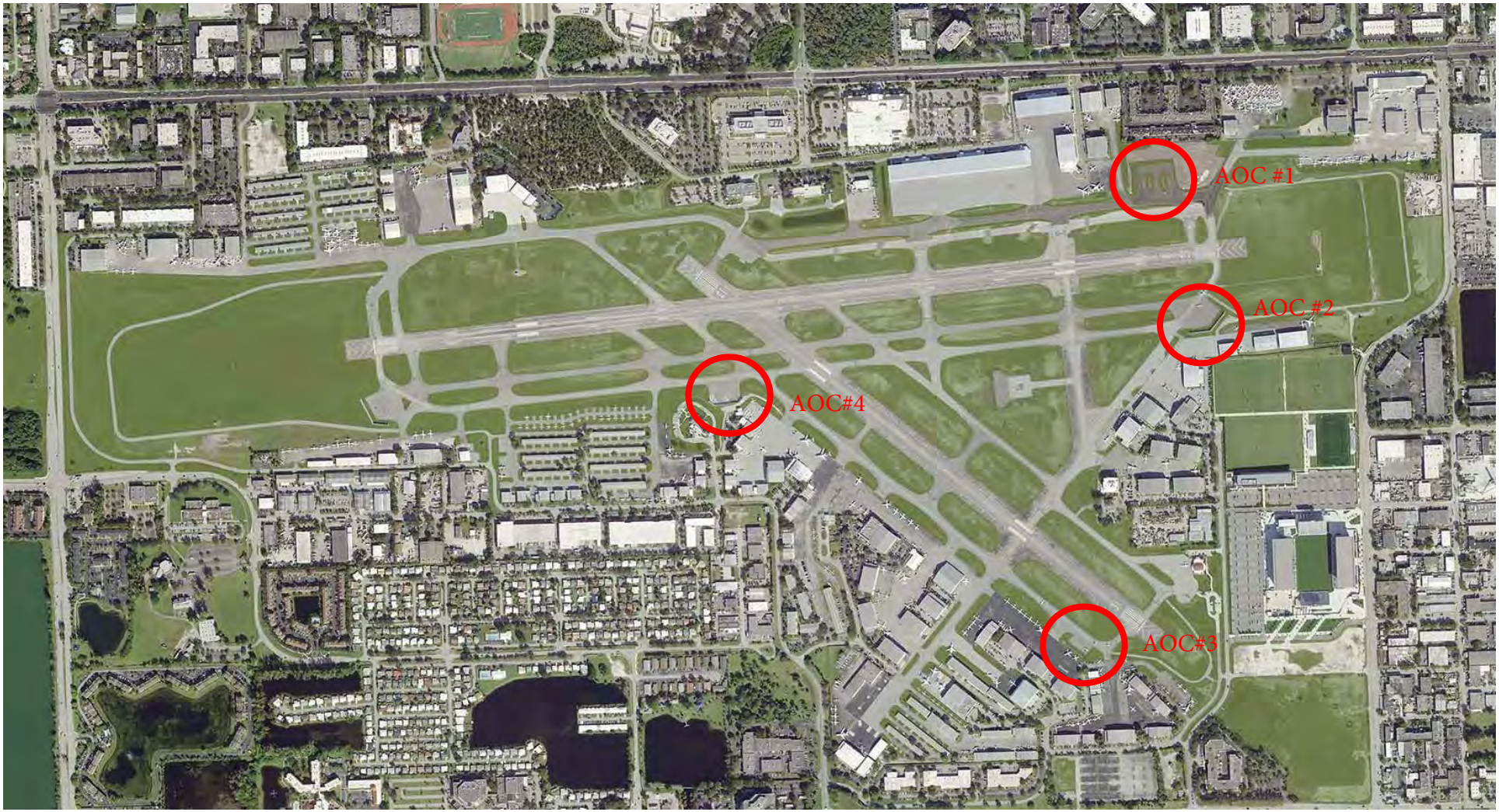
Figure 1 - FXE Areas of Concern for Soil Testing

Fort Lauderdale Executive Airport- FXE



FXE- Area of Concern #1

Figure 2

February 5, 2024

1:1,200

0 55 110 220 ft

0 15 30 60 m

● Proposed Soil Boring Location

Flight Date : Jan. 6 to Jan. 11, 2023 Broward County Property Appraiser

# FXE - Area of Concern #2

Figure 3

February 5, 2024

Proposed Soil Boring Location

1:600

0 25 50 100 ft

0 5 10 20 m

Flight Date : Jan. 6 to Jan. 11, 2023 Broward County Property Appraiser

# FXE - Area of Concern 3

Figure 4


February 5, 2024

- Proposed Soil Boring Locations

1:600

0 25 50 100 ft

0 5 10 20 m

Flight Date : Jan. 6 to Jan. 11, 2023 Broward County Property Appraiser

# FXE - Area of Concern #4

Figure 5

February 5, 2024

1:600

0 25 50 100 ft

0 5 10 20 m

Flight Date : Jan. 6 to Jan. 11, 2023 Broward County Property Appraiser

# Job Safety Analysis (JSA)

## Insert Name : Environmental-Soil Sampling

Field staff must review job specific work plan and coordinate with project manager to verify that all up front logistics are completed prior to starting work including, but not limited to, permitting, access agreements, and notification to required contacts (e.g., site managers, inspectors, clients, subcontractors, etc.). Additionally, a tailgate safety meeting must be performed and documented at the beginning of each workday. **Stop, Think, Act, Review (STAR)** must be used prior to any activity. All personnel must possess the appropriate training prior to initiating scheduled tasks. Also consider weather conditions. GHD personnel have the authority and responsibility to use **Stop Work Authority (SWA).** Review this JHA initially and in the field prior to initiating the job, using the P66 RM "Go Card" to assist in identifying specific site hazards. Document by "dirtying" this JHA.

| | | | | | |
|---|---|---|---|---|---|
| **Date Issued/Revised:** | 03/28/2024 18:15:22 | **Client:** | The City of Fort Lauderdale | | |
| **Project Number:** | 12637954 | **Created By:** | cra\ediaz2 | SIM OPS? YES/NO | SSE on site? YES/NO |
| **Project Address:** | 6000 NW 21st Avenue Fort Lauderdale | | | | |
| **Key Equipment:** | PPE, hand auger, gloves, safety glasses, and steel-toe boots. | | | | |
| **Task-specific Training:** | GHD Field Method Training on Soil Sampling Procedures. Decontamination/Site Restorarion | | | | |

| Hard Hat | Gloves (ANSI/EN 388) | Eye Protection | Fall Protection | APR | Vest | PPE Clothing |
|---|---|---|---|---|---|---|
| ☐ Type 1 (Top Impact) | ☐ Chemical Protective (ie.Nitrile) | ☑ ANSI/CSA Safety Glasses | ☐ Harness | ☐ Full Face Mask | ☑ Class II (standard) | ☐ Coveralls |
| ☐ Type 2 (Side Impact) | ☑ Level 1 - Light Duty | ☐ Goggles/Spoggles | ☐ Shock Absorbing Lanyard | ☐ Half Face Mask | ☐ Class III ( Night or Highway Traffic) | ☐ Fire Retardent Clothing (FRC) |
| ☑ Class E (standard) | ☐ Level 2 - Light Duty with Protection | ☐ Face Shields | ☐ Lifeline | | ☐ Anti-Static | ☐ High Viz Clothing |
| ☐ Class G | ☐ Level 3 - Medium Duty | ☐ Other* | | **Cartridges** | ☐ FRC | ☐ Long Pants |
| | ☐ Level 4 - Heavy Duty | | | ☐ N95 | ☐ PFD | ☐ Long Sleeve Shirts |
| **Foot Protection** | ☐ High Viz | **Hearing Protection** | **Arc Flash/Shock Protection** | ☐ P100 | | ☐ Paper Tyvek (disposible) |
| ☑ )Industrial Grade Safety Boot | ☐ Other* | ☑ NOT Required for this task | ☐ Hazard Category 2 | ☐ P95 | | ☐ Polyethyene Tyvek |
| ☐ Rubber Boots (industrial grade) | | ☐ Required | ☐ Hazard Category 4 | ☐ R95 | | ☐ Other* |

| Hard Hat | Gloves (ANSI/EN 388) | Eye Protection | Fall Protection | APR | Vest | PPE Clothing |
|---|---|---|---|---|---|---|
| ☐ Hip Waders | | | | ☐ Organic Vapour | | |
| | * see key equipment | | | ☐ Speciality* | | |

| Project Development Team | | Modified by | Reviewed by | Date |
|---|---|---|---|---|
| Name | Signature | | | |
| Gabrielle Enos | | | | |
| | | | | |
| | | | | |

| Job steps[1] | Task activity | Potential hazard(s)[2] | Corrective measure(s)[3] | Person responsible (Print first and last names) |
|---|---|---|---|---|
| 1 | Discuss STAR and SWA | • Site personnel not aware of STAR and SWA | • Project team (GHD) discusses importance of and documentation procedures for SWA during pre job safety meeting<br>• Use SWA to stop any work that is unsafe | Site Personnel |
| 2 | Inspect and calibrate sampling and monitoring equipment | • Lost time from improperly functioning equipment<br>• Incorrect sampling procedures/ collection due to malfunctioning equipment | • Ensure all equipment is functioning properly<br>• Complete Quality Control documents | Sampling Technician |
| 3 | Prepare to collect soil samples | • Lifting hazards<br>• Back injury<br>• Manual material handling<br>• Pinch points<br>• Cuts<br>• Punctures<br>• Sample misidentification | • Size up the load; if the object is too large or odd shaped OR is in excess of 50 pounds (23 kg) then assistance (mechanical or a buddy lift) will be required<br>• Lift with the legs (bend at the knees and use the leg muscles) to protect the lower back and keep lower back in a neutral position<br>• Avoid one handed carrying if possible; maintain awareness of footing<br>• No bending or twisting while under load<br>• Refer to the HASP for additional lifting information<br>• Avoid placing hands/fingers in pinch point locations<br>• Use proper tools when opening container packaging<br>• Do not use fixed open blade knives when opening boxes or containers<br>• Ensure the sample id label matches sample location with site plan/GHD site supervisor/subcontractor | Sampling Technician |
| 4 | Opening the sample sleeve (if applicable) | • Cuts due to sharp edges of sample sleeve<br>• Contaminant exposure | • Use sleeve cutter for opening the sample sleeves<br>• Keep hands clear of the sleeve when cutting<br>• Wear nitrile gloves<br>• Maintain awareness of sharp edges of sample sleeve | Sampling Technician |
| 5 | Sample collection | • Contaminant exposure<br>• Cuts from container breakage<br>• Sample misidentification | • Wear nitrile gloves and replace between soil samples<br>• Inspect glass bottles for breaks/cracks<br>• Do not attempt to use any suspect containers<br>• Close glass sample containers carefully to avoid breakage<br>• Check sample labels for accuracy prior to placing in cooler | Sampling Technician |
| 6 | Headspace screening of samples | • Contaminant exposure<br>• Incorrect headspace readings | • Wear nitrile gloves<br>• Ensure proper calibration of equipment | Sampling Technician |
| 7 | Sample selection | • Bottle breakage<br>• Contaminant exposure<br>• Pinch points<br>• Lost time due to incorrect sample selection | • Wear nitrile gloves when handling sample containers<br>• Confirm selected samples are correct based on work plan selection criteria, PID readings, and soil boring logs<br>• Avoid placing hands/fingers in pinch point locations (e.g., between cooler and lid) | Sampling Technician |

