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FINAL TECHNICAL MEMORANDUM SITE 21 REMEDIAL ACTION OPERATION PHASE VAPOR INTRUSION MONITORING EVENT 1 ST JULIENS CREEK ANNEX VA

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CH2MHILL

Final Technical Memorandum

Site 21 Remedial Action-Operation Phase Vapor Intrusion Monitoring Event 1

St. Juliens Creek Annex
Chesapeake, Virginia

NAVFAC
Naval Facilities Engineering Command

Prepared for

Department of the Navy

Naval Facilities Engineering Command Mid-Atlantic

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Prepared by

CH2MHILL

Site 21 Remedial Action-Operation Phase Vapor Intrusion Monitoring Event 1, St. Juliens Creek Annex, Chesapeake, Virginia

PREPARED FOR: St. Juliens Creek Annex Tier I Partnering Team

PREPARED BY: CH2M HILL

DATE: December 2012

1 Introduction

This technical memorandum presents the field activities, analytical results, and data evaluation of the first vapor intrusion monitoring event conducted during the remedial action-operation (RA-O) phase at Site 21, Industrial Area, located at St. Juliens Creek Annex (SJCA) in Chesapeake, Virginia. This technical memorandum was prepared under Naval Facilities Engineering Command (NAVFAC) Mid-Atlantic, Comprehensive Long-term Environmental Action—Navy 1000, Contract Task Order WE47, for submittal to the SJCA Tier I Partnering Team, consisting of representatives from NAVFAC Mid-Atlantic, United States Environmental Protection Agency (USEPA) Region III, and the Virginia Department of Environmental Quality.

2 Objectives

The overall objective of the vapor intrusion monitoring is to determine if changes in site conditions at Site 21 resulting from the ongoing groundwater remedial action (RA) or changes in building characteristics have created the potential for inhalation risks to exceed regulatory targets within the occupied buildings or explosive hazards beneath and/or within the occupied or unoccupied buildings. In order to achieve this objective, the SJCA Tier I Partnering Team developed an approach for conducting vapor intrusion monitoring during the Site 21 RA-O phase and evaluating the results. This approach is documented in the Site 21 Vapor Intrusion Monitoring Uniform Federal Policy (UFP)-Sampling and Analysis Plan (SAP) (CH2M HILL, 2011).

3 Site Description and Background

3.1 St. Juliens Creek Annex

SJCA is approximately 490 acres at the confluence of St. Juliens Creek and the Southern Branch of the Elizabeth River in the City of Chesapeake in southeastern Virginia (**Figure 3-1**). SJCA was one of the largest ammunition depots in the United States involving wartime transfer of ammunitions to various other naval facilities. Non-ordnance operations at SJCA included degreasing operations; paint, machine, vehicle and locomotive maintenance; pest control; battery, print, and electrical shops; boiler plant, wash rack, and fire-fighter training operations; and storage of oil and chemicals

3.2 Site 21

Site 21 is located in a former industrial area in the south-central portion of SJCA (**Figure 3-1**)**. Figure 3-2** presents the current conceptual site model (CSM). The site vicinity, including the boundary, existing and demolished buildings, and other site features, are shown on **Figure 3-3**. Although the site was initially identified as Building 187 the Site 21 boundary was expanded, based on investigation data, to encompass the shallow groundwater chlorinated volatile organic compound (CVOC) plume that underlies a number of nearby industrial buildings. Buildings at Site 21 were historically used as machine, vehicle, and locomotive maintenance shops; electrical shops; and munitions loading facilities. Outdoor areas were used for equipment and chemical storage. Several of these buildings and/or their surrounding areas were designated as former Installation Restoration (IR) sites (Sites 9, 10, 11, 12, 13, 14, 18, and Area of Concern E). Additionally, a fuel service station was previously

located just south of Building 187. Two abandoned underground storage tanks (USTs) at the former service station had a history of leakage. Following removal of the USTs and remediation of the associated groundwater in the vicinity of the USTs, the UST site was closed under the state UST program (CH2M HILL, 2008).

The existing buildings and the Site 21 area are currently used for storage and maintenance activities. Building 1556 was constructed in 1992 and is currently used as the warehouse for Fleet and Industrial Supply Center, Norfolk Integrated Logistics Support. Many of the older buildings at the site have been demolished. A storm sewer system runs through the site and drains to a downstream inlet (IR Site 2) to St. Juliens Creek (**Figure 3-3**).

Shallow soils beneath Site 21 are generally fine- to coarse-grained sands, silty sands, or clayey sands of the shallow Columbia aquifer. The Columbia aquifer extends to a depth of 14 to 20 feet (ft) below ground surface and is underlain by the Yorktown confining unit. The Yorktown confining unit consists predominantly of relatively impermeable silt and clay layers interbedded with quartz sands. The Yorktown confining unit is approximately 17 ft thick beneath the site. Shallow aquifer groundwater is generally encountered from 2 to 7 ft below ground surface and flows to the southwest in the eastern portion of the site and to the southeast in the western portion of the site, towards the storm sewer system east of Building 1556.

3.2.1 Summary of Previous Site 21 Environmental Activities

Several investigations, including a Remedial Investigation (RI) have been conducted for Site 21 in order to characterize the nature and extent of contamination at the site. An approximately 8-acre CVOC plume in shallow aquifer (Columbia aquifer) groundwater was delineated during the RI (**Figure 3-4**). The baseline Human Health Risk Assessment (HHRA) conducted during the RI identified trichloroethene (TCE), cis-1,2-dichloroethene (DCE), vinyl chloride (VC), and 1,1-DCE as constituents of concern (COCs) for potable use of the Site 21 shallow aquifer groundwater (CH2M HILL, 2008). Additionally, the HHRA identified potential risks above regulatory targets from vapor intrusion using the Johnson and Ettinger Model (1991) to estimate concentrations of volatile organic compounds (VOCs) in indoor air based on the concentrations of VOCs in groundwater. However, a site-specific vapor intrusion investigation was recommended to further assess the potential current and future risks associated with potential vapor intrusion based on concerns (e.g., shallow depth-to-groundwater) with the validity of the vapor intrusion modeling performed as part of the HHRA.

An interim remedy was selected to address estimated risks above regulatory targets from potable use of Site 21 shallow aquifer groundwater while the potential vapor intrusion pathway for current and future building occupants was further evaluated (NAFVAC, 2011). In situ chemical reduction and enhanced reductive dechlorination (ERD) was selected as the interim remedy. The RA includes groundwater monitoring to evaluate remedy effectiveness.

A vapor intrusion investigation, including collection and analysis of subslab vapor, indoor air, and outdoor air samples, was conducted in 2009 to evaluate the potential for the migration of the CVOCs from shallow aquifer groundwater to indoor air in overlying occupied buildings and to assess potential current and future risk to building occupants from potential vapor intrusion. The investigation was documented in an RI and Feasibility Study (FS) Addendum (CH2M HILL, 2010). Significant vapor intrusion was not occurring, as indoor air and subslab vapor constituent of interest (COI) concentrations were below regulatory targets for current or future industrial workers or potential future residents as documented in the RI and FS Addendum (CH2M HILL, 2010). However, additional vapor intrusion monitoring and land use controls (LUCs) were recommended as a conservative measure until the RA for shallow aquifer groundwater is complete.

The interim RA was initiated in November 2010 and is currently in the RA-O phase. RA-O phase groundwater monitoring is currently being conducted on a semi-annual basis; however, the frequency may be adjusted as the RA progresses. The interim RA will not change and will serve as the final remedy for the site since significant vapor intrusion is not occurring, as documented in the RI and FS Addendum. The Record of Decision documenting the final selected remedy for the site was signed in October 2011 (NAVFAC, 2011). The LUCs have been implemented to prohibit a change from current industrial building use to residential, child care, or elementary or secondary school use; prohibit construction of new buildings; and prohibit activities that would compromise the integrity of

the building envelopes without further evaluation and/or implementation of mitigation measures. The initial LUC boundaries, based on the RI data, are shown on **Figure 3-5**.

3.2.2 Vapor Intrusion Monitoring Approach

Due to the potential for concentrations of TCE dechlorination daughter products and methane and hydrogen sulfide gases to temporarily increase during groundwater treatment at Site 21, the SJCA Partnering Team developed an approach for conducting vapor intrusion monitoring for the buildings included in the building LUC boundary after each RA-O phase groundwater monitoring event (currently conducted semi-annually) until the RA for shallow aquifer groundwater is completed. Increases in TCE dechlorination daughter products are expected throughout the life of the RA. Likewise, the generation of methane and hydrogen sulfide may increase after the injections of biological substrate and may persist throughout the life of the RA; however, the highest concentrations of methane and hydrogen sulfide are expected to be generated within 18 months after ERD injection and then taper off. It should be noted that hydrogen sulfide generation is expected to be attenuated with iron and it is likely that hydrogen sulfide detections could be limited or not even detected. There could be the potential for concentrations of vapor intrusion COIs (TCE, TCE dechlorination daughter products, and hydrogen sulfide) to increase, volatilize from the shallow groundwater CVOC plume, migrate through the vadose zone beneath the building, and trigger a re-evaluation of the vapor intrusion pathway. Increased concentrations of explosive hazard COIs (methane and hydrogen sulfide) may result in an explosive hazard if concentrations accumulate in the subslab or enter the buildings above target levels. Because a LUC prohibiting a change in the use of site buildings from industrial to residential, child care, or elementary or secondary school use, unoccupied buildings located within the building LUC boundary (Buildings 54, 63, 68, and 81) are not monitored at this time for inhalation risks resulting from vapor intrusion. However, due to the acute nature of the potential explosive hazard, the unoccupied buildings are included in the explosive hazard monitoring.

The environmental questions to be answered during the vapor intrusion monitoring are:

- Have changes in site conditions resulting from the groundwater RA or changes in building characteristics resulted in a basis to re-evaluate the potential inhalation risks from vapor intrusion into the occupied buildings?
  - Are inhalation risk COIs present in indoor air at concentrations that exceed project action limits (PALs)?
  - If inhalation risk COIs are present in the indoor air at concentrations that exceed PALs, are those concentrations the result of vapor intrusion?
- Have changes in site conditions resulting from the groundwater RA resulted in explosive hazards at the site buildings?
  - Are explosive hazard COIs present in the subslab vapor of the occupied buildings or the indoor air of the unoccupied buildings at concentrations that exceed their respective PALs?
    - If explosive hazard COIs are present in the subslab vapor of the occupied buildings at concentrations that exceed the subslab vapor PALs, are explosive hazard COIs present in the indoor air of the occupied buildings at concentrations that exceed the indoor air PALs?
  - If explosive hazard COIs are present in the indoor air at concentrations that exceed PALs, are those concentrations the result of vapor intrusion?