| Job steps[1] | Task activity | Potential hazard(s)[2] | Corrective measure(s)[3] | Person responsible (Print first and last names) |
|---|---|---|---|---|
| 8 | Packing samples in cooler(s) | • Bottle breakage<br>• Contaminant exposure<br>• Cuts<br>• Pinch points<br>• Lifting hazards<br>• Back injury<br>• Manual material handling<br>• Lost time due to incorrect sample packaging or hold time exceedances | • Wear nitrile gloves when handling sample containers<br>• Pack glass containers in bubble wrap<br>• Check COC against sample labels and SSOW for accuracy before shipping<br>• Avoid placing hands/fingers in pinch point locations (e.g., between cooler and lid)<br>• Use proper lifting techniques as discussed in step 3<br>• If possible use a dolly or cart if cooler is heavy or has to be moved over a long distance<br>• Ensure equipment and supplies are loaded correctly and do not shift during transport | Sampling Technician |
| 9 | Investigation derived waste (IDW) management | • Contaminant exposure<br>• Lifting hazards<br>• Back injury<br>• Manual material handling<br>• Pinch points<br>• Slips/trips/fall hazards<br>• Mislabeled waste | • Wear nitrile gloves when handling IDW<br>• Use proper lifting techniques as discussed in step 3<br>• Avoid placing hands/fingers in pinch point locations<br>• Maintain awareness of walking surfaces<br>• Label IDW with generator, a contact number, identification of contents, and site location<br>• Specify IDW as either hazardous or non hazardous material | Sampling Technician |

1. Each Job or Task consists of a set of steps. Be sure to list all the steps in the sequence that they are performed. Specify the equipment or other details to set the basis for the potential (associated) hazards.
2. A hazard is a potential danger. What can go wrong? How can someone get hurt? Consider, but do not limit, the analysis to: **Contact** - victim is struck by or strikes an object; **Caught** - victim is caught on, caught in or caught between objects; **Fall** - victim falls to ground or lower level (includes slips and trips); **Exertion** - excessive strain or stress/ergonomics/lifting techniques; **Exposure** - inhalation/skin hazards. Specify the hazards and do not limit the description to a single word such as "Caught".
3. Aligning with the Job Steps, Task Activity Description, and Potential Hazard columns, describe what actions or procedures are necessary to eliminate or minimize the hazards. Be clear, concise and specific. Use objective, observable, and quantified terms. Avoid subjective general statements such as "be careful" or "use as appropriate".

**Site Personnel Participating in JSA Review:**

I have participated in the review and discussion of the Job Safety Analysis (JSA) listed on this document and understand the duties I am responsible to fulfill. As part of my work, I know I have the responsibility and obligation to STOP work with a Stop Work Authority (SWA) if conditions change and/or potential hazards have been identified.

| Name/Company | Sign | Date |
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**SSE(s) on job:** _____ **Assigned mentor:** _____

Presenter Signature: _____ Date/Time: _____

My signature below indicates that all conditions and requirements listed above have been verified, met, and reviewed with all affected personnel prior to start of work.

Supervisor Signature: _____ Date/Time: _____

Location of Mustering Point: _____ Wind direction (current): _____

GHD Emergency contact (Name and verified phone number): _____

Supervisor Signature documenting Daily Debrief has been completed: _____

# Job Safety Analysis (JSA)

**Insert Name :** Environmental-Decontamination of Sampling Equipment and Personnel (PPE Level D)

Field staff must review job specific work plan and coordinate with project manager to verify that all up front logistics are completed prior to starting work including, but not limited to, permitting, access agreements, and notification to required contacts (e.g., site managers, inspectors, clients, subcontractors, etc.). Additionally, a tailgate safety meeting must be performed and documented at the beginning of each workday. **Stop, Think, Act, Review (STAR)** must be used prior to any activity. All personnel must possess the appropriate training prior to initiating scheduled tasks. Also consider weather conditions. GHD personnel have the authority and responsibility to use **Stop Work Authority (SWA).** Review this JHA initially and in the field prior to initiating the job, using the P66 RM "Go Card" to assist in identifying specific site hazards. Document by "dirtying" this JHA.

| | | | | | |
|---|---|---|---|---|---|
| **Date Issued/Revised:** | 03/28/2024 18:15:22 | **Client:** | The City of Fort Lauderdale | | |
| **Project Number:** | 12637954 | **Created By:** | cra\ediaz2 | SIM OPS? YES/NO | SSE on site? YES/NO |
| **Project Address:** | 6000 NW 21st Avenue Fort Lauderdale | | | | |
| **Key Equipment:** | Alconox/Liquinox, brushes | | | | |
| **Task-specific Training:** | Decontamination/Site Control; Quality Control/Sampling Plan | | | | |

| Hard Hat | Gloves (ANSI/EN 388) | Eye Protection | Fall Protection | APR | Vest | PPE Clothing |
|---|---|---|---|---|---|---|
| ☐ Type 1 (Top Impact) | ☑ Chemical Protective (ie.Nitrile) | ☑ ANSI/CSA Safety Glasses | ☐ Harness | ☐ Full Face Mask | ☑ Class II (standard) | ☐ Coveralls |
| ☐ Type 2 (Side Impact) | ☐ Level 1 - Light Duty | ☐ Goggles/Spoggles | ☐ Shock Absorbing Lanyard | ☐ Half Face Mask | ☐ Class III ( Night or Highway Traffic) | ☐ Fire Retardent Clothing (FRC) |
| ☑ Class E (standard) | ☐ Level 2 - Light Duty with Protection | ☐ Face Shields | ☐ Lifeline | | ☐ Anti-Static | ☐ High Viz Clothing |
| ☐ Class G | ☐ Level 3 - Medium Duty | ☐ Other* | | **Cartridges** | ☐ FRC | ☑ Long Pants |
| | ☐ Level 4 - Heavy Duty | | | ☐ N95 | ☐ PFD | ☑ Long Sleeve Shirts |
| **Foot Protection** | ☐ High Viz | **Hearing Protection** | **Arc Flash/Shock Protection** | ☐ P100 | | ☐ Paper Tyvek (disposible) |

| Hard Hat | Gloves (ANSI/EN 388) | Eye Protection | Fall Protection | APR | Vest | PPE Clothing |
|---|---|---|---|---|---|---|
| ☑ )Industrial Grade Safety Boot | ☐ Other* | ☑ NOT Required for this task | ☐ Hazard Category 2 | ☐ P95 | | ☐ Polyethyene Tyvek |
| ☐ Rubber Boots (industrial grade) | | ☐ Required | ☐ Hazard Category 4 | ☐ R95 | | ☐ Other* |
| ☐ Hip Waders | | | | ☐ Organic Vapour | | |
| | * see key equipment | | | ☐ Speciality* | | |

| Project Development Team | | Modified by | Reviewed by | Date |
|---|---|---|---|---|
| Name | Signature | | | |
| Gabrielle Enos | | | | |
| | | | | |
| | | | | |

| Job steps[1] | Task activity | Potential hazard(s)[2] | Corrective measure(s)[3] | Person responsible (Print first and last names) |
|---|---|---|---|---|
| 1 | Decontamination of sampling equipment (including pumps, bailers, tubing, etc.) | • Contaminant exposure<br>• Pinch points<br>• Slip/trip/hit/fall hazards<br>• Lifting hazards<br>• Back injury<br>• Manual material handling | • Set up decon station to capture any spills to avoid cross contamination and manage wastes<br>• Wear appropriate PPE<br>• Scrub equipment clean then rinse and verify it is clean and free of contamination<br>• Avoid putting hands in or near pinch points<br>• Maintain good housekeeping and be aware of surroundings<br>• Size up the load; if the object is too large or odd shaped OR is in excess of 50 pounds (23 kg) then assistance (mechanical means, such as a dolly, cart, or a buddy lift) will be required<br>• Lift with the legs (bend at the knees and use the leg muscles) to protect the lower back and keep lower back in a neutral position<br>• Refer to the HASP for additional lifting techniques | Sampling Personnel |
| 2 | Decontamination of personnel | • Contaminant exposure<br>• Slip/trip/hit/fall hazards | • Refer to the HASP for specific procedures but in general start with most contaminated article and remove until inner gloves are the last item left<br>• Dispose of used PPE in accordance with site requirements<br>• Wash hands and face before eating, drinking, or using tobacco products<br>• Take care when removing PPE (boots, gloves, etc.); sit down to remove/change boots as necessary | Sampling personnel |
| 3 | Management of waste derived from decontamination activities | • Contaminant exposure<br>• Lifting hazards<br>• Back injury<br>• Manual material handling | • Containerize decon waste (e.g., water, used PPE) as required<br>• Properly dispose of decon fluids (e.g., sediments)<br>• Refer to step 1 and the HASP for additional lifting information | Sampling personnel |

1. Each Job or Task consists of a set of steps. Be sure to list all the steps in the sequence that they are performed. Specify the equipment or other details to set the basis for the potential (associated) hazards.
2. A hazard is a potential danger. What can go wrong? How can someone get hurt? Consider, but do not limit, the analysis to: **Contact** - victim is struck by or strikes an object; **Caught** - victim is caught on, caught in or caught between objects; **Fall** - victim falls to ground or lower level (includes slips and trips); **Exertion** - excessive strain or stress/ergonomics/lifting techniques; **Exposure** - inhalation/skin hazards. Specify the hazards and do not limit the description to a single word such as "Caught".
3. Aligning with the Job Steps, Task Activity Description, and Potential Hazard columns, describe what actions or procedures are necessary to eliminate or minimize the hazards. Be clear, concise and specific. Use objective, observable, and quantified terms. Avoid subjective general statements such as "be careful" or "use as appropriate".