The decision trees presenting the approach for conducting the vapor intrusion monitoring and evaluating inhalation risks and explosive hazards are presented in **Figures 3-6** and **3-7**, respectively. In order to determine if site conditions resulting from the groundwater RA or changes in building conditions have resulted in a basis to re-evaluate the potential inhalation risks from vapor intrusion into the occupied buildings or explosive hazards at the site buildings, vapor intrusion monitoring is being conducted following each RA-O phase groundwater monitoring event. The amount of data collected during each vapor intrusion monitoring event will depend upon the results of the RA groundwater data and the decision trees (**Figures 3-6** and **3-7**). At a minimum, each vapor intrusion

monitoring event will consist of refinement of the building surveys to identify potential new vapor intrusion pathways, changes in building use, and if COI sources are present in buildings.

4 Investigation Activities

Prior to conducting the first RA-O phase vapor intrusion monitoring event, in April 2011 an additional subslab vapor probe was installed in Building 47 and baseline explosive hazard COIs measurements were collected before ERD injections were initiated at the site. These additional activities are documented in this technical memorandum. The first RA-O phase vapor intrusion monitoring event was conducted in two phases between January and February 2012. Phase 1 activities consisted of completion of building surveys and measurement of explosive hazard COIs. Phase 2 activities consisted of collection of indoor air samples. The field activities were conducted in accordance with the SAP (CH2M HILL, 2011). Copies of the field notes are provided in **Attachment A**. Representative photographs are provided in **Attachment B**.

4.1 Subslab Vapor Probe Installation

One subslab vapor probe (SV10) was installed in Building 47 at the location proposed in the SAP (**Figure 4-1**). Prior to installation of the probe, a utility clearance of the location was performed. Ground-penetrating radar was employed to identify, mark, and differentiate between any underground utilities, conduit, rebar, post-tension cables, wire mesh, and other non-conductive targets within 2 by 2 feet around and 2 feet below the proposed subslab vapor probe drill points in the concrete slab. The utility clearance activities were overseen by a member of the field team.

The subslab vapor probe was constructed of a stainless steel Swagelok gas tight fitting (a length of one-quarter-inch stainless steel tubing, a probe union, a sampling union, and a probe cap). The probe was installed by drilling through the building foundation with a rotary hammer drill and securing the probe in place by emplacing Portland cement into the hole so that the probe was flush with the foundation. The end of the probe was installed within 2 inches of the bottom of the foundation. The cement was allowed to dry for 24 hours, after which time a helium leak check was performed to ensure the probe was installed correctly. The leak check did not detect helium, indicating the seal around the probe was sufficient to prevent leakage between subslab and ambient air. The subslab vapor probe installation information is provided in **Table 4-1**.

4.2 Groundwater Data Review

The results of the first RA-O phase groundwater monitoring event conducted in December 2011 (Shaw, 2012) were evaluated to determine if the concentrations of the COIs in groundwater had increased by a factor of 3 since the baseline RA groundwater monitoring event. The evaluation indicated that concentrations of VC in the groundwater at several monitoring wells had increased from the baseline concentrations by a factor of three or more. Therefore, it was determined that indoor air samples should be collected in the occupied buildings following the building surveys.

4.3 Building Surveys

Building surveys were conducted for the occupied and unoccupied buildings located within the building LUC boundary, approximately two weeks prior to collection of the indoor air samples. The building surveys were conducted in accordance with the CH2M HILL field standard operating procedure, Conducting Building Surveys for Vapor Intrusion Evaluation (CH2M HILL, 2011). Building characteristics and conditions pertinent to vapor intrusion were documented in the building surveys. Such items included building use and occupancy, building dimensions, floor/foundation type and condition, typical operation of the heating, ventilation, and air conditioning system, and the presence of preferential pathways or chemicals.

4.4 Explosive Hazard COIs Measurement

The subslab vapor and indoor air of the occupied buildings were measured for the explosive hazard COIs, methane and hydrogen sulfide, prior to initial implementation of ERD to serve as a baseline[1]. The subslab vapor measurements were collected from every subslab vapor probe installed in the buildings. The indoor air measurements were co-located with the subslab vapor probes, and an additional indoor air measurement was collected from the location identified in the SAP (IA09).

During Phase 1 of the first RA-O phase vapor intrusion monitoring, the subslab vapor of the occupied buildings and the indoor air of the unoccupied buildings were measured for the explosive hazard COIs. The subslab vapor measurements were collected from the same locations that were measured during the baseline event. The indoor air measurements were collected from the number of locations identified in the SAP: two locations in Building 54 and three locations in Buildings 63, 68, and 81. The measurement locations are shown on **Figure 4-1**.

The explosive hazard COIs, methane and hydrogen sulfide, were measured using a real-time analyzing instrument, a GEM 2000Plus. Three readings were collected from each indoor air location and the most conservative was recorded. The subslab vapor probes were leak tested prior to measuring the subslab vapor. At each probe, Teflon-coated tubing was attached to the probe and the subslab vapor was purged into a 1-L tedlar bag, which was connected to a GEM 2000Plus via Teflon-coated tubing. Prior to recording measurements, one tube connection volume was purged and the most conservative reading for each constituent was recorded following the initial 30 seconds of purging.

4.5 Indoor Air Sampling

Indoor air samples were collected from six locations in Building 1556 and four locations in Building 47, as proposed in the SAP (**Figure 4-1**).

The indoor air samples for all inhalation COIs except for hydrogen sulfide were collected over an approximately 24-hour period in 6-L SUMMA canisters equipped with flow controllers. The SUMMA canisters were placed 2 to 5 feet above the ground surface to capture the breathing zone. The SUMMA canisters were placed at the sampling location, turned on, and checked after 20 hours to ensure that the canister pressure did not reach zero before the 24-hour timeframe. The indoor air sampling information is provided in **Table 4-2** and the indoor air field data sheets are provided in **Attachment A**. Quality control (QC) samples were collected in accordance with Worksheet #12-2 of the UFP-SAP (CH2M HILL, 2011) (one duplicate indoor air sample was collected).

The indoor air samples for hydrogen sulfide were collected over an approximately 5-minute period in 1-L tedlar bags. A vacuum pump with Teflon-coated tubing was used to collect indoor air into the tedlar bags. The pump was equipped with flow controllers set to collect samples at a desired flow rate of 200 ml/min over a period of 5 minutes. The samples were collected at breathing level (2 to 5 ft above the slab or ground surface) to reflect the type of air present at breathing level.

The indoor air samples were shipped under standard chain-of-custody procedures to Environmental Conservation Laboratories for VOC analysis by Method TO-15. The indoor air samples were analyzed for the list of COIs identified in the UFP-SAP (CH2M HILL, 2011).

4.6 Data Management

Field samples and their corresponding analytical tests were recorded on executed chain-of-custody forms, which were submitted with the samples to the laboratory. Chain-of-custody entries were checked against the site-specific project instructions and work plans to verify that all designated field samples were collected and submitted for the appropriate analysis. Upon receipt of the samples by the laboratories, a comparison to the field

[1] Explosive hazard monitoring of the unoccupied buildings was added to the approach developed in the SAP following initiation of ERD; therefore, due to potential safety concerns associated with installation of subslab vapor probes in the unoccupied buildings in the event explosive gases have been generated from the ERD, the monitoring was limited to indoor air in the occupied buildings.

information to verify that each sample was analyzed for the correct parameters and appropriate quality assurance (QA)/QC samples were collected.

5 Data Evaluation

5.1 Data Validation and Usability

All of the inhalation risk COIs indoor air data were internally validated by CH2M HILL. During the data validation process, QA/QC criteria established in the SAP or in the analytical method were used to evaluate the data quality in a process similar to that outlined in *Contract Laboratory Program Region III Modifications to National Functional Guidelines for Organic Data Review, Multi Media Multi Concentration* (USEPA, 1994). A data usability assessment of the validated data was performed to evaluate the overall measurement performance results (reliability), and their potential effects on data availability for decision-making. The data usability assessment determined that the laboratory reporting limits met the requirements of the SAP, and the entire dataset is available for use, exceeding the data completeness goal of 95 percent. The data usability assessment is provided in **Attachment C**.

5.2 Data Evaluation

The data have been evaluated in accordance with the decision trees developed in the SAP. **Figure 3-6** presents the decision tree to for evaluating potential inhalation risks and **Figure 3-7** presents the decision tree for evaluating potential explosive hazards. The PALs used in the evaluation were developed in the SAP (CH2M HILL, 2011).

5.2.1 Building Surveys

Completed building survey forms are presented in **Attachment D**. Photographs of the buildings are presented in **Attachment B**. No new building uses or significant pathways were identified in the occupied buildings during the building surveys. Summaries of the characteristics of the occupied buildings are provided below.

Building 47 is primarily used for storage and some mechanical work. Approximately 20 employees access the building and work 1 to 2 hours per day inside. A three-dimensional CSM of Building 47 is provided as **Figure 5-1**. Building 47 is a single-story building constructed of corrugated steel exterior walls over wood. The interior consists mainly of open bay storage with several interior offices constructed of drywall. The roof has several leaks and two non-functioning fans positioned over the central portion of the building. The building is approximately 125 feet wide, 180 feet long, and 30 feet tall. The foundation of the building includes an approximately 10-inch-thick concrete slab on grade. Based on the understanding of site geotechnical conditions, it is believed the building foundation may also include piles. The slab is mostly in good condition but cracks and damage were observed in some locations. Multiple expansion joints are present, mostly in good condition. The building contains one bay door on the north side, two bay doors on the east side, and one bay door on the west side of the building. All or some of these bay doors remain open during working hours. There is no functioning central air handling system in the building.

Building 1556 is the Fleet Industrial Supply Center Norfolk Integrated Logistics Services, where approximately 50 employees work 8 hours per day, five days per week. A 3-dimensional CSM of Building 1556 is provided as **Figure 5-2**. The majority of the building is one-story, though a second story is present at the southern end of the building. It is constructed of commercial fiberglass and corrugated metal walls and a corrugated metal roof. The building is approximately 245 ft wide, 410 ft long, and 50 ft tall. The building is constructed on a 10-inch-thick concrete slab on a pile-supported foundation. NAVFAC drawings for Building 1556 indicate 4 inches minimum porous fill and moisture and/or gaseous vapor barrier under the slab (Whitman, Requardt, and Associates, 1992; NAVFAC drawing no. 4224388) (**Attachment E**), a likely barrier inhibiting/preventing COI vapor intrusion into the building. The slab is mostly in good condition, but cracks have been observed in some locations. Multiple expansion joints are present in the larger warehouse portion of the building. There are several potential vapor intrusion entry points (cracks, drains, conduits, and so forth) in the building slab. An elevator, including a subslab pit and shaft, connecting the first and second stories is located on the south end of the building. However, vapor

intrusion within the elevator shaft may not be significant because a NAVFAC drawing (Whitman, Requardt, and Associates, 1992; NAVFAC drawing no. 4224374) (**Attachment E**) indicates that a waterproof layer is present on all sides of the pit, COC concentrations are low in the area, and the waterproofing layer may also provide a barrier for vapor intrusion. According to Bill Landon of NAVFAC Mid-Atlantic, based on a discussion with the Building 1556 elevator inspector, groundwater has not been observed in the pit during any of the regularly conducted elevator inspections (CH2M HILL, 2010), indicating the waterproofing layer is effectively preventing groundwater intrusion. In addition, the lack of groundwater inside the elevator shaft is evidence that volatilization directly from groundwater into the interior air is not a source of COIs. There is one large bay door on the north end of the building and three large bay doors on the east side of the building. All or some of these bay doors remain open during working hours to allow propane- and electric-powered forklifts access. Roof-top air handling units provide ventilation for the building.