**Site Personnel Participating in JSA Review:**

I have participated in the review and discussion of the Job Safety Analysis (JSA) listed on this document and understand the duties I am responsible to fulfill. As part of my work, I know I have the responsibility and obligation to STOP work with a Stop Work Authority (SWA) if conditions change and/or potential hazards have been identified.

| Name/Company | Sign | Date |
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SAFE YOU ME GHD
ENVIRONMENT & PEOPLE

**SSE(s) on job:** _____ **Assigned mentor:** _____

Presenter Signature: _____ Date/Time: _____

My signature below indicates that all conditions and requirements listed above have been verified, met, and reviewed with all affected personnel prior to start of work.

Supervisor Signature: _____ Date/Time: _____

Location of Mustering Point: _____ Wind direction (current): _____

GHD Emergency contact (Name and verified phone number): _____

Supervisor Signature documenting Daily Debrief has been completed: _____

# Job Safety Analysis (JSA)

## Insert Name : Motor Vehicle - Driving

Field staff must review job specific work plan and coordinate with project manager to verify that all up front logistics are completed prior to starting work including, but not limited to, permitting, access agreements, and notification to required contacts (e.g., site managers, inspectors, clients, subcontractors, etc.). Additionally, a tailgate safety meeting must be performed and documented at the beginning of each workday. **Stop, Think, Act, Review (STAR)** must be used prior to any activity. All personnel must possess the appropriate training prior to initiating scheduled tasks. Also consider weather conditions. GHD personnel have the authority and responsibility to use **Stop Work Authority (SWA).** Review this JHA initially and in the field prior to initiating the job, using the P66 RM "Go Card" to assist in identifying specific site hazards. Document by "dirtying" this JHA.

| | | | | | |
|---|---|---|---|---|---|
| **Date Issued/Revised:** | 03/28/2024 18:15:22 | **Client:** | The City of Fort Lauderdale | | |
| **Project Number:** | 12637954 | **Created By:** | cra\ediaz2 | SIM OPS? YES/NO | SSE on site? YES/NO |
| **Project Address:** | 6000 NW 21st Avenue Fort Lauderdale | | | | |
| **Key Equipment:** | Vehicle, valid driver's license, 360-degree topper; seatbelt | | | | |
| **Task-specific Training:** | Defensive Driving | | | | |

| Hard Hat | Gloves (ANSI/EN 388) | Eye Protection | Fall Protection | APR | Vest | PPE Clothing |
|---|---|---|---|---|---|---|
| ☐ Type 1 (Top Impact) | ☐ Chemical Protective (ie.Nitrile) | ☐ ANSI/CSA Safety Glasses | ☐ Harness | ☐ Full Face Mask | ☐ Class II (standard) | ☐ Coveralls |
| ☐ Type 2 (Side Impact) | ☐ Level 1 - Light Duty | ☐ Goggles/Spoggles | ☐ Shock Absorbing Lanyard | ☐ Half Face Mask | ☐ Class III ( Night or Highway Traffic) | ☐ Fire Retardent Clothing (FRC) |
| ☐ Class E (standard) | ☐ Level 2 - Light Duty with Protection | ☐ Face Shields | ☐ Lifeline | | ☐ Anti-Static | ☐ High Viz Clothing |
| ☐ Class G | ☐ Level 3 - Medium Duty | ☐ Other* | | **Cartridges** | ☐ FRC | ☐ Long Pants |
| | ☐ Level 4 - Heavy Duty | | | ☐ N95 | ☐ PFD | ☐ Long Sleeve Shirts |
| **Foot Protection** | ☐ High Viz | **Hearing Protection** | **Arc Flash/Shock Protection** | ☐ P100 | | ☐ Paper Tyvek (disposible) |
| ☐ )Industrial Grade Safety Boot | ☐ Other* | ☐ NOT Required for this task | ☐ Hazard Category 2 | ☐ P95 | | ☐ Polyethyene Tyvek |
| ☐ Rubber Boots (industrial grade) | | ☐ Required | ☐ Hazard Category 4 | ☐ R95 | | ☐ Other* |

| Hard Hat | Gloves (ANSI/EN 388) | Eye Protection | Fall Protection | APR | Vest | PPE Clothing |
|---|---|---|---|---|---|---|
| ☐ Hip Waders | | | | ☐ Organic Vapour | | |
| | * see key equipment | | | ☐ Speciality* | | |

| Project Development Team | | Modified by | Reviewed by | Date |
|---|---|---|---|---|
| Name | Signature | | | |
| Gabrielle Enos | | | | |
| | | | | |
| | | | | |

| Job steps[1] | Task activity | Potential hazard(s)[2] | Corrective measure(s)[3] | Person responsible (Print first and last names) |
|---|---|---|---|---|
| 1 | Discuss STAR and SWA | Site personnel not aware of STAR and SWA | • Project team (GHD) discusses importance of and documentation procedures for SWA during pre-job safety meeting<br>• Discuss route, concerns, and alternate routes with passenger and drivers of other vehicles<br>• Use SWA to stop any work that is unsafe<br>• Ensure proper vehicle selected for travel (use a truck if going to construction site or area with rough conditions that would damage a small vehicle?) | Driver and passenger |
| 2 | Check weather | • Unexpected storm<br>• Fog; rain; snow; lightning/thunder<br>• Heat/cold stress | • Check local weather forecast<br>• Discuss weather issues and precautions to take while driving and on site during the pre-job safety meeting<br>• If weather conditions (e.g., fog, rain, snow, etc.) impair the ability/vision of the driver, exit at nearest safe location and assess the situation<br>• While on site, at first sign of lightning/thunder utilize SWA and assess weather conditions<br>• In extreme temperatures, ensure all personnel have proper clothing, hydration, and heat/cold protection (e.g., canopy, fan, glove warmers) | Driver or Passenger |

| Job steps[1] | Task activity | Potential hazard(s)[2] | Corrective measure(s)[3] | Person responsible (Print first and last names) |
|---|---|---|---|---|
| 3 | Complete GHD Daily Operator Vehicle Checklist | • Damaged vehicle lights, tires, windows, mirrors, horn<br>• Inadequate vehicle documents and/or safety items | • Check for fluid leaks under vehicle<br>• Test operation of headlights, front/rear turn signals, backup lights, brake lights, and emergency flashers<br>• Visually check the pressure/wear of tires<br>• Ensure the vehicle has a properly inflated spare tire and associated tools to install<br>• Assure windshield and window glass is clean and free from obstructions<br>• Assure all fluids are topped off (e.g., windshield wiper fluid) and scheduled routine maintenance has occurred (e.g., oil changes).<br>• Test the windshield wipers and horn<br>• Verify vehicle registration, insurance card, and inspection sticker is present and valid<br>• If the vehicle contains a first aid kit, fire extinguisher, and road hazard kit, verify that all items with expiration dates are current and that fire extinguisher has had documented monthly check<br>• Do not use vehicle if any safety device is found not functioning | Driver or Passenger |
| 4 | Check and adjust seat, steering wheel, headrest, and mirrors | • Back/body strain<br>• Blind spot<br>• Impaired vision | • Adjust seat, headrest, and steering wheel height so body is fully supported/comfortable and pedals are within easy reach<br>• Ensure mirrors are properly adjusted | Driver or Passenger |
| 5 | Fasten seat belt(s) and ensure passengers' seat belts are fastened | • Serious injury, ejection, or death from collision and/or traffic citation | Verify driver and passenger(s) seat belts are in good condition and properly latched | Driver or Passenger |

| Job steps[1] | Task activity | Potential hazard(s)[2] | Corrective measure(s)[3] | Person responsible (Print first and last names) |
|---|---|---|---|---|
| 6 | Ensure vehicle doors are locked | • Serious injury, ejection, or death from collision<br>• Unwanted intrusion<br>• Lost equipment | Manually lock all doors to vehicle prior to starting the vehicle | Driver |
| 7 | Start engine and check gauges and warning lights | • Vehicle breakdown | Verify sufficient fuel and other hazard lamps (e.g., battery, oil, and temperature) are not lit | Driver |
| 8 | Driving – Use defensive driving techniques and stay alert | • Arriving late<br>• Collision<br>• Blind spots of other vehicles<br>• Injury or death to occupants or other parties | • Acknowledge and comply with all traffic regulations, laws, and ordinances<br>• Do not use two-way communicating devices or perform other distracting activities while vehicle is in motion<br>• Constantly scan intersections, move eyes, check mirrors, and assess traffic lights (fresh vs. stale)<br>• Recognize other vehicle's blind spots and minimize time spent within these zones<br>• Maintain safety cushion around vehicle (front, sides, and rear) and 4-second following distance (add an extra second for each hazardous condition, triple following distance in poor weather conditions)<br>• Signal well in advance before changing lanes or turning<br>• Utilize all driving defensive techniques | Driver |
| 9 | Arrive at site | • Pedestrian injury<br>• Collision | • Maintain awareness of pedestrian/vehicular traffic when entering site and traveling to work zone | Driver |

| Job steps[1] | Task activity | Potential hazard(s)[2] | Corrective measure(s)[3] | Person responsible (Print first and last names) |
|---|---|---|---|---|
| 10 | Park vehicle – assign a spotter if necessary (when in doubt use a spotter) | • Pedestrian injury<br>• Collision<br>• Property damage<br>• Equipment theft | • Maintain awareness of pedestrian/vehicular traffic<br>• Park vehicle in pull-through parking space or facing the exit<br>• Parking in a parking space that is not a designated parking space will require the placement of the 360-degree topper on the hood of the vehicle<br>• Use a spotter when backing up a vehicle<br>• If no spotter available when backing up a vehicle, complete a 360-degree walk around vehicle. Ensure there are no hidden obstacles (e.g. pot holes, rocks, stumps, broken tree branches hidden by vegetation/foliage, etc.) that could be struck – look up and down. Stop, park and exit vehicle to check rear clearance as necessary when backing up to ensure travel pathway remains clear<br>• Use caution and mirrors/spotter when backing vehicle<br>• Set parking brake<br>• Never leave field equipment in a vehicle unprotected<br>• Never miss use and and always care for all field equipment<br>• Never leave expensive equipment in your vehicle overnight<br>• Always take expensive equipment with you into your hotel room/ house<br>• Never miss use and always care for all field equipment | Driver |
| 11 | Demobilization – conduct a vehicle walk around inspection paying particular attention to path(s) of travel | • Collision<br>• Injury or death to occupants or other parties | • Perform perimeter vehicle check<br>• Maintain awareness of pedestrian/vehicular traffic when exiting site<br>• Utilize defensive driving techniques<br>• Complete post-departure checklist and report vehicle problems to company vehicle maintenance manager or rental car agency | Driver or Passenger |

| Job steps[1] | Task activity | Potential hazard(s)[2] | Corrective measure(s)[3] | Person responsible (Print first and last names) |
|---|---|---|---|---|
| 12 | Report maintenance or mechanical problems upon returning vehicle | • Conditions worsen leading to mechanical failure resulting in collision and injury | • Report vehicle problems immediately to company representative or rental car agency<br>• Schedule and/or perform repairs as soon as possible | Driver |

1. Each Job or Task consists of a set of steps. Be sure to list all the steps in the sequence that they are performed. Specify the equipment or other details to set the basis for the potential (associated) hazards.
2. A hazard is a potential danger. What can go wrong? How can someone get hurt? Consider, but do not limit, the analysis to: **Contact** - victim is struck by or strikes an object; **Caught** - victim is caught on, caught in or caught between objects; **Fall** - victim falls to ground or lower level (includes slips and trips); **Exertion** - excessive strain or stress/ergonomics/lifting techniques; **Exposure** - inhalation/skin hazards. Specify the hazards and do not limit the description to a single word such as "Caught".
3. Aligning with the Job Steps, Task Activity Description, and Potential Hazard columns, describe what actions or procedures are necessary to eliminate or minimize the hazards. Be clear, concise and specific. Use objective, observable, and quantified terms. Avoid subjective general statements such as "be careful" or "use as appropriate".

**Site Personnel Participating in JSA Review:**

I have participated in the review and discussion of the Job Safety Analysis (JSA) listed on this document and understand the duties I am responsible to fulfill. As part of my work, I know I have the responsibility and obligation to STOP work with a Stop Work Authority (SWA) if conditions change and/or potential hazards have been identified.

| Name/Company | Sign | Date |
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**SSE(s) on job:** _____ **Assigned mentor:** _____

Presenter Signature: _____ Date/Time: _____

My signature below indicates that all conditions and requirements listed above have been verified, met, and reviewed with all affected personnel prior to start of work.

Supervisor Signature: _____ Date/Time: _____

Location of Mustering Point: _____ Wind direction (current): _____

GHD Emergency contact (Name and verified phone number): _____

Supervisor Signature documenting Daily Debrief has been completed: _____

# Job Safety Analysis (JSA)

## Insert Name : Mobilization-Demobilization

Field staff must review job specific work plan and coordinate with project manager to verify that all up front logistics are completed prior to starting work including, but not limited to, permitting, access agreements, and notification to required contacts (e.g., site managers, inspectors, clients, subcontractors, etc.). Additionally, a tailgate safety meeting must be performed and documented at the beginning of each workday. **Stop, Think, Act, Review (STAR)** must be used prior to any activity. All personnel must possess the appropriate training prior to initiating scheduled tasks. Also consider weather conditions. GHD personnel have the authority and responsibility to use **Stop Work Authority (SWA).** Review this JHA initially and in the field prior to initiating the job, using the P66 RM "Go Card" to assist in identifying specific site hazards. Document by "dirtying" this JHA.

| | | | | | |
|---|---|---|---|---|---|
| **Date Issued/Revised:** | 03/28/2024 18:15:23 | **Client:** | The City of Fort Lauderdale | | |
| **Project Number:** | 12637954 | **Created By:** | cra\ediaz2 | SIM OPS? YES/NO | SSE on site? YES/NO |
| **Project Address:** | 6000 NW 21st Avenue Fort Lauderdale | | | | |
| **Key Equipment:** | #360 degree topper | | | | |
| **Task-specific Training:** | # | | | | |

| Hard Hat | Gloves (ANSI/EN 388) | Eye Protection | Fall Protection | APR | Vest | PPE Clothing |
|---|---|---|---|---|---|---|
| ☐ Type 1 (Top Impact) | ☐ Chemical Protective (ie.Nitrile) | ☐ ANSI/CSA Safety Glasses | ☐ Harness | ☐ Full Face Mask | ☐ Class II (standard) | ☐ Coveralls |
| ☐ Type 2 (Side Impact) | ☑ Level 1 - Light Duty | ☐ Goggles/Spoggles | ☐ Shock Absorbing Lanyard | ☐ Half Face Mask | ☐ Class III ( Night or Highway Traffic) | ☐ Fire Retardent Clothing (FRC) |
| ☐ Class E (standard) | ☐ Level 2 - Light Duty with Protection | ☐ Face Shields | ☐ Lifeline | | ☐ Anti-Static | ☐ High Viz Clothing |
| ☐ Class G | ☐ Level 3 - Medium Duty | ☐ Other* | | **Cartridges** | ☐ FRC | ☐ Long Pants |
| | ☐ Level 4 - Heavy Duty | | | ☐ N95 | ☐ PFD | ☐ Long Sleeve Shirts |
| **Foot Protection** | ☐ High Viz | **Hearing Protection** | **Arc Flash/Shock Protection** | ☐ P100 | | ☐ Paper Tyvek (disposible) |
| ☑ )Industrial Grade Safety Boot | ☐ Other* | ☐ NOT Required for this task | ☐ Hazard Category 2 | ☐ P95 | | ☐ Polyethyene Tyvek |
| ☐ Rubber Boots (industrial grade) | | ☐ Required | ☐ Hazard Category 4 | ☐ R95 | | ☐ Other* |

| Hard Hat | Gloves (ANSI/EN 388) | Eye Protection | Fall Protection | APR | Vest | PPE Clothing |
|---|---|---|---|---|---|---|
| ☐ Hip Waders | | | | ☐ Organic Vapour | | |
| | * see key equipment | | | ☐ Speciality* | | |

| Project Development Team | | Modified by | Reviewed by | Date |
|---|---|---|---|---|
| Name | Signature | | | |
| Gabrielle Enos | | | | |
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| Job steps[1] | Task activity | Potential hazard(s)[2] | Corrective measure(s)[3] | Person responsible (Print first and last names) |
|---|---|---|---|---|
| 1 | Discuss STAR and SWA | • Site personnel not aware of STAR and SWA | • Project team (GHD) discusses importance of and documentation procedures for SWA during pre job safety meeting<br>• Use SWA to stop any work that is unsafe | |
| 2 | Check weather | • Unexpected storm<br>• Fog, rain, snow; lightening/thunder<br>• Heat/cold stress | • Check local weather forecast<br>• If adverse weather conditions are likely, prepare a contingency plan for lodging, etc. with project manager<br>• Discuss weather issues and precautions to take while driving and on site during the pre job safety meeting<br>• If weather conditions (e.g., fog, rain, snow, etc.) impair the ability/vision of the driver, exit at nearest safe location and assess the situation<br>• While on site, at first sign of lightening/thunder utilize SWA and assess weather conditions<br>• In extreme temperatures, ensure all personnel have proper clothing, hydration, and heat/cold protection (e.g., canopy, fan, glove warmers) | |
| 3 | Load equipment into vehicle | • Lifting hazards<br>• Manual material handling<br>• Back injury<br>• Cuts<br>• Pinch points<br>• Hand/foot injury<br>• Forgotten or damaged equipment | • Reduce travel distance when there is a need to carry/lift materials<br>• Make sure grip is adequate; wear leather/cotton gloves<br>• Size up the load; if the object is too large or odd shaped OR is in excess of 50 pounds (23 kg) then assistance (mechanical or a buddy lift) will be required<br>• Maintain neutral back posture - Lift with the legs (bend at the knees and use the leg muscles) to protect the lower back and make sure to shift with the feet rather than twisting at the back<br>• Maintain neutral wrist posture when lifting, carrying, pushing or pulling. The wrist is the strongest and most stable when it is straight.<br>• Avoid one handed carrying if possible; maintain awareness of footing<br>• Avoid placing hands/fingers in pinch point locations<br>• Wear safety toed boots<br>• Verify requested equipment against warehouse form<br>• Load equipment in an organized manner to prevent shifting during transport or use cargo netting | |