5.2.2 Explosive Hazard COIs Measurements

No explosive hazard COIs were detected during the baseline field measurement event (**Tables 5-1** and **5-2**). The only explosive hazard COI detected during the first RA-O phase vapor intrusion monitoring event was hydrogen sulfide in the indoor air of unoccupied Building 63 (measurement location IA19, shown on **Figure 4-1**). This detection (0.2 part per million by volume [ppmv]) was below the hydrogen sulfide explosive hazard COI PAL (4,000 ppmv) (**Table 5-1**). The explosive hazard COI measurements are provided in **Attachment A**.

5.2.3 Inhalation Risk COIs Samples

Three inhalation risk COIs, 1,2-dichloroethane (DCA), cis-1,2-DCE, and TCE, were detected in the indoor air (**Table 5-3** and **Figure 5-3**). 1,2-DCA was detected in two of the samples collected in Building 47 (IA07 and IA08) at a maximum concentration of 2 micrograms per cubic meter ($\mu g/m^3$), which is below the inhalation risk PAL of 4.7 $\mu g/m^3$. Cis-1,2-DCE was detected in one sample collected in Building 47 (IA07) at a concentration of 3 $\mu g/m^3$; however, an inhalation risk PAL was not established for cis-1,2-DCE. TCE was detected at one location in Building 1556 (IA09) at a concentration of 4 $\mu g/m^3$, which is below the PAL of 61 $\mu g/m^3$.

5.2.4 Uncertainties

Quantitation Limits

Although 1,2-DCA was only detected in two of the indoor air samples, the laboratory's limit of detection (LOD) (10 $\mu g/m^3$) was above the inhalation risk PAL (4.7 $\mu g/m^3$). However, the detection limit (DL) (4 $\mu g/m^3$) was lower than the PAL. Therefore, it is unlikely that this uncertainty impacted the outcome of the investigation.

Although hydrogen sulfide was not detected in the indoor air samples analyzed by the laboratory, the laboratory's LOD (7 $\mu g/m^3$) was above the inhalation risk PAL (2.9 $\mu g/m^3$). However, the DL (3.7 $\mu g/m^3$) was only slightly higher than the PAL. Therefore, there is minimal uncertainty associated with the absence of hydrogen sulfide in the indoor air above its PAL.

Constituents without PALs

One constituent, cis-1,2-DCE, does not have a PAL because a regional screening level (RSL) (USEPA, 2011) does not exist for this constituent. Cis-1,2-DCE was detected at one of the ten indoor air sample locations (IA07 in Building 47). Cis-1,2-DCE would have to be either significantly more toxic or have a higher concentration than other VOCs in order for the detected concentrations of cis-1,2-DCE to be a risk driver for this vapor intrusion investigation. The toxicity of cis-1,2-DCE from the inhalation pathway is unknown, which is why cis-1,2-DCE does not have an RSL (USEPA, 2011). The concentration of the cis-1,2-DCE detection (3 $\mu g/m^3$) was similar to the concentrations of the other detections (ranged from 2 $\mu g/m^3$ to 4 $\mu g/m^3$). Therefore, although no PAL is available for cis-1,2-DCE, the detected concentration of cis-1,2-DCE is unlikely to affect the conclusions of the vapor intrusion evaluation.

Background Sources

No background samples were collected during the first RA-O phase vapor intrusion monitoring event. Therefore, background source contribution to the COIs detected in the indoor air is unknown.

6 Conclusions and Recommendations

6.1 Conclusions

No new significant vapor intrusion preferential pathways were identified during the building surveys of the occupied buildings. However, changes in site conditions resulting from the groundwater RA (an increase in concentrations of VC in the shallow aquifer groundwater from the baseline to the first RA-O phase groundwater monitoring event conducted in December 2011 by a factor of 3 or more) resulted in the need to re-evaluate potential inhalation risks from vapor intrusion into the occupied buildings. Therefore, indoor air samples were collected in the occupied buildings. Neither of the detected inhalation risk COIs that have inhalation risk PALs exceeded their PAL. Although cis-1,2-DCE does not have a PAL and was detected in the indoor air, it was detected at a concentration similar to the other detected constituents and is unlikely to affect the conclusions of the vapor intrusion evaluation. Although hydrogen sulfide was not detected in the indoor air samples collected and analyzed by a fixed laboratory to evaluate potential inhalation risks, there is minimal uncertainty associated with its absence above its inhalation risk PAL since the laboratory's LOD was only slightly above the inhalation risk PAL. However, based on the low frequency and magnitude of the inhalation risk COIs, vapor intrusion is not occurring at the occupied buildings at concentrations that may result in an inhalation risk above the PALs as a result of changes in building characteristics or the groundwater RA.

No explosive hazard COIs were detected during the baseline monitoring. During the first RA-O phase vapor intrusion monitoring event, there was only one explosive hazard COI detection. The detection was in the indoor air of an unoccupied building and was well below its explosive hazard PAL. Therefore, changes in site conditions resulting from the groundwater RA have not resulted in explosive hazards at the site building.

6.2 Recommendations

In accordance with the vapor intrusion monitoring approach developed in the SAP, vapor intrusion monitoring is required until the shallow groundwater COC concentrations in all monitoring wells within 100 feet of a building within the building LUC boundary are equal to or less than shallow groundwater cleanup levels for three consecutive RA-O phase groundwater monitoring events. Therefore, because groundwater data from only one RA-O phase groundwater monitoring event were considered, additional vapor intrusion monitoring is recommended for the buildings within the building LUC boundary (**Figure 4-1**). Since indoor air data were collected during this vapor intrusion monitoring event, the groundwater data from the second RA-O phase groundwater monitoring event should be evaluated to determine of the concentrations have increased by a factor of three or more since the first RA-O phase groundwater monitoring event. The results of that evaluation will be used to determine if indoor air samples should be collected following the building surveys that will be updated during the second RA-O phase vapor intrusion monitoring event.

In accordance with the explosive hazard monitoring approach developed in the SAP, measurements of the explosive hazard COIs are required after ERD injections until concentrations in all measurements collected in a building are less than the PALs for three consecutive RA-O phase vapor intrusion monitoring events. Therefore, because only one RA-O phase vapor intrusion monitoring event has been conducted, explosive hazard COI measurements should be collected and evaluated in accordance with the explosive hazard monitoring decision tree during the next RA-O phase vapor intrusion monitoring event.

Additionally, it is recommended that the vapor intrusion monitoring SAP be revised in order to update the PALs as a result of a change in the RSLs for TCE since the time the SAP was finalized. The current inhalation risk PAL is based on the November 2010 cancer RSL because a non-cancer RSL was not agreed to at that time. Since the development of the SAP, the cancer RSL for indoor air was changed from 6.1 $\mu g/m^3$ to 3 $\mu g/m^3$ and a non-cancer RSL of 8.8 $\mu g/m^3$ was established. However, because the PALs for non-cancer RSLs in the SAP are adjusted RSL values to account for accumulative effects to target organs (divided by the number of non-cancer COIs), TCE's RSL of 8.8 $\mu g/m^3$ would be divided by 4 to establish a PAL of 2.2 $\mu g/m^3$. Therefore, revision of the TCE PAL to 2.2 $\mu g/m^3$ is recommended for future vapor intrusion monitoring events.

7 References

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Figures

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Legend

Site 21

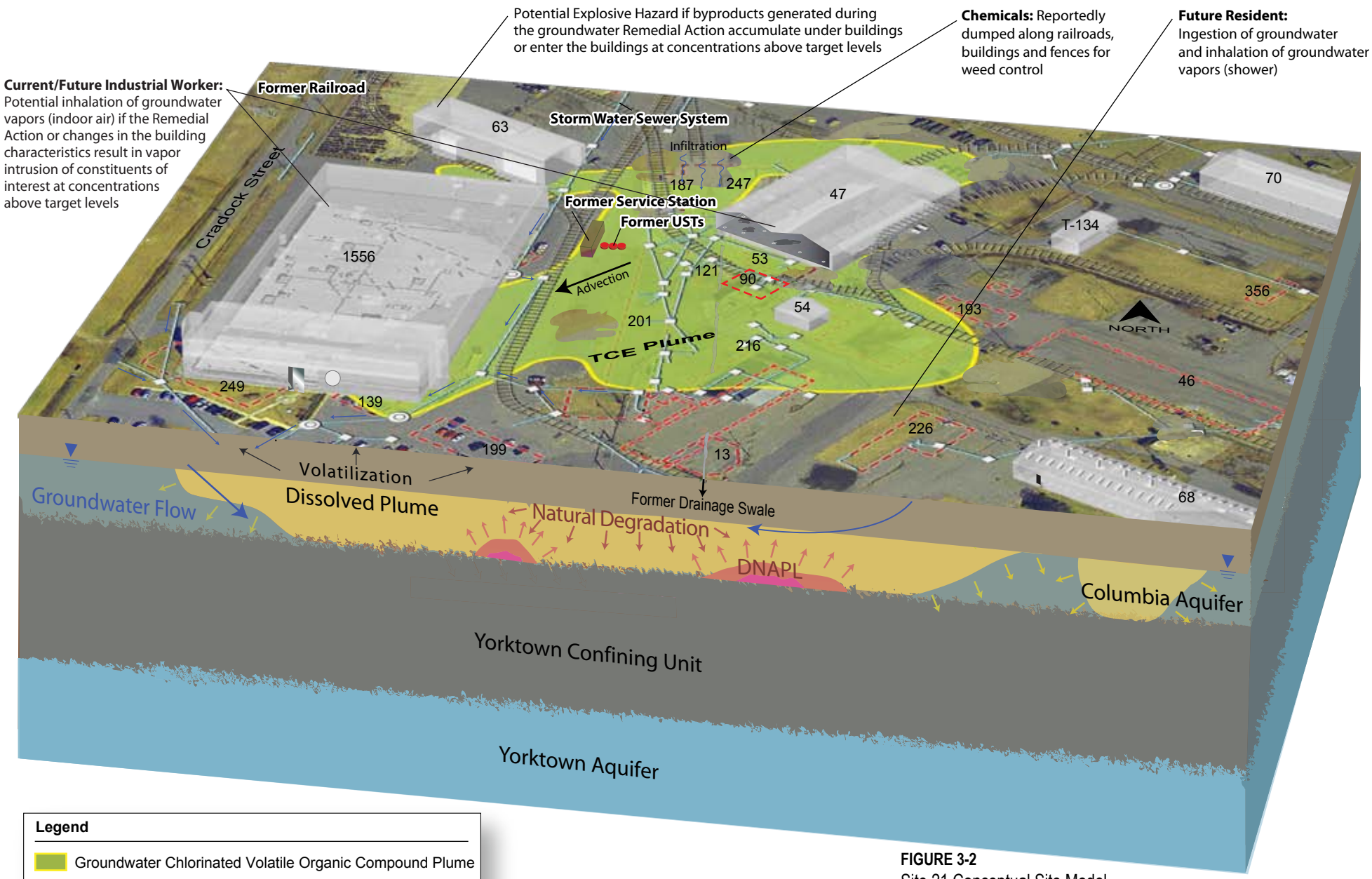
SJCA Boundary

N
W E
S

0 500 1,000 Feet

Figure 3-1
St. Juliens Creek Annex and Site 21 Location
Technical Memorandum: Site 21 Remedial Action-Operation Phase Vapor Intrusion Monitoring Event 1
St. Juliens Creek Annex
Chesapeake, Virginia

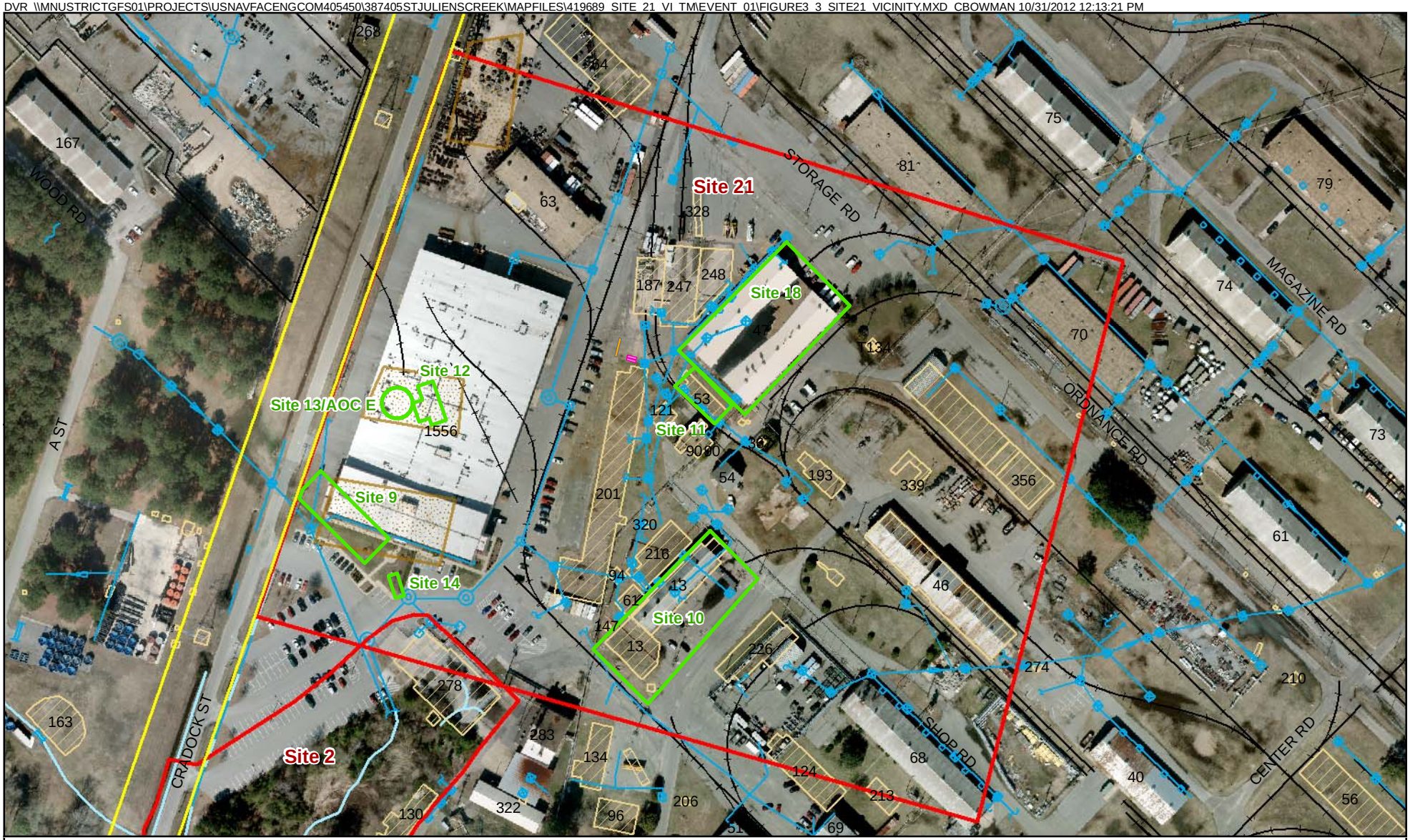
CH2MHILL



NOTE: Groundwater plume based on December 2011 data.

FIGURE 3-2
Site 21 Conceptual Site Model
Technical Memorandum: Site 21 Remedial Action-Operation Phase Vapor Intrusion Monitoring Event 1
St. Juliens Creek Annex, Chesapeake, Virginia

DVR \\MNUSTRICTGFS01\PROJECTS\USNAVFACENGCOM405450\387405STJULIENSCREEK\MAPFILES\419689_SITE_21_VI_TM\EVENT_01\FIGURE3_3_SITE21_VICINITY.MXD CBOWMAN 10/31/2012 12:13:21 PM



Legend

- VEPCO Corridor
- Former Railroad Track
- Storm Sewer System
- No Further Action IR Site
- Approximate Locations of Former USTs
- Former Pump Island
- Approx. Areas of TPH Contaminated Soil Removal (1993)
- Site 21 Boundary
- Demolished Buildings

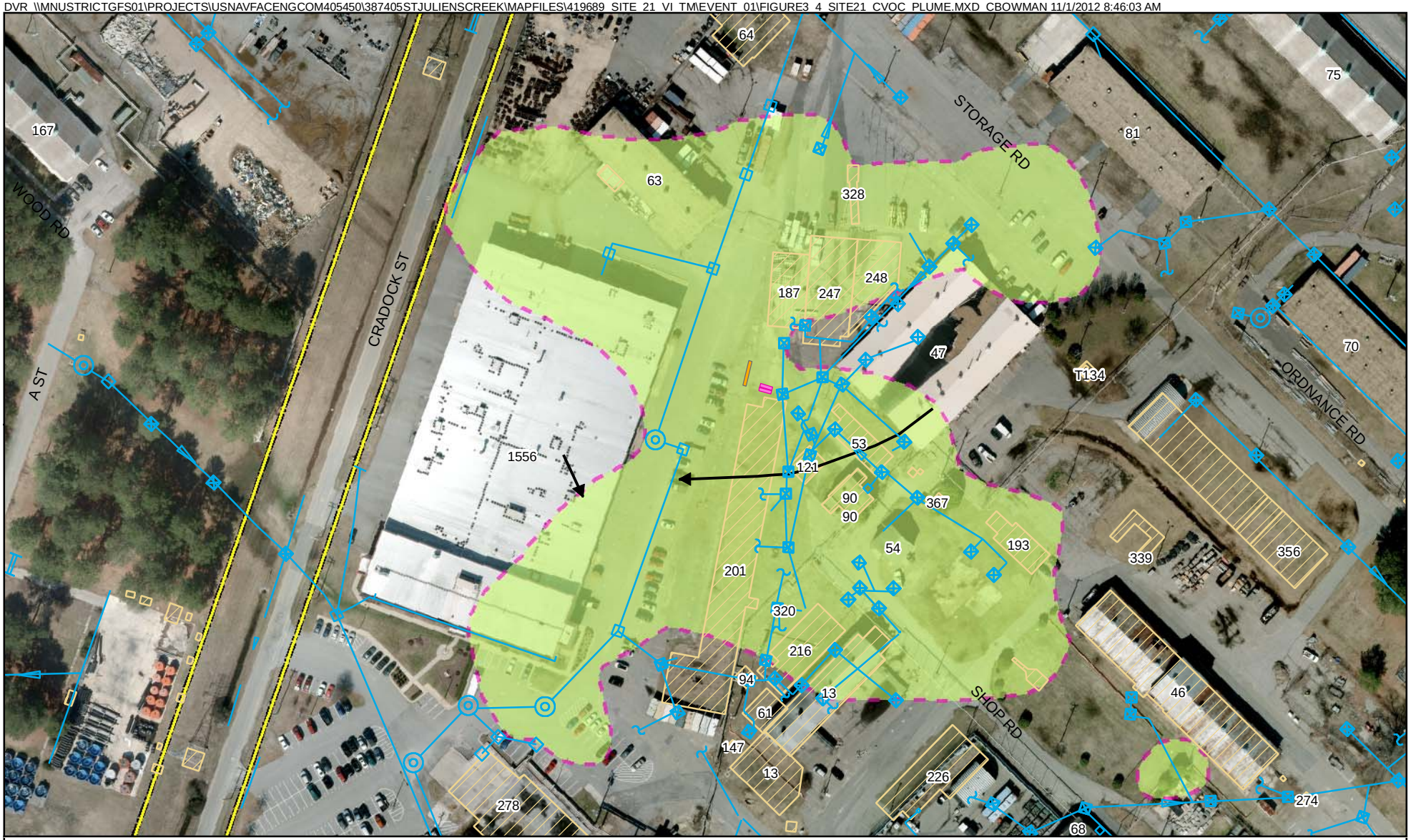
N
W E
S

0 100 200
Feet

Figure 3-3
Site 21 Vicinity
Technical Memorandum: Site 21 Remedial
Action-Operation Phase Vapor Intrusion Monitoring Event 1
St. Juliens Creek Annex
Chesapeake, Virginia

CH2MHILL

DVR \\MNUSTRICTGFS01\PROJECTS\USNAVFACENGCOM405450\387405STJULIENSCREEK\MAPFILES\419689_SITE_21_VI_TM\EVENT_01\FIGURE3_4_SITE21_CVOC_PLUME.MXD CBOWMAN 11/1/2012 8:46:03 AM



Legend

- Storm Sewer System
- Estimated Groundwater Flow Direction
- VEPCO Corridor
- Demolished Buildings
- Chlorinated Volatile Organic Compound Groundwater Plume
- Approximate Locations of Former USTs
- Former Pump Island
- SJCA Boundary