| Job steps[1] | Task activity | Potential hazard(s)[2] | Corrective measure(s)[3] | Person responsible (Print first and last names) |
|---|---|---|---|---|
| 4 | Complete GHD Daily Operator Vehicle Checklist | • Damaged vehicle lights, tires, windows, mirrors, horn<br>• Inadequate vehicle documents and/or safety items | • Check for fluid leaks under vehicle<br>• Test operation of headlights, front/rear turn signals, backup lights, brake lights, and emergency flashers<br>• Visually check the pressure/wear of tires<br>• Ensure the vehicle has a spare tire<br>• Assure windshield and window glass is clean and free from obstructions<br>• Test the windshield wipers and horn<br>• Verify vehicle registration, insurance card, and inspection sticker is present and valid<br>• Ensure the vehicle contains a first aid kit, fire extinguisher, and road hazard kit<br>• Check immediate vehicle perimeter and initial path of travel for obstructions | |
| 5 | Check and adjust seat, steering wheel, headrest, and mirrors | • Back/body strain<br>• Blind spot<br>• Impaired vision | • Adjust seat, headrest, and steering wheel height so body is fully supported/comfortable and pedals are within easy reach<br>• Ensure mirrors are properly adjusted | |
| 6 | Fasten seat belt(s) and ensure passenger(s) seat belts are fastened | • Serious injury, ejection, or death from collision and/or traffic citation | • Verify driver and passenger(s) seat belts are in good condition and properly latched | |
| 7 | Ensure vehicle doors are locked | • Serious injury, ejection, or death from collision<br>• Unwanted intrusion<br>• Lost equipment | • Manually lock all doors to vehicle | |
| 8 | Start engine and check gauges and warning lights | • Vehicle breakdown | • Verify sufficient fuel and other hazard lamps (e.g., battery, oil, and temperature) are not lit | |
| 9 | Mobilize to site | • Arriving late<br>• Collision<br>• Injury or death to occupants or other parties | • Do not use cell phones or perform other distracting activities while vehicle is in motion<br>• Constantly scan intersections, move eyes, check mirrors, and assess traffic lights (fresh vs. stale)<br>• Maintain safety cushion around vehicle (front, sides, and rear) and 4 second following distance<br>• Utilize all driving defensive techniques | |
| 10 | Arrive at site | • Pedestrian injury<br>• Collision | • Maintain awareness of pedestrian/vehicular traffic when entering site and traveling to work zone | |

| Job steps[1] | Task activity | Potential hazard(s)[2] | Corrective measure(s)[3] | Person responsible (Print first and last names) |
|---|---|---|---|---|
| 11 | Park vehicle | • Pedestrian injury<br>• Collision<br>• Property damage | • Maintain awareness of pedestrian/vehicular traffic<br>• Park vehicle in pull through parking space or facing the exit<br>• Parking in a parking space that is not a designated parking space will require the placement of the 360 degree topper on the hood of the vehicle<br>• Use caution and mirrors/spotter when backing vehicle<br>• Set parking brake | |
| 12 | Demobilization | • Collision<br>• Injury or death to occupants or other parties | • Check immediate vehicle perimeter and initial path of travel for obstructions<br>• Maintain awareness of pedestrian/vehicular traffic when exiting site<br>• Utilize defensive driving techniques | |

1. Each Job or Task consists of a set of steps. Be sure to list all the steps in the sequence that they are performed. Specify the equipment or other details to set the basis for the potential (associated) hazards.
2. A hazard is a potential danger. What can go wrong? How can someone get hurt? Consider, but do not limit, the analysis to: **Contact** - victim is struck by or strikes an object; **Caught** - victim is caught on, caught in or caught between objects; **Fall** - victim falls to ground or lower level (includes slips and trips); **Exertion** - excessive strain or stress/ergonomics/lifting techniques; **Exposure** - inhalation/skin hazards. Specify the hazards and do not limit the description to a single word such as "Caught".
3. Aligning with the Job Steps, Task Activity Description, and Potential Hazard columns, describe what actions or procedures are necessary to eliminate or minimize the hazards. Be clear, concise and specific. Use objective, observable, and quantified terms. Avoid subjective general statements such as "be careful" or "use as appropriate".

**Site Personnel Participating in JSA Review:**

I have participated in the review and discussion of the Job Safety Analysis (JSA) listed on this document and understand the duties I am responsible to fulfill. As part of my work, I know I have the responsibility and obligation to STOP work with a Stop Work Authority (SWA) if conditions change and/or potential hazards have been identified.

| Name/Company | Sign | Date |
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**SSE(s) on job:** _____ **Assigned mentor:** _____

Presenter Signature: _____ Date/Time: _____

My signature below indicates that all conditions and requirements listed above have been verified, met, and reviewed with all affected personnel prior to start of work.

Supervisor Signature: _____ Date/Time: _____

Location of Mustering Point: _____ Wind direction (current): _____

GHD Emergency contact (Name and verified phone number): _____

Supervisor Signature documenting Daily Debrief has been completed: _____

# Job Safety Analysis (JSA)

## Insert Name : Environmental-Site Recon and Walkthrough

Field staff must review job specific work plan and coordinate with project manager to verify that all up front logistics are completed prior to starting work including, but not limited to, permitting, access agreements, and notification to required contacts (e.g., site managers, inspectors, clients, subcontractors, etc.). Additionally, a tailgate safety meeting must be performed and documented at the beginning of each workday. **Stop, Think, Act, Review (STAR)** must be used prior to any activity. All personnel must possess the appropriate training prior to initiating scheduled tasks. Also consider weather conditions. GHD personnel have the authority and responsibility to use **Stop Work Authority (SWA).** Review this JHA initially and in the field prior to initiating the job, using the P66 RM "Go Card" to assist in identifying specific site hazards. Document by "dirtying" this JHA.

| | | | | | |
|---|---|---|---|---|---|
| **Date Issued/Revised:** | 03/28/2024 18:15:23 | **Client:** | The City of Fort Lauderdale | | |
| **Project Number:** | 12637954 | **Created By:** | cra\ediaz2 | SIM OPS? YES/NO | SSE on site? YES/NO |
| **Project Address:** | 6000 NW 21st Avenue Fort Lauderdale | | | | |
| **Key Equipment:** | Basic PPE, hand/power tools based on site condition, site inspection checklist or notebook, JSA forms, pens, flashlight.<br><br>Additional PPE: Insect repellant. Coveralls may be necessary based on type of brush/plants/insects in work area(s) being inspected. Leather gloves if overgrown vegetation or rundown buildings. | | | | |
| **Task-specific Training:** | SMART Safety training (STAR), JSA development, Poison Plant Identification | | | | |

| Hard Hat | Gloves (ANSI/EN 388) | Eye Protection | Fall Protection | APR | Vest | PPE Clothing |
|---|---|---|---|---|---|---|
| ☐ Type 1 (Top Impact) | ☐ Chemical Protective (ie.Nitrile) | ☑ ANSI/CSA Safety Glasses | ☐ Harness | ☐ Full Face Mask | ☑ Class II (standard) | ☑ Coveralls |
| ☐ Type 2 (Side Impact) | ☑ Level 1 - Light Duty | ☐ Goggles/Spoggles | ☐ Shock Absorbing Lanyard | ☐ Half Face Mask | ☐ Class III ( Night or Highway Traffic) | ☐ Fire Retardent Clothing (FRC) |
| ☑ Class E (standard) | ☐ Level 2 - Light Duty with Protection | ☐ Face Shields | ☐ Lifeline | | ☐ Anti-Static | ☐ High Viz Clothing |
| ☐ Class G | ☐ Level 3 - Medium Duty | ☐ Other* | | **Cartridges** | ☐ FRC | ☐ Long Pants |
| | ☐ Level 4 - Heavy Duty | | | ☐ N95 | ☐ PFD | ☐ Long Sleeve Shirts |
| **Foot Protection** | ☐ High Viz | **Hearing Protection** | **Arc Flash/Shock Protection** | ☐ P100 | | ☐ Paper Tyvek (disposible) |

| Hard Hat | Gloves (ANSI/EN 388) | Eye Protection | Fall Protection | APR | Vest | PPE Clothing |
|---|---|---|---|---|---|---|
| ☑ )Industrial Grade Safety Boot | ☐ Other* | ☑ NOT Required for this task | ☐ Hazard Category 2 | ☐ P95 | | ☐ Polyethyene Tyvek |
| ☐ Rubber Boots (industrial grade) | | ☐ Required | ☐ Hazard Category 4 | ☐ R95 | | ☑ Other* |
| ☐ Hip Waders | | | | ☐ Organic Vapour | | |
| | * see key equipment | | | ☐ Speciality* | | |

| Project Development Team | | Modified by | Reviewed by | Date |
|---|---|---|---|---|
| Name | Signature | | | |
| Gabrielle Enos | | | | |
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| Job steps[1] | Task activity | Potential hazard(s)[2] | Corrective measure(s)[3] | Person responsible (Print first and last names) |
|---|---|---|---|---|
| 1 | Discuss STAR and SWA | • Site personnel not aware of STAR and SWA | • Project team discusses importance of and documentation procedures for SWA during pre-job safety meeting<br>• Use SWA to stop any work that is unsafe | All persons on project team |
| 2 | Check weather | • Unexpected storm, fog; rain; snow; lightening, thunder<br>• Heat/cold stress, including frostbite and sunburn | • Check local weather forecast<br>• Discuss weather issues and precautions to take while driving and on site during the pre job safety meeting<br>• If weather conditions (e.g., fog, rain, snow) impair the ability/vision of the driver, exit at nearest safe location and assess the situation<br>• While on site, at first sign of lightning/thunder utilize SWA and assess weather conditions<br>• In extreme temperatures, ensure all personnel have proper clothing, which includes either a helmet liner or hat/mask that will cover exposed skin on one's face and ears, hydration, and heat/cold protection (e.g., canopy, fan, glove warmers)<br>• Implement the "Buddy System." The site supervisor shall also keep close tabs on all project personnel working in extreme temperatures. | Assessor |
| 3 | Sign in | • Site Manager and Operator not aware of GHD staff presence in facility or on grounds | • Sign in at front desk<br>• Ask to speak to Site Manager or alternate designate | |
| 4 | Don necessary GHD and client required PPE | • Contact with recyclable material or equipment | • Wear all required PPE (hard hat, vest, boots, and glasses) at all times while in the facility | |
| 5 | Unload equipment from vehicle | • Lifting hazards<br>• Back injury<br>• Manual material handling<br>• Cuts<br>• Pinch points<br>• Hand/foot injury<br>• Forgotten equipment<br>• Damaged equipment | • Reduce travel distance when there is a need to carry/lift materials<br>• Make sure grip is adequate; wear leather/cotton gloves<br>• Size up the load; if the object is too large or odd shaped OR is in excess of 50 pounds (23 kg) then assistance (mechanical or a buddy lift) will be required<br>• Lift with the legs (bend at the knees and use the leg muscles) to protect the lower back and keep lower back in a neutral position<br>• Avoid one handed carrying if possible; maintain awareness of footing<br>• Wear leather/cotton gloves and avoid placing hands/fingers in pinch point locations<br>• Wear steel toed boots<br>• Verify requested equipment against warehouse form<br>• Load equipment in an organized manner to prevent shifting during transport or use cargo netting | Assessor |

| Job steps[1] | Task activity | Potential hazard(s)[2] | Corrective measure(s)[3] | Person responsible (Print first and last names) |
|---|---|---|---|---|
| 6 | Complete site inspection and walkover of the property and work areas – Note any hazards that will impact site personnel and/or their operations | • Slip/trip/fall hazards<br>• Insects/reptiles<br>• Pedestrian injury<br>• Poison plants | • Check in with site personnel and sign appropriate visitor or safety log (may require watching safety video [i.e., plant])<br>• Check with site contact to determine safely accessible areas and areas where PPE are required<br>• Wear PPE as directed by site personnel or dependent upon your evaluation of conditions<br>• If building(s) looks dilapidated or in poor condition, do not enter<br>• Watch for vehicles or other mobile equipment moving around<br>• Make sure areas are well lit and you are accompanied by a site representative (if applicable)<br>• Watch where you step on pavement (potholes, dips, or obstructions) and in vegetated/wooded areas (dips, holes, branches, vines, etc.)<br>• Do not take photographs while walking<br>• Do not talk on cell phone while walking<br>• If in vegetated or wooded areas, watch for beehives, wear insect repellent (if area and season dictate) as needed, be mindful of gopher holes/tunnels, small animal dens, snakes, stray dogs/cats, transient/homeless individuals, poison ivy/oak/sumac, etc. | Assessor |
| 7 | Sign out | • Site Manager and Operator not aware that GHD staff have left facility | • Sign out at front desk<br>• Ask to speak to Site Manager or alternate designate | |
| 8 | Demobilization | • Collision<br>• Injury or death to vehicle occupants or other parties | • Perform perimeter vehicle check<br>• Maintain awareness of pedestrian/vehicular traffic when exiting the site<br>• Utilize defensive driving techniques<br>• Complete post departure checklist and report vehicle problems to company vehicle maintenance manager or rental car agency | Assessor |

1. Each Job or Task consists of a set of steps. Be sure to list all the steps in the sequence that they are performed. Specify the equipment or other details to set the basis for the potential (associated) hazards.
2. A hazard is a potential danger. What can go wrong? How can someone get hurt? Consider, but do not limit, the analysis to: **Contact** - victim is struck by or strikes an object; **Caught** - victim is caught on, caught in or caught between objects; **Fall** - victim falls to ground or lower level (includes slips and trips); **Exertion** - excessive strain or stress/ergonomics/lifting techniques; **Exposure** - inhalation/skin hazards. Specify the hazards and do not limit the description to a single word such as "Caught".
3. Aligning with the Job Steps, Task Activity Description, and Potential Hazard columns, describe what actions or procedures are necessary to eliminate or minimize the hazards. Be clear, concise and specific. Use objective, observable, and quantified terms. Avoid subjective general statements such as "be careful" or "use as appropriate".

**Site Personnel Participating in JSA Review:**

I have participated in the review and discussion of the Job Safety Analysis (JSA) listed on this document and understand the duties I am responsible to fulfill. As part of my work, I know I have the responsibility and obligation to STOP work with a Stop Work Authority (SWA) if conditions change and/or potential hazards have been identified.

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**SSE(s) on job:** _____ **Assigned mentor:** _____

Presenter Signature: _____ Date/Time: _____

My signature below indicates that all conditions and requirements listed above have been verified, met, and reviewed with all affected personnel prior to start of work.

Supervisor Signature: _____ Date/Time: _____

Location of Mustering Point: _____ Wind direction (current): _____

GHD Emergency contact (Name and verified phone number): _____

Supervisor Signature documenting Daily Debrief has been completed: _____

# SAFETY DATA SHEET

Version 8.6
Revision Date 10/15/2023
Print Date 02/24/2024

## SECTION 1: Identification of the substance/mixture and of the company/undertaking

### 1.1 Product identifiers

Product name : Alconox® detergent

Product Number : 242985
Brand : Aldrich

### 1.2 Relevant identified uses of the substance or mixture and uses advised against

Identified uses : Laboratory chemicals, Synthesis of substances

Uses advised against : This product is not intended for consumer use.

### 1.3 Details of the supplier of the safety data sheet

Company : Sigma-Aldrich Inc.
3050 SPRUCE ST
ST. LOUIS MO 63103
UNITED STATES

Telephone : +1 314 771-5765
Fax : +1 800 325-5052

### 1.4 Emergency telephone

Emergency Phone # : 800-424-9300 CHEMTREC (USA) +1-703-527-3887 CHEMTREC (International) 24 Hours/day; 7 Days/week

## SECTION 2: Hazards identification

### 2.1 Classification of the substance or mixture

**GHS Classification in accordance with 29 CFR 1910 (OSHA HCS)**

Skin irritation (Category 2), H315
Serious eye damage (Category 1), H318
Specific target organ toxicity - repeated exposure (Category 2), Respiratory Tract, H373
Short-term (acute) aquatic hazard (Category 3), H402

For the full text of the H-Statements mentioned in this Section, see Section 16.

### 2.2 GHS Label elements, including precautionary statements

Pictogram

Signal Word Danger

Hazard statement(s)

| | |
|---|---|
| H315 | Causes skin irritation. |
| H318 | Causes serious eye damage. |
| H373 | May cause damage to organs (Respiratory Tract) through prolonged or repeated exposure. |
| H402 | Harmful to aquatic life. |

Precautionary statement(s)

| | |
|---|---|
| P260 | Do not breathe dust. |
| P264 | Wash skin thoroughly after handling. |
| P273 | Avoid release to the environment. |
| P280 | Wear protective gloves/ eye protection/ face protection. |
| P302 + P352 | IF ON SKIN: Wash with plenty of soap and water. |
| P305 + P351 + P338 + P310 | IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Immediately call a POISON CENTER/ doctor. |
| P314 | Get medical advice/ attention if you feel unwell. |
| P332 + P313 | If skin irritation occurs: Get medical advice/ attention. |
| P362 | Take off contaminated clothing and wash before reuse. |
| P501 | Dispose of contents/ container to an approved waste disposal plant. |

### 2.3 Hazards not otherwise classified (HNOC) or not covered by GHS - none

## SECTION 3: Composition/information on ingredients

### 3.2 Mixtures

| Component | | Classification | Concentration |
|---|---|---|---|
| **n-alkylbenzenesulfonic acid, sodium salts** | | | |
| CAS-No.<br>EC-No.<br>Registration number | 68411-30-3<br>270-115-0<br>01-2119489428-22-XXXX | Acute Tox. 4; Skin Irrit. 2; Eye Dam. 1; Aquatic Acute 2; Aquatic Chronic 3; H302, H315, H318, H401, H412 | >= 10 - < 20 % |
| **sodium carbonate** | | | |
| CAS-No.<br>EC-No.<br>Index-No.<br>Registration number | 497-19-8<br>207-838-8<br>011-005-00-2<br>01-2119485498-19-XXXX | Eye Irrit. 2A; H319 | >= 10 - < 20 % |
| **tetrasodium diphosphate** | | | |
| CAS-No.<br>EC-No.<br>Registration number | 7722-88-5<br>231-767-1<br>01-2119489794-17-XXXX | Acute Tox. 4; Eye Dam. 1; H302, H318 | >= 10 - < 20 % |
| **Sulfuric acid, mono-C12-14-alkyl esters, sodium salts** | | | |
| CAS-No. | 85586-07-8 | Aquatic Acute 2; Aquatic | >= 1 - < 5 % |

| | | | |
|---|---|---|---|
| EC-No. | 287-809-4 | Chronic 3; H401, H412 | |
| **Ethylenedinitrilotetraacetic acid,Tetrasodiumsalt** | | | |
| CAS-No.<br>EC-No.<br>Index-No.<br>Registration number | 64-02-8<br>200-573-9<br>607-428-00-2<br>01-2119486762-27-XXXX | Acute Tox. 4; Eye Dam. 1; STOT RE 2; H302, H332, H318, H373 | >= 1 - < 5 % |

For the full text of the H-Statements mentioned in this Section, see Section 16.

## SECTION 4: First aid measures

### 4.1 Description of first-aid measures

**General advice**
Show this material safety data sheet to the doctor in attendance.

**If inhaled**
After inhalation: fresh air.

**In case of skin contact**
In case of skin contact: Take off immediately all contaminated clothing. Rinse skin with water/ shower.

**In case of eye contact**
After eye contact: rinse out with plenty of water. Immediately call in ophthalmologist. Remove contact lenses.

**If swallowed**
After swallowing: immediately make victim drink water (two glasses at most). Consult a physician.

### 4.2 Most important symptoms and effects, both acute and delayed
The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11

### 4.3 Indication of any immediate medical attention and special treatment needed
No data available

## SECTION 5: Firefighting measures

### 5.1 Extinguishing media

**Suitable extinguishing media**
Water Foam Carbon dioxide (CO2) Dry powder

**Unsuitable extinguishing media**
For this substance/mixture no limitations of extinguishing agents are given.

### 5.2 Special hazards arising from the substance or mixture

Carbon oxides
Nitrogen oxides (NOx)
Oxides of phosphorus
Sodium oxides
Combustible.
Development of hazardous combustion gases or vapours possible in the event of fire.

### 5.3 Advice for firefighters

Stay in danger area only with self-contained breathing apparatus. Prevent skin contact by keeping a safe distance or by wearing suitable protective clothing.

### 5.4 Further information

Suppress (knock down) gases/vapors/mists with a water spray jet. Prevent fire extinguishing water from contaminating surface water or the ground water system.

## SECTION 6: Accidental release measures

### 6.1 Personal precautions, protective equipment and emergency procedures

Advice for non-emergency personnel: Avoid inhalation of dusts. Avoid substance contact. Ensure adequate ventilation. Evacuate the danger area, observe emergency procedures, consult an expert.
For personal protection see section 8.

### 6.2 Environmental precautions

Do not let product enter drains.