N
W E
S

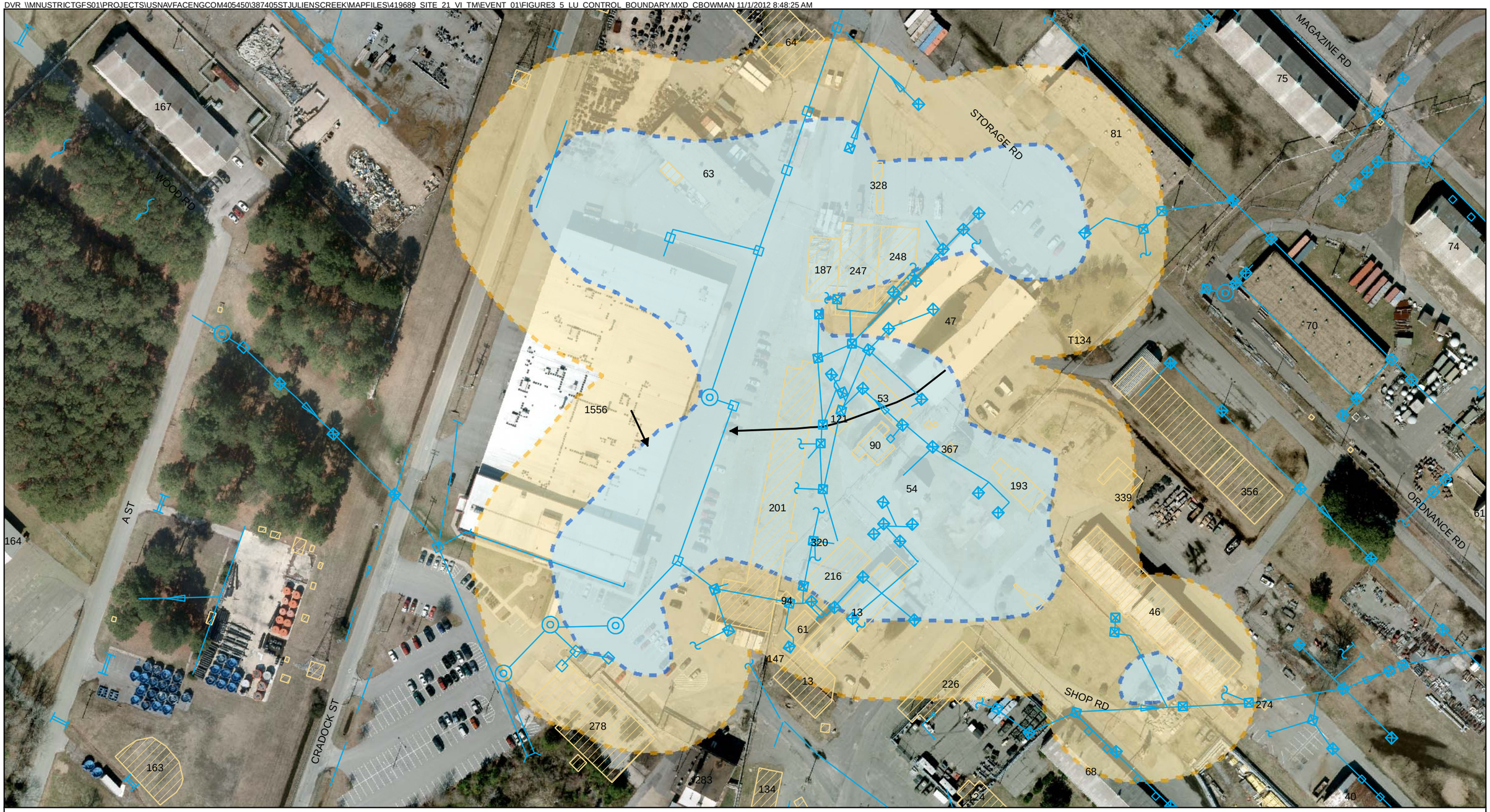
0 75 150
Feet

Note:
The chlorinated volatile organic compound plume boundary shown is based on the 2008 Remedial Investigation data

Figure 3-4
Site 21 Remedial Investigation Chlorinated Volatile Organic Compound Groundwater Plume
Technical Memorandum: Site 21 Remedial Action-Operation Phase Vapor Intrusion Monitoring Event 1
St. Juliens Creek Annex
Chesapeake, Virginia

CH2MHILL

DVR \\MNUSTRICTGFS01\PROJECTS\USNAVFACENGCOM405450\387405STJULIENSCREEK\MAPFILES\419689_SITE_21_VI_TM\EVENT_01\FIGURE3_5_LU_CONTROL_BOUNDARY.MXD CBOWMAN 11/1/2012 8:48:25 AM



Legend

- Storm Sewer System
- Estimated Groundwater Flow Direction
- Demolished Buildings
- Building LUC Boundary
- Groundwater LUC Boundary

Note:
The LUC boundaries shown are based on the 2008 Remedial Investigation data.

N
W E
S

0 120 240
Feet

Figure 3-5
Initial Site 21 LUC boundaries
Technical Memorandum: Site 21 Remedial
Action-Operation Phase Vapor Intrusion Monitoring Event 1
St. Juliens Creek Annex
Chesapeake, Virginia

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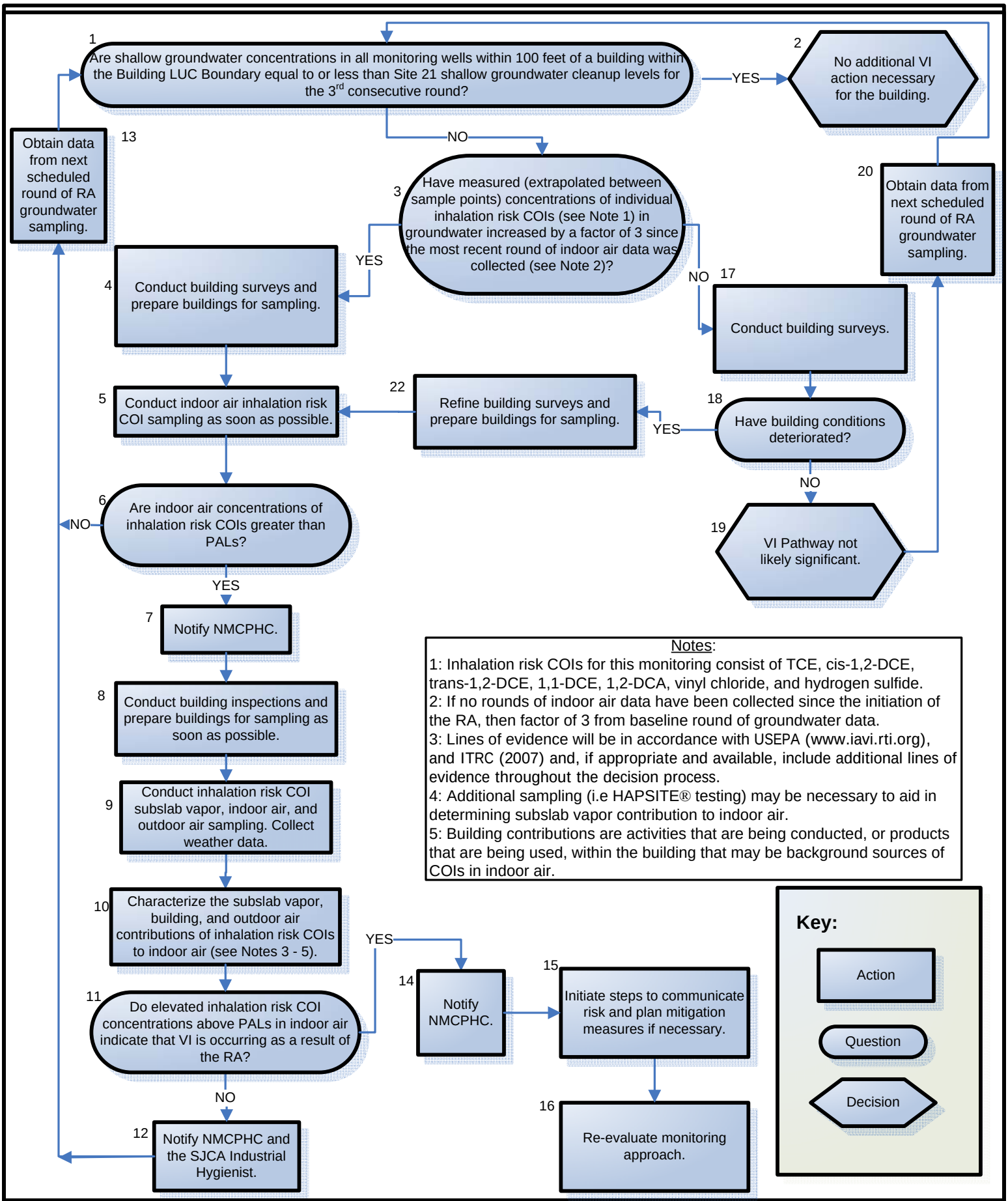
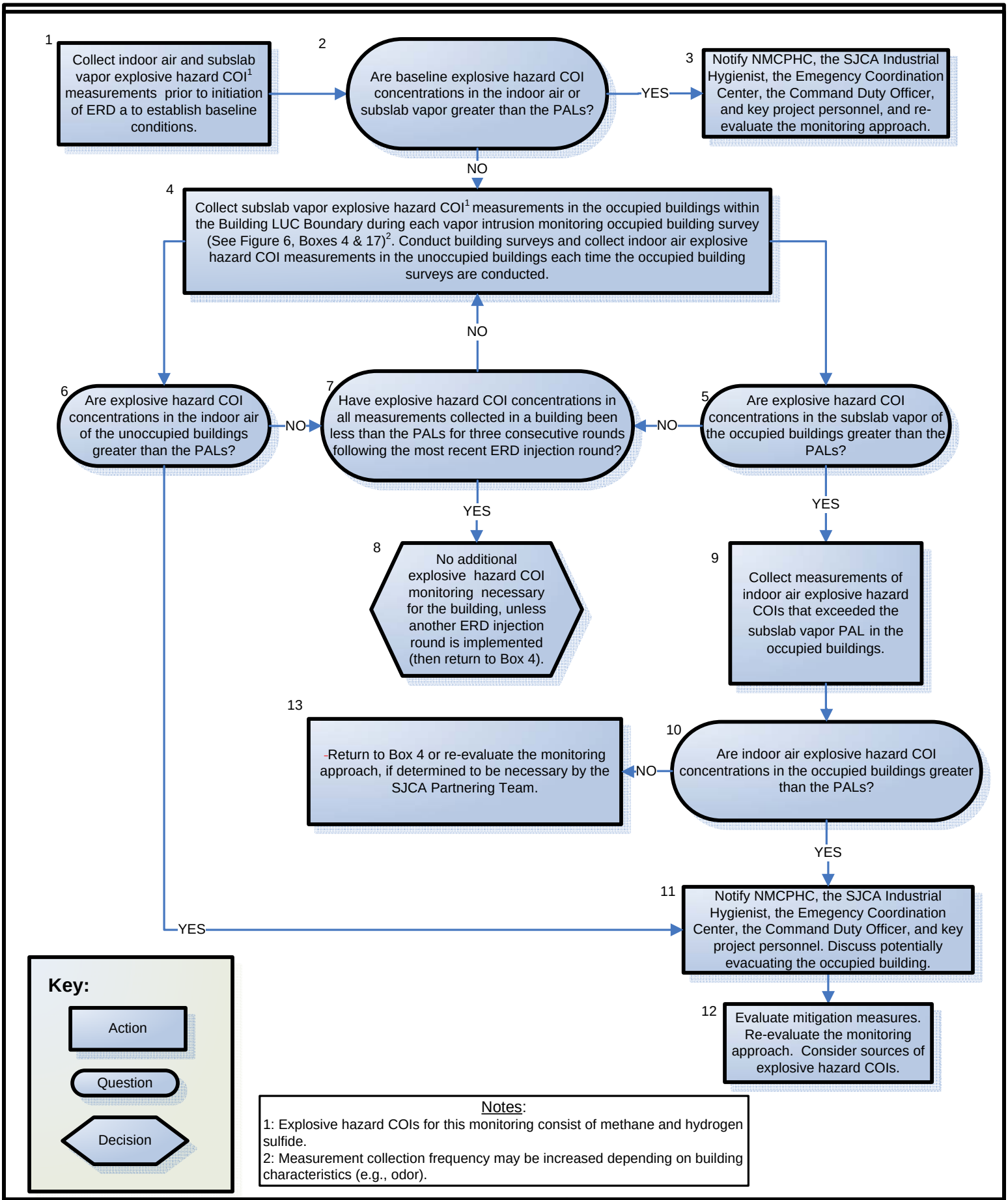