### 6.3 Methods and materials for containment and cleaning up

Cover drains. Collect, bind, and pump off spills. Observe possible material restrictions (see sections 7 and 10). Take up dry. Dispose of properly. Clean up affected area. Avoid generation of dusts.

### 6.4 Reference to other sections

For disposal see section 13.

## SECTION 7: Handling and storage

### 7.1 Precautions for safe handling

For precautions see section 2.2.

### 7.2 Conditions for safe storage, including any incompatibilities

**Storage conditions**
Tightly closed. Dry.

**Storage class**
Storage class (TRGS 510): 11: Combustible Solids

### 7.3 Specific end use(s)

Apart from the uses mentioned in section 1.2 no other specific uses are stipulated

## SECTION 8: Exposure controls/personal protection

### 8.1 Control parameters

**Ingredients with workplace control parameters**

| Component | CAS-No. | Value | Control parameters | Basis |
|---|---|---|---|---|
| tetrasodium diphosphate | 7722-88-5 | TWA | 5 mg/m3 | USA. NIOSH Recommended Exposure Limits |
| | | PEL | 5 mg/m3 | California permissible exposure limits for chemical contaminants (Title 8, Article 107) |

### 8.2 Exposure controls

**Appropriate engineering controls**
Immediately change contaminated clothing. Apply preventive skin protection. Wash hands and face after working with substance.

**Personal protective equipment**

**Eye/face protection**
Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU). Tightly fitting safety goggles

**Skin protection**
Handle with gloves. Gloves must be inspected prior to use. Use proper glove removal technique (without touching glove's outer surface) to avoid skin contact with this product. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices. Wash and dry hands.

Full contact
Material: Nitrile rubber
Minimum layer thickness: 0.11 mm
Break through time: 480 min
Material tested:Dermatril® (KCL 740 / Aldrich Z677272, Size M)

Splash contact
Material: Nitrile rubber
Minimum layer thickness: 0.11 mm
Break through time: 480 min
Material tested:Dermatril® (KCL 740 / Aldrich Z677272, Size M)

data source: KCL GmbH, D-36124 Eichenzell, phone +49 (0)6659 87300, e-mail sales@kcl.de, test method: EN374
If used in solution, or mixed with other substances, and under conditions which differ from EN 374, contact the supplier of the EC approved gloves. This recommendation is advisory only and must be evaluated by an industrial hygienist and safety officer familiar with the specific situation of anticipated use by our customers. It should not be construed as offering an approval for any specific use scenario.

**Body Protection**
protective clothing

**Respiratory protection**
Recommended Filter type: Filter type P2
The entrepeneur has to ensure that maintenance, cleaning and testing of respiratory protective devices are carried out according to the instructions of the producer. These measures have to be properly documented.
required when dusts are generated.
Our recommendations on filtering respiratory protection are based on the following standards: DIN EN 143, DIN 14387 and other accompanying standards relating to the used respiratory protection system.

**Control of environmental exposure**
Do not let product enter drains.

## SECTION 9: Physical and chemical properties

### 9.1 Information on basic physical and chemical properties

| | | |
|---|---|---|
| a) | Appearance | Form: granular, powder<br>Color: white |
| b) | Odor | odorless |
| c) | Odor Threshold | No data available |
| d) | pH | 9.5 at 10 g/l |
| e) | Melting point/freezing point | No data available |
| f) | Initial boiling point and boiling range | No data available |
| g) | Flash point | ()No data available |
| h) | Evaporation rate | No data available |
| i) | Flammability (solid, gas) | No data available |
| j) | Upper/lower flammability or explosive limits | No data available |
| k) | Vapor pressure | No data available |
| l) | Vapor density | No data available |
| m) | Density | No data available |
| | Relative density | No data available |
| n) | Water solubility | soluble |
| o) | Partition coefficient: n-octanol/water | No data available |
| p) | Autoignition temperature | No data available |
| q) | Decomposition temperature | No data available |

| | | |
|---|---|---|
| r) | Viscosity | No data available |
| s) | Explosive properties | Not classified as explosive. |
| t) | Oxidizing properties | none |

**9.2 Other safety information**
No data available

## SECTION 10: Stability and reactivity

**10.1 Reactivity**
The following applies in general to flammable organic substances and mixtures: in correspondingly fine distribution, when whirled up a dust explosion potential may generally be assumed.

**10.2 Chemical stability**
The product is chemically stable under standard ambient conditions (room temperature) .

**10.3 Possibility of hazardous reactions**
No data available

**10.4 Conditions to avoid**
no information available

**10.5 Incompatible materials**
No data available

**10.6 Hazardous decomposition products**
In the event of fire: see section 5

## SECTION 11: Toxicological information

**11.1 Information on toxicological effects**

**Mixture**

**Acute toxicity**
Oral: No data available
Acute toxicity estimate Oral - 2,173 mg/kg
(Calculation method)
Symptoms: Irritations of mucous membranes in the mouth, pharynx, oesophagus and gastrointestinal tract.
Acute toxicity estimate Inhalation - 4 h - 150 mg/l - dust/mist(Calculation method)

Symptoms: Possible symptoms:, mucosal irritations
Dermal: No data available

Acute toxicity estimate Dermal - > 5,000 mg/kg
(Calculation method)

**Skin corrosion/irritation**
Remarks: Mixture causes skin irritation.

**Serious eye damage/eye irritation**
Remarks: Mixture causes serious eye damage.

**Respiratory or skin sensitization**
No data available

**Germ cell mutagenicity**
No data available

**Carcinogenicity**

IARC: No ingredient of this product present at levels greater than or equal to 0.1% is identified as probable, possible or confirmed human carcinogen by IARC.

NTP: No ingredient of this product present at levels greater than or equal to 0.1% is identified as a known or anticipated carcinogen by NTP.

OSHA: No component of this product present at levels greater than or equal to 0.1% is on OSHA's list of regulated carcinogens.

**Reproductive toxicity**
No data available

**Specific target organ toxicity - single exposure**
No data available

**Specific target organ toxicity - repeated exposure**
Mixture may cause damage to organs through prolonged or repeated exposure.
- Respiratory Tract

**Aspiration hazard**
No data available

## 11.2 Additional Information

To the best of our knowledge, the chemical, physical, and toxicological properties have not been thoroughly investigated.
Other dangerous properties can not be excluded.

Handle in accordance with good industrial hygiene and safety practice.

**Components**

**n-alkylbenzenesulfonic acid, sodium salts**

**Acute toxicity**
LD50 Oral - Rat - male and female - 1,080 mg/kg
(OECD Test Guideline 401)
Inhalation: No data available
LD50 Dermal - Rat - male and female - > 2,000 mg/kg
(OECD Test Guideline 402)

**Skin corrosion/irritation**
Skin - Rabbit
Result: irritating - 4 h
(OECD Test Guideline 404)

**Serious eye damage/eye irritation**
Eyes - Rabbit
Result: Irreversible effects on the eye - 72 h

(OECD Test Guideline 405)

**Respiratory or skin sensitization**
Maximization Test - Guinea pig
Result: Does not cause skin sensitization.
(OECD Test Guideline 406)

**Germ cell mutagenicity**
Test Type: In vitro mammalian cell gene mutation test
Result: negative
Test Type: Ames test
Test system: Salmonella typhimurium
Result: negative
Test Type: Mutagenicity (mammal cell test): chromosome aberration.
Result: Positive results were obtained in some in vitro tests.
Species: Mouse - male - Bone marrow
Result: negative
Remarks: (ECHA)

**Carcinogenicity**
No data available

**Reproductive toxicity**
No data available

**Specific target organ toxicity - single exposure**
No data available

**Specific target organ toxicity - repeated exposure**

**Aspiration hazard**
No data available

**sodium carbonate**

**Acute toxicity**
LD50 Oral - Rat - male and female - 2,800 mg/kg
Remarks: (ECHA)
Inhalation: No data available
LD50 Dermal - Rabbit - > 2,000 mg/kg
(US-EPA)

**Skin corrosion/irritation**
Skin - Rabbit
Result: No skin irritation - 4 h
(OECD Test Guideline 404)

**Serious eye damage/eye irritation**
Eyes - Rabbit
Result: Eye irritation
(US-EPA)

**Respiratory or skin sensitization**
No data available

**Germ cell mutagenicity**
No data available

**Carcinogenicity**
No data available

**Reproductive toxicity**
No data available

**Specific target organ toxicity - single exposure**
No data available

**Specific target organ toxicity - repeated exposure**
No data available

**Aspiration hazard**
No data available

**tetrasodium diphosphate**

**Acute toxicity**
LD50 Oral - Rat - female - > 300 - < 2,000 mg/kg
(OECD Test Guideline 420)
LC50 Inhalation - Rat - male and female - 4 h - > 0.58 mg/l - dust/mist
(OECD Test Guideline 403)
Remarks: (highest concentration to be prepared)
The value is given in analogy to the following substances: Disodium pyrophosphate
LD50 Dermal - Rabbit - male and female - > 2,000 mg/kg
(US-EPA)

**Skin corrosion/irritation**
Skin - Rabbit
Result: No skin irritation - 4 h
(OECD Test Guideline 404)

**Serious eye damage/eye irritation**
Eyes - Rabbit
Result: Irreversible effects on the eye - 4 h
(OECD Test Guideline 405)

**Respiratory or skin sensitization**
Local lymph node assay (LLNA) - Mouse
Result: negative
(OECD Test Guideline 429)
Remarks: The value is given in analogy to the following substances: Disodium pyrophosphate

**Germ cell mutagenicity**
Test Type: gene mutation test
Test system: Mouse lymphoma test
Result: negative
Test Type: Micronucleus test
Test system: lymphocyte
Result: negative

**Carcinogenicity**
No data available

**Reproductive toxicity**
No data available

**Specific target organ toxicity - single exposure**
No data available

**Specific target organ toxicity - repeated exposure**

**Aspiration hazard**
No data available

## Sulfuric acid, mono-C12-14-alkyl esters, sodium salts

**Acute toxicity**
LD50 Oral - Rat - female - > 2,000 mg/kg
(OECD Test Guideline 420)
Inhalation: No data available
LD50 Dermal - Rat - > 2,000 mg/kg
(OECD Test Guideline 402)

**Skin corrosion/irritation**
Remarks: No data available

**Serious eye damage/eye irritation**
Remarks: No data available

**Respiratory or skin sensitization**
- Rabbit
Does not cause skin sensitization.
(OECD Test Guideline 406)

**Germ cell mutagenicity**
Test Type: Ames test
Test system: S. typhimurium
Result: negative

**Carcinogenicity**
No data available

**Reproductive toxicity**
No data available

**Specific target organ toxicity - single exposure**
No data available

**Specific target organ toxicity - repeated exposure**

**Aspiration hazard**
No data available

## Ethylenedinitrilotetraacetic acid,Tetrasodiumsalt

**Acute toxicity**
LD50 Oral - Rat - female - 1,780 mg/kg
Remarks: (ECHA)
Inhalation: No data available
Dermal: No data available
No data available

**Skin corrosion/irritation**
Skin - Rabbit
Result: No skin irritation - 4 h
(OECD Test Guideline 404)

**Serious eye damage/eye irritation**
Eyes - Rabbit
Result: Risk of serious damage to eyes.
(OECD Test Guideline 405)
Remarks: (Regulation (EC) No 1272/2008, Annex VI)

**Respiratory or skin sensitization**
Maximization Test - Guinea pig
Result: negative
(OECD Test Guideline 406)
Remarks: The value is given in analogy to the following substances:
Ethylenedinitrilotetraacetic acid disodium salt

**Germ cell mutagenicity**
Test Type: Ames test
Test system: Escherichia coli/Salmonella typhimurium
Result: negative
Remarks: (in analogy to similar products)
Test Type: In vitro mammalian cell gene mutation test
Test system: mouse lymphoma cells
Result: negative
Remarks: (in analogy to similar products)
(ECHA)
Test Type: Chromosome aberration test in vitro
Test system: Chinese hamster ovary cells
Result: negative
Remarks: (in analogy to similar products)
(ECHA)
Method: OECD Test Guideline 474
Species: Mouse - male - Bone marrow
Result: negative
Remarks: (in analogy to similar products)
The value is given in analogy to the following substances: Ethylenedinitrilotetraacetic acid disodium salt

**Carcinogenicity**
No data available

**Reproductive toxicity**
No data available

**Specific target organ toxicity - single exposure**
No data available

**Specific target organ toxicity - repeated exposure**
May cause damage to organs through prolonged or repeated exposure.
- Respiratory Tract

**Aspiration hazard**
No data available

## SECTION 12: Ecological information

### 12.1 Toxicity

**Mixture**
No data available

### 12.2 Persistence and degradability
No data available

### 12.3 Bioaccumulative potential
No data available

### 12.4 Mobility in soil
No data available

### 12.5 Results of PBT and vPvB assessment
PBT/vPvB assessment not available as chemical safety assessment not required/not conducted

### 12.6 Endocrine disrupting properties
No data available

### 12.7 Other adverse effects
No data available

**Components**

**n-alkylbenzenesulfonic acid, sodium salts**

| | |
|---|---|
| Toxicity to fish | static test LC50 - Lepomis macrochirus (Bluegill sunfish) - 1.67 mg/l - 96 h<br>(US-EPA) |
| Toxicity to daphnia and other aquatic invertebrates | static test EC50 - Daphnia magna (Water flea) - 2.9 mg/l - 48 h<br>(OECD Test Guideline 202) |
| Toxicity to algae | static test ErC50 - Pseudokirchneriella subcapitata (green algae) - 235 mg/l - 72 h<br>Remarks: (ECHA) |
| Toxicity to fish(Chronic toxicity) | flow-through test NOEC - Oncorhynchus tshawytscha (chinook salmon) - 0.23 mg/l - 72 d<br>(OECD Test Guideline 210) |
| Toxicity to daphnia and other aquatic invertebrates(Chronic toxicity) | flow-through test NOEC - Daphnia magna (Water flea) - 1.18 mg/l - 21 d<br>(OECD Test Guideline 211) |

**sodium carbonate**

| | |
|---|---|
| Toxicity to fish | static test LC50 - Lepomis macrochirus (Bluegill sunfish) - 300 mg/l - 96 h<br>Remarks: (ECHA) |
| Toxicity to daphnia and other aquatic | semi-static test EC50 - Ceriodaphnia (water flea) - 220 - 227 mg/l - 48 h |

| | |
|---|---|
| invertebrates | Remarks: (ECHA) |

**tetrasodium diphosphate**

| | |
|---|---|
| Toxicity to fish | semi-static test LC50 - Oncorhynchus mykiss (rainbow trout) - > 100 mg/l - 96 h<br>(OECD Test Guideline 203) |
| Toxicity to daphnia and other aquatic invertebrates | static test EC50 - Daphnia magna (Water flea) - > 100 mg/l - 48 h<br>(US-EPA) |
| Toxicity to algae | static test ErC50 - Desmodesmus subspicatus (green algae) - > 100 mg/l - 72 h<br>(OECD Test Guideline 201) |
| | static test NOEC - Desmodesmus subspicatus (green algae) - > 100 mg/l - 72 h<br>(OECD Test Guideline 201) |
| Toxicity to bacteria | static test EC50 - activated sludge - > 1,000 mg/l - 3 h<br>(OECD Test Guideline 209)<br>Remarks: The value is given in analogy to the following substances: dipotassium hydrogen phosphate |

**Sulfuric acid, mono-C12-14-alkyl esters, sodium salts**

| | |
|---|---|
| Toxicity to daphnia and other aquatic invertebrates | static test EC50 - Daphnia magna (Water flea) - 2.9 mg/l - 48 h<br>(OECD Test Guideline 202) |
| Toxicity to algae | EC50 - Pseudokirchneriella subcapitata (green algae) - 29 mg/l - 96 h<br>(US-EPA) |
| Toxicity to bacteria | static test EC50 - activated sludge - 220 mg/l - 3 h<br>(OECD Test Guideline 209) |
| Toxicity to fish(Chronic toxicity) | NOEC - Pimephales promelas (fathead minnow) - 0.96 mg/l - 196 d |
| Toxicity to daphnia and other aquatic invertebrates(Chronic toxicity) | flow-through test LC50 - Daphnia magna (Water flea) - 1.67 mg/l - 21 d<br>(OECD Test Guideline 211) |

**Ethylenedinitrilotetraacetic acid,Tetrasodiumsalt**

| | |
|---|---|
| Toxicity to fish | static test LC50 - Oncorhynchus mykiss (rainbow trout) - > 100 mg/l - 96 h<br>(OECD Test Guideline 203) |
| Toxicity to daphnia and other aquatic invertebrates | static test EC50 - Daphnia magna (Water flea) - > 114 mg/l - 48 h<br>(OECD Test Guideline 202) |

| | |
|---|---|
| Toxicity to bacteria | static test EC10 - activated sludge - > 500 mg/l - 30 min<br>(OECD Test Guideline 209)<br>Remarks: (in analogy to similar products)<br>The value is given in analogy to the following substances: Ethylenedinitrilotetraacetic acid disodium saltThe value is given in analogy to the following substances: Sodium feredetate |
| Toxicity to fish(Chronic toxicity) | flow-through test NOEC - Danio rerio (zebra fish) - >= 35.1 mg/l - 35 d<br>(OECD Test Guideline 210)<br>Remarks: The value is given in analogy to the following substances: Sodium calcium edetate hydrate |
| Toxicity to daphnia and other aquatic invertebrates(Chronic toxicity) | semi-static test NOEC - Daphnia magna (Water flea) - 25 mg/l - 21 d<br>Remarks: The value is given in analogy to the following substances: Ethylenedinitrilotetraacetic acid disodium salt |

## SECTION 13: Disposal considerations

### 13.1 Waste treatment methods

**Product**
Waste material must be disposed of in accordance with the national and local regulations. Leave chemicals in original containers. No mixing with other waste. Handle uncleaned containers like the product itself.

## SECTION 14: Transport information

**DOT (US)**
Not dangerous goods

**IMDG**
Not dangerous goods

**IATA**
Not dangerous goods

**Further information**
Not classified as dangerous in the meaning of transport regulations.

## SECTION 15: Regulatory information

### SARA 302 Components
This material does not contain any components with a section 302 EHS TPQ.

### SARA 313 Components
This material does not contain any chemical components with known CAS numbers that exceed the threshold (De Minimis) reporting levels established by SARA Title III, Section 313.

### SARA 311/312 Hazards
Acute Health Hazard

### Massachusetts Right To Know Components

| | CAS-No. | Revision Date |
|---|---|---|
| pentasodium triphosphate | 7758-29-4 | 1993-04-24 |
| tetrasodium diphosphate | 7722-88-5 | 1993-02-16 |

### Pennsylvania Right To Know Components

| | CAS-No. | Revision Date |
|---|---|---|
| pentasodium triphosphate | 7758-29-4 | 1993-04-24 |
| tetrasodium diphosphate | 7722-88-5 | 1993-02-16 |

## SECTION 16: Other information

### Further information
The above information is believed to be correct but does not purport to be all inclusive and shall be used only as a guide. The information in this document is based on the present state of our knowledge and is applicable to the product with regard to appropriate safety precautions. It does not represent any guarantee of the properties of the product. Sigma-Aldrich Corporation and its Affiliates shall not be held liable for any damage resulting from handling or from contact with the above product. See www.sigma-aldrich.com and/or the reverse side of invoice or packing slip for additional terms and conditions of sale.



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Version: 8.6 Revision Date: 10/15/2023 Print Date: 02/24/2024

# Records of Training

Date: _____ Project Name:_____Project Number: _____

Project Location: _____

Project Description _____

The Project Manager is ultimately responsible for the accuracy of the information on this Record of Training and ensuring GHD Employees and Subcontractors are familiar with the site and have the required training to do the task

| Employee's Name: | Confined Space Entry | Excavation Safety | Fall Protection | GHS (HazCom/WHMIS) | Lock Out Tag Out (LOTO) | Motor Vehicle Safety | Aerial Lift | Other - | Other - | Other - | Other - |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ |
| | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ |
| | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ |
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| | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ |
| | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ |
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