Acronyms:
COI – constituents of interest
NMCPHC - Navy and Marine Corps Public Health Center
PAL – project action limits
RA – Remedial Action
SJCA – St. Juliens Creek Annex
VI – Vapor Intrusion

Figure 3-6
Vapor Intrusion (Inhalation) Monitoring Approach
Technical Memorandum: Site 21 Remedial Action-Operation Phase Vapor Intrusion Monitoring Event 1
St. Juliens Creek Annex
Chesapeake, Virginia



Acronyms:
COI – constituents of interest
ERD – enhanced reductive dechlorination
PAL – project action limits
NMCPHC – Navy and Marine Corps Public Health Center
SJCA – St. Juliens Creek Annex

Figure 3-7
Vapor Intrusion (Explosion) Monitoring Approach
Technical Memorandum: Site 21 Remedial Action-Operation Phase Vapor Intrusion Monitoring Event 1
St. Juliens Creek Annex
Chesapeake, Virginia

DVR \\MNUSTRICTGFS01\PROJECTS\USNAVFACENGCOM405450\387405STJULIENSCREEK\MAPFILES\419689_SITE_21_VI_TM\EVENT_01\FIGURE4_1_VI_MONITORING.MXD CBOWMAN 10/31/2012 12:17:02 PM

Legend

- Explosive Gas Measurment Location
- Subslab Vapor Location
- Indoor Air Location
- Demolished Buildings
- Groundwater LUC Boundary
- Building LUC Boundary

Note:
LUC boundaries shown are based on December 2011 groundwater data.

N
W E
S

0 130 260
Feet

Figure 4-1
Vapor Intrusion Monitoring Locations
Technical Memorandum: Site 21 Remedial
Action-Operation Phase Vapor Intrusion Monitoring Event 1
St. Juliens Creek Annex
Chesapeake, Virginia

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North

Potential Explosive Hazard if byproducts generated during the groundwater Remedial Action accumulate under buildings or enter the buildings at concentrations above target levels

Current/Future Industrial Worker:
Potential inhalation of groundwater vapors (indoor air) if the Remedial Action or changes in the building characteristics result in vapor intrusion of constituents of interest at concentrations above target levels

Restroom with Floor Drains

Inoperable Fans

"Leaky Roof"

Expansion Joints Throughout Building

Space Between Slabs

Broken Windows

Roll-up Door

Potential Future Vapor Intrusion

Expansion Joints

Concrete Slab On Grade

Storm Sewer System

Indoor/Outdoor Air Exchange

CVOC vapors

CVOC vapors

Cracking

Volatilization

~3'

Volatilization

Vadose Zone

Volatilization

Water Table

~17' thick

Columbia Aquifer

Dissolved Plume

Dissolved Plume

Dissolved Plume

~17' thick

Yorktown Confining Unit

~200' thick

Yorktown Aquifer

St. Mary's Confining Unit

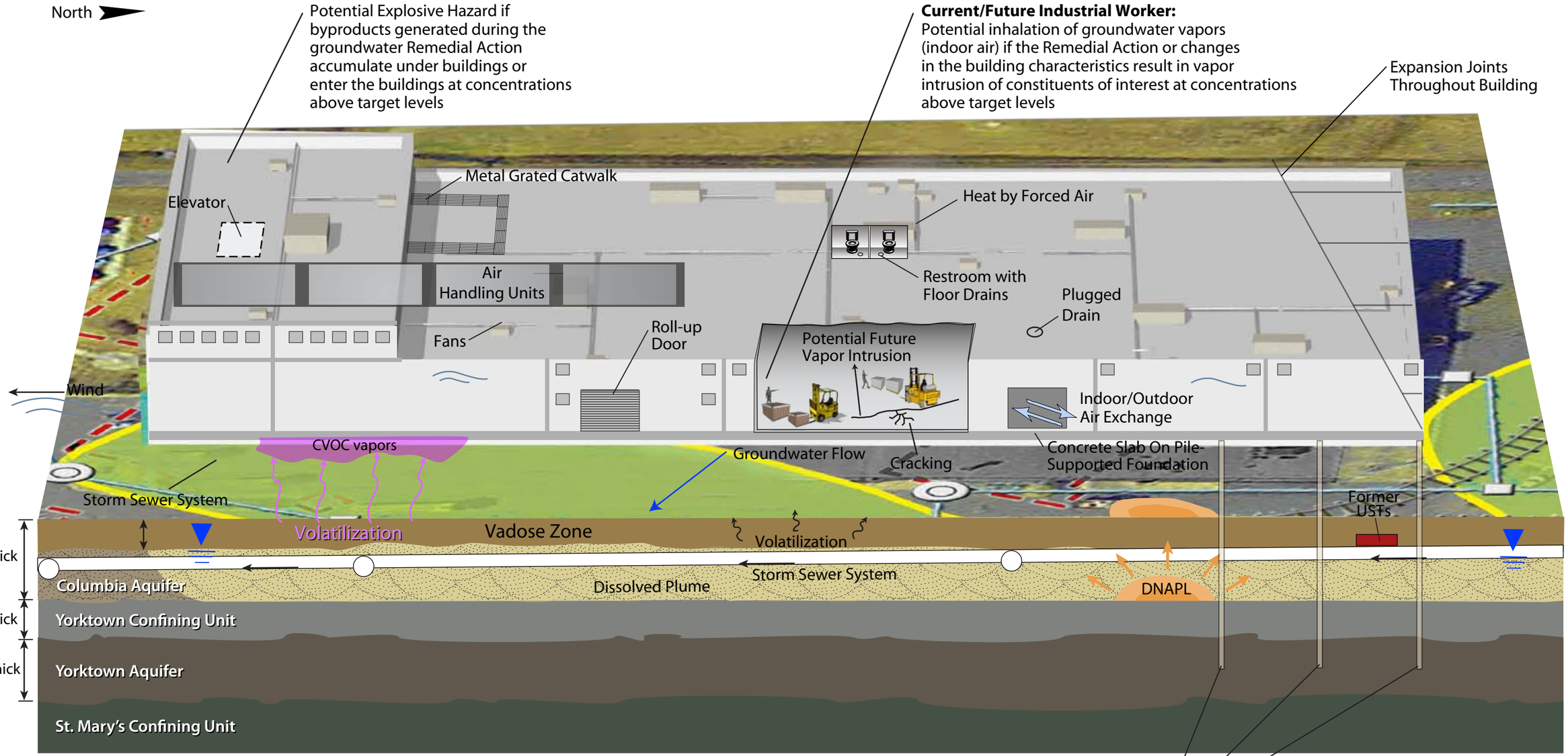
Possible Piles (50-110 ft bgs)
Pilings relatively evenly spaced under the entire building footprint.

Legend

- Groundwater Chlorinated Volatile Organic Compound Plume
- Demolished Building
- Storm Sewer System
- Estimated Groundwater Flow Direction

NOTE: Groundwater plume based on December 2011 data.

FIGURE 5-1
Building 47 Vapor Intrusion Conceptual Site Model
Technical Memorandum: Site 21 Remedial Action-Operation Phase Vapor Intrusion Monitoring Event 1
St. Juliens Creek Annex, Chesapeake, Virginia



Legend

- Groundwater Chlorinated Volatile Organic Compound Plume
- Demolished Building
- Storm Sewer System
- Estimated Groundwater Flow Direction

NOTE: Groundwater plume based on December 2011 data.

FIGURE 5-2
Building 1556 Vapor Intrusion Conceptual Site Model
Technical Memorandum: Site 21 Remedial Action-Operation Phase Vapor Intrusion Monitoring Event 1
St. Juliens Creek Annex, Chesapeake, Virginia

DVR \\MNUSTRICTGFS01\PROJECTS\USNAVFACENGCOM405450\387405STJULIENSCREEK\MAPFILES\419689_SITE_21_VI_TM\EVENT_01\FIGURE5_3_AIR_SAMPLE_DEDECTIONS.MXD CBOWMAN 10/31/2012 12:17:23 PM

SJS21-IA04	Feb-12
No Detections	

SJS21-IA06	Feb-12
No Detections	

SJS21-IA05	Feb-12
No Detections	

SJS21-IA10	Feb-12
No Detections	

SJS21-IA03	Feb-12
No Detections	

SJS21-IA07	Feb-12
1,2-Dichloroethane	2 J
Cis-1,2-Dichloroethene	3 J

SJS21-IA09	Feb-12
Trichloroethene	4 J

SJS21-IA08	Feb-12
1,2-Dichloroethane	2 J

SJS21-IA01	Feb-12
No Detections	

SJS21-IA02	Feb-12
No Detections	

Constituent of Interest	Inhalation Risk Indoor Air Project Action Limit
1,2-Dichloroethane	4.7
cis-1,2-Dichloroethene	--
Trichoroethene	61

Legend

- Indoor Air Location
- Demolished Buildings
- Cumulative Shallow Aquifer Groundwater Plume (December 2011)

Notes:
Concentrations are shown in microgram per cubic meter
A project action limit has not been established for cis-1,2-DCE because an inhalation toxicity value, and consequently an regional screening level, does not exist for cis-1,2-DCE. Note that concentrations of cis-1,2-DCE would likely need to be significantly higher than the other chlorinated volatile organic compounds (such as trans-1,2-DCE) for this to result in a significant uncertainty.
J - Analyte present between limit of quantitation and detection limit

N W E S

0 100 200 Feet

Figure 5-3
Indoor Air Sample Detections
Technical Memorandum: Site 21 Remedial Action-Operation Phase Vapor Intrusion Monitoring Event 1
St. Juliens Creek Annex
Chesapeake, Virginia

CH2MHILL

Tables

TABLE 4-1
Indoor Air Sampling Information
Technical Memorandum: Site 21 Remedial Action-Operation Phase Vapor Intrusion Monitoring Event 1
St. Juliens Creek Annex
Chesapeake, Virginia

Building Number	Sample Location	Slab Depth (inches)	Probe Depth (inches)	Installation Date	Installation Time
47	SJS21-SV10	6	4	4/8/2011	11:45

TABLE 4-2
Indoor Air Sampling Information
Technical Memorandum: Site 21 Remedial Action-Operation Phase Vapor Intrusion Monitoring Event 1
St. Juliens Creek Annex
Chesapeake, Virginia

Building Number	Sample Location	Sample ID	Canister ID	Flow Controller ID	Sample Start Date	Sample Start Time	Initial Canister Pressure (" Hg)	Sample End Date	Sample End Time	Final Canister Pressure (" Hg)
47	SJS21-IA06	SJS21-IA06-12A	JS-079	JAX-R-12	2/12/2012	11:05	-28	2/13/2012	13:09	-9
	SJS21-IA07	SJS21-IA06-12A	JS-068	JAX-R-15	2/12/2012	11:08	-30	2/13/2012	7:00	-0.5
	SJS21-IA08	SJS21-IA06-12A	JS-066	JAX-R-55	2/12/2012	11:12	-32	2/13/2012	13:02	-8.75
	SJS21-IA10	SJS21-IA06-12A	JS-094	JAX-R-62	2/12/2012	11:05	-30	2/13/2012	13:06	-7.5
1556	SJS21-IA01	SJS21-IA01-12A	JS-071	JAX-R-53	2/12/2012	10:55	-30	2/13/2012	9:55	-5
	SJS21-IA02	SJS21-IA02-12A	JS-064	JAX-R-02	2/12/2012	10:53	-29.5	2/13/2012	12:45	-6
		SJS21-IA02-12AP	JS-078	JAX-5-56	2/12/2012	10:53	-30	2/13/2012	12:45	-8
	SJS21-IA03	SJS21-IA03-12A	JS-084	JAX-R-60	2/12/2012	10:49	-30	2/13/2012	9:33	-5
	SJS21-IA04	SJS21-IA04-12A	JS-067	JAX-R-52	2/12/2012	10:48	-30	2/13/2012	12:24	-7
	SJS21-IA05	SJS21-IA05-12A	JS-040	JAX-R-03	2/12/2012	10:46	-28	2/13/2012	6:48	-5
	SJS21-IA09	SJS21-IA09-12A	JS-083	JAX-R-64	2/12/2012	10:51	-30	2/13/2012	12:50	-14

Notes:
One duplicate indoor air sample was collected at sample location SJS21-IA02

TABLE 5-1

Indoor Air Explosive Hazard Constituents of Interest Measurements

Technical Memorandum: Site 21 Remedial Action-Operation Phase Vapor Intrusion Monitoring Event 1

St. Juliens Creek Annex

Chesapeake, Virginia

Explosive Hazard Measurement Station Name	**Indoor Air-Explosive**	SJS21-IA01		SJS21-IA02		SJS21-IA03		SJS21-IA04		SJS21-IA05		SJS21-IA06		SJS21-IA07		SJS21-IA08		SJS21-IA09		SJS21-IA10		SJS21-IA11		SJS21-IA12		SJS21-IA13		SJS21-IA14		SJS21-IA15		SJS21-IA16		SJS21-IA17		SJS21-IA18		SJS21-IA19		SJS21-IA20		SJS21-IA21	
Measurement Date	**Hazard PAL**	Apr-11	Jan-12	Apr-11	Jan-12	Apr-11	Jan-12	Apr-11	Jan-12	Apr-11	Jan-12	Apr-11	Jan-12	Apr-11	Jan-12	Apr-11	Jan-12	Apr-11	Jan-12	Apr-11	Jan-12	Apr-11	Jan-12	Apr-11	Jan-12	Apr-11	Jan-12	Apr-11	Jan-12	Apr-11	Jan-12	Apr-11	Jan-12	Apr-11	Jan-12	Apr-11	Jan-12	Apr-11	Jan-12	Apr-11	Jan-12	Apr-11	Jan-12
Chemical Name																																									
Volatile Organic Compounds (ppmv)																																									
Hydrogen Sulfide	4,000	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0.2**	0	0	0	0
Methane	5,000	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Notes:

Bold indicates detection

ppmv - parts per million by volume

TABLE 5-2

Subslab Vapor Explosive Hazrad Constituents of Concern Measurements

Technical Memorandum: Site 21 Remedial Action-Operation Phase Vapor Intrusion Monitoring Event 1

St. Juliens Creek Annex

Chesapeake, Virginia

Explosive Hazard Measurement Station Name	**Subslab Vapor-Explosive**	SJS21-SV01		SJS21-SV02		SJS21-SV03		SJS21-SV04		SJS21-SV05		SJS21-SV06		SJS21-SV07		SJS21-SV08		SJS21-SV10	
Measurement Date	**Hazard PAL**	Apr-11	Jan-12	Apr-11	Jan-12	Apr-11	Jan-12	Apr-11	Jan-12	Apr-11	Jan-12	Apr-11	Jan-12	Apr-11	Jan-12	Apr-11	Jan-12	Apr-11	Jan-12
Chemical Name																			
Volatile Organic Compounds (ppmv)																			
Hydrogen Sulfide	4,000	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Methane	5,000	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Notes:
ppmv - parts per million by volume

TABLE 5-3

Indoor Air Analytical Results

Technical Memorandum: Site 21 Remedial Action-Operation Phase Vapor Intrusion Monitoring Event 1

St. Juliens Creek Annex

Chesapeake, Virginia

Sample Name	Indoor Air-Inhalation Risk PAL	SJS21-IA01-12A	SJS21-IA02-12A	SJS21-IA02P-12A[1]	SJS21-IA03-12A	SJS21-IA04-12A	SJS21-IA05-12A	SJS21-IA06-12A	SJS21-IA07-12A	SJS21-IA08-12A	SJS21-IA09-12A	SJS21-IA10-12A
Sample Date		2/13/2012	2/13/2012	2/13/2012	2/13/2012	2/13/2012	2/13/2012	2/13/2012	2/13/2012	2/13/2012	2/13/2012	2/13/2012
Chemical Name												
Volatile Organic Compounds (µg/m3)												
1,1-Dichloroethene	293	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
1,2-Dichloroethane[2]	4.7	10 U	10 U	10 U	10 U	10 U	10 U	10 U	**2 J**	**2 J**	10 U	10 U
cis-1,2-Dichloroethene[3]	--	10 U	10 U	10 U	10 U	10 U	10 U	10 U	**3 J**	10 U	10 U	10 U
trans-1,2-Dichloroethene	87	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Trichloroethene	61	13 U	13 U	13 U	13 U	13 U	13 U	13 U	13 U	13 U	**4 J**	13 U
Vinyl Chloride	28	6 U	6 U	6 U	6 U	6 U	6 U	6 U	6 U	6 U	6 U	6 U
Hydrogen Sulfide	2.9	7 U	7 U	7 U	7 U	7 U	7 U	7 U	7 U	7 U	7 U	7 U

Notes:

[1]Duplicate sample

[2]Although the LOD was higher than the PAL, the DL (4 µg/m3) was lower than the PAL.

[3]A PAL has not been established for cis-1,2-DCE because an inhalation toxicity value, and consequently an RSL, does not exist for cis-1,2-DCE. Note that concentrations of cis-1,2-DCE would likely need to be significantly higher than the other CVOCs (such as trans-1,2-DCE) for this to result in a significant uncertainty.

Bold indicates detection

J - Analyte present between LOQ and DL

U - Analyte not detected above the DL

µg/m3 - microgram per cubic meter

Attachment A

CONTENTS

PAGE	REFERENCE	DATE

Location SJCA Site 21 Date 4/8/11

Project / Client CTO WE47 / NAVFAC

Personnel: R. Shelw
A.P. Jones } CH2MHILL

Weather: Windy, overcast, ~50° F

0650 Depart office to MOB to Rental location

0725 Arrive at Bay Equipment Rental. Rent the following items
(1) Rotary Hammer Drill
(2) Dry Shop Vac
(3) 1" Drill Bit
(4) 1/2" Drill Bit
Equipment rented to install 1 subslab probe at Building 47.

0805 Arrive at NNSY Pass Office to meet utility locator: Accumark / J Disbrow

0815 Not able to locate Accumark. Call Mike Schmeltz at office but no answer

0830 J. Disbrow called. Forgot I-9 form at office. Had to return to office to retrieve

0840 J. Disbrow arrives at NNSY pass office.

Location SJCA Site 21 Date 4/5/11

Project / Client CTO-WE47 / NAVFAC

0900 Leave pass office - head to St. Julen's Creek Annex

915 Arrive at Building 47

920 Health and Safety meeting - main topics included slips, trips and falls; electrical safety and working with compressed gas cylinders

930 A. Petree talks to CHIEF ABSTON (757 553-7033) at BLDG 1550. ABLE TO ACCESS BUILDING 9-12 TOMORROW. BLDG 47 EMPLOYEES WILL BE ONSITE TOMORROW AS WELL.

945 Unload equipment for Utility locate and sampling. Begin UTILITY LOCATE.

005 Assemble pump (ASL #4970PU) TEST MANIFOLD (4004GA ASL). Purge UNTIL reading indicates -30" Hg

007 MANIFOLD able to HOLD -30" Hg. MANIFOLD PASSES LEAK CHECK

012 Begin QUICK purge of SVO6.

017 End purge. Collect 1L of gas in TEDLAR BAG

020 Collect INDOOR air measurement FOR IAO6 ABS

Location SJCA Site 21 Date 4/5/11

Project / Client CTO-WE47 / NAVFAC

~~CH4~~ Time	CH_4	CO_2	O_2	H_2S	CO
1023	0%	0%	21%	0	0
1024	0%	0%	20.9%	0	0
1025	0%	0%	20.9%	0	0

Collect measurement for SVO6 ABS

1026	0%	8.2%	10.4%	0	5ppm
1027	0%	8.2%	10.7%	0	2ppm
1028	0%	8.4%	10.3%	0	3ppm

NO CH_4 or H_2S DETECTED.

1040 Set up on PM47

1043 Collect indoor air measurements

Time	CH_4	CO_2	O_2	H_2S	CO
1044	0%	0.3%	19.9%	0ppm	0ppm
1045	0%	0.3%	20.0%	0ppm	0ppm
1046	0%	0.3%	19.8%	0ppm	0ppm

1046 Begin quick purge of PM47

1051 End Purge. Collect 1L of gas in Tedlar bag

1051 collect measurement for PM47

Time	CH_4	CO_2	O_2	H_2S	CO
1052	0%	1.2%	19.2%	0ppm	4ppm
1053	0%	1.2%	19.3%	0ppm	0ppm
1054	0%	1.2%	19.3%	0ppm	0ppm

NO CH_4 or H_2S detected

Location SJCA Site 21 Date 4/8/11

Project / Client CTO-WE47/ NAVFAC

1059 Set up on SV07

1102 Collect measurements for 1107

Time	CH_4	CO_2	O_2	CO	H_2S
1102	0%	0%	20.5	0	0
1103	0%	0%	20.6	0	0
1104	0%	0%	20.5	0	0

1103 Begin purge SV07.

1108 End purge SV07

Collect measurements SV07

Time	CH_4	CO_2	O_2	CO	H_2S
1108	0%	0.2%	20%	0.2	0
1109	0%	0.2%	19%	0.2	0
1110	0%	0.2%	19.2%	0.2	0

1110 MOB TO SV08; Begin collect measurements SV08

Time	CH_4	CO_2	O_2	CO	H_2S
1117	0%	0%	20.6%	0	0
1118	0%	0%	20.6%	0	0
1119	0%	0%	20.6%	0	0

1119 Begin purge SV08

1123 End purge SV08, Collect measurements

1124	0%	0.1%	20%	0%	0
1125	0%	0.2%	20%	0	0
1126	0%	0.1%	20%	0	0

Location SJCA Site 21 Date 4/8/11

Project / Client CTO-WE47/NAVFAC

1130 J. Disbrow/AccuMark offsite

1145 Begin install SV10

DRILL TO 8" (~2" bgs BOTTOM OF SLAB)

SLAB ~6" THICK

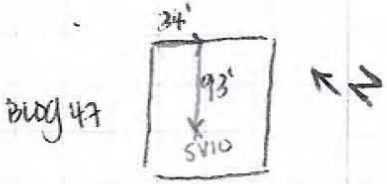
INSTALL PROBE ~4" BGS

PID reading: 0.2ppm

(FRESH air CAL MULTIRAE)

* NOTE: WALT BELL STOPPED BY 11:40 OFFSITE BY 11:43.

1205 Begin packing up equipment. Measure distance of probe.



1210 TALK TO Marcus (BLDG 47 CONTACT). WILL BE AT BLDG 47 AROUND 11AM TOMORROW. BLDG ACCESS WILL NOT BE A PROBLEM

1220 WALK BLDG. NO REVISIONS TO PREVIOUS BLDG SURVEY MADE. SEVERAL FENCES HAVE BEEN REPLACED W/ WOODEN PANELS.

1225 HILL EMPLOYEES OFFSITE TO RETURN RENTAL EQUIPMENT.

Location SJCA SITE 21 Date 4/8/11

Project / Client CTO WE47/NAVFAC

1332 Call Adrienne to report field activities

1340 Return Hammer rotary drill, drill bits (1" & 1½") and Siteprvac to Bay Equipment.

410 Arrive at office. Agree to meet tomorrow at 0800.

Note: Accumark will send utility sheet Monday morning. No rebar/utilities found in vicinity of SVID.

A Peter Jones
4/8/11

Location SJCA SITE 21 Date 4/9/11

Project / Client CTO WE47/NAVFAC

0830 HILL personnel depart VBO office to MOB to SJCA Site 21

0845 Chief Abston calls; will be at Bldg 1556 at 0915.

0850 HILL personnel onsite
A. P Jones
R Shaw

Objective: Complete building surveys, collect subslab & indoor air baseline CH_4 & H_2S measurements

Weather: Chilly, overcast, ~50°F

0855 Conduct H&S meeting: Beware of pinch points

0900 Calibrate multirae
Pine Env # 05876
4-gas calibration (H_2S, CO, CH_4, O_2)
lot # 40239-01 exp 08/2011
isobutylene/e
lot# LAK-248-100-4 exp: 11/5/2014
H_2S 25 ppm CH_4: 2.5%
CO: 50 ppm O_2: 20.8%
Isobutylene: 99 ppm
Calibration complete
CRJ

Location: SJCA SITE 21 Date: 4/9/11

Project / Client: CTO WE47/NAVFAC

1420 CHIEF ADSTON ONSITE. MOB TO SV01

937 Begin collecting [IA01]

Time	CH_4	CO_2	O_2	CO	H_2S
0937	0%	0%	20.9%	0ppm	0ppm
0938	↓	↓	↓	↓	↓
0939					

939 CONDUCT MANIFOLD LEAK CHECK. HELD -30" Hg FOR > 3 MINUTES.

1942 Begin purge OF SV01. Background PID = 0.3 ppm. Purge VAC: -5" Hg.

*NOTE: COLLECTING ~1.5L OF GAS. 0.5L USED FOR He/MULTIRAE reading. 1L USED FOR GEM measurements.

He DETECTOR: PINE ENV #14962

He CANISTER: LOT# 41090-06 EXP: 3/2014

0948 END purge: He = 0% PID: 4.5 ppm [SV01]

Time	CH_4	CO_2	O_2	CO	H_2S
0950	0.00	07.5	13	0003ppm	0000ppm
0951	00.0	07.5	12.8	0000	0000
0952	00.0	07.5	12.8	0000	0000

LEAK CHECK: PASS

0953 MOB TO SV02/IA02

0954 A JONES MOB TO IA09 TO COLLECT measurements

CPJ

Location: SJCA SITE 21 Date: 4/9/11

Project / Client: CTO WE47/NAVFAC

0956 Begin [IA09] measurements

Time	CH_4	CO_2	O_2	CO	H_2S
0956	00.0	0.00	20.5	0000	0000
0957	00.0	00.0	20.4	0000	0000
0958	00.0	00.0	20.5	0000	0000

1000 Begin [IA02] measurements

Time	CH_4	CO_2	O_2	CO	H_2S
1000	00.0	0.00	20.5	0000	0000
1001	00.0	0.00	20.4	0000	0000
1002	00.0	0.00	20.4	0000	0000

1002 Begin purge SV02. Purge vacuum ~ -4.5" Hg. Background PID = 0.0 ppm. Collect ~ 1.5L

1009 END purge [SV02]. He: 100 ppm PID: 1.2 ppm. PASS

Time	CH_4(%)	CO_2(%)	O_2(%)	CO ppm	H_2S ppm
1010	0000	07.7	14.2	0000	0000
1011	0000	08.2	11.1	0000	0000
1012	0000	08.3	11.0	0000	0000

1015 MOB TO SV03. Background PID = 0.0 ppm

1016 Begin [IA03] measurements

1016	00.0	00.0	20.4	2	0000
1017	00.0	00.0	20.3	0000	0000
1018	00.0	00.0	20.3	0000	0000

CPJ

Location SJCA SITE 21 Date 4/9/11

Project / Client CTO WE47 / NAVFAC

1020 Begin purge SV03. Purge VAC -3.5" Hg

027 END purge SV03 He: 0% PID 0.9 ppm

Time	CH_4(%)	CO_2(%)	O_2(%)	CO ppm	H_2S ppm
1028	00.0	09.5	11.0	0000	0000
1029	00.0	09.7	08.3	0000	0000
1030	00.0	09.7	08.2	0000	0000

031 MOB TO SV05. Background VOC 0.0 ppm

032 Begin measurements for IA05

Time	CH_4(%)	CO_2(%)	O_2(%)	CO ppm	H_2S ppm
1032	00.0	00.0	20.2	0003	0000
1033	00.0	00.0	20.4	0001	0000 ars
1034	00.0	00.0	20.4	0000	0000

037 Begin purge SV05. Purge VAC -5.0" Hg.

Note: called PM, Adrienne Jones, confirmed no measurements should be collected at pressure monitoring locations (PM47 & PM1556).

045 END purge SV05 collect ~1.5 L. He: 200 ppm. PID: 0.5 ppm PASS. Begin measurements

1045	00.0	00.6	19.5	0000	0000
1046	00.0	00.6	19.4	0000	0000 ars
1047	00.0	00.6	19.4	0000	0000

1048 MOB TO IA/SV05.

1050 Begin measurements at IA04 ars

aPJ

Location SJCA SITE 21 Date 4/9/11

Project / Client CTO WE47 / NAVFAC

Time	CH_4(%)	CO_2(%)	O_2(%)	CO ppm	H_2S ppm
1050	00.0	00.0	20.7	0000	0000
1051	00.0	00.0	20.7	0004	0000
1052	00.0	00.0	20.7	0001	0000

1054 Begin purge of SV05. Purge VAC -4" Hg

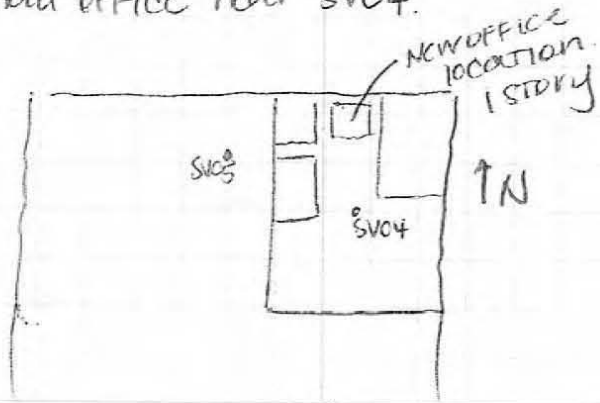
Background PID: 0.0 ppm

1102 END purge SV05 ars He: 0% PID: 0.3 ppm

PASS. ~1.5 L collected

Time	CH_4(%)	CO_2(%)	O_2(%)	CO ppm	H_2S ppm
1102	00.0	00.8	20.1	0000	0000
1103	00.0	00.8	20.0	0000	0000
1104	00.0	00.8	20.0	0002	0000

END collecting measurements inside Bldg 1556. Only change in Bldg 1556 noted during visit is construction of small office near SV04.

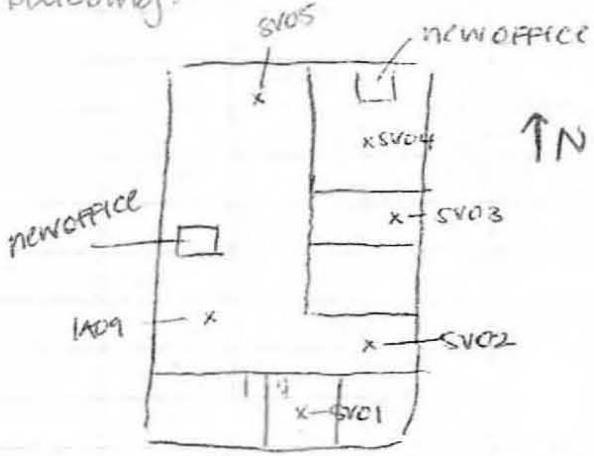


ars

Location STCA SITE 21 Date 4/9/11

Project / Client CTO WE47 / NAVFAC

ONE OTHER SMALL OFFICE BUILT BETWEEN SV05 AND IA09 ON WESTERN SIDE OF BUILDING.



1115 DEPART BLDG 1556. CHIEF DESTON LOCKED BUILDING. MOBILIZE TO BLDG 47.

1120 MOBS TO SV06. BEGIN MEASUREMENTS FOR IA06 BACKGROUND PID: 0.0 ppm

TIME	CH_4(%)	CO_2(%)	O_2(%)	CO ppm	H_2S ppm
1121	00.0	00.3	20.3	0002	0000
1122	00.0	00.3	20.3	0002	0000
1123	00.0	00.3	20.3	0002	0000

1124 BEGIN PURGE SV06. PURGE VAC -0.5" Hg

1128 END PURGE SV06. HE: 0% PID: 1.1 ppm PASS ~1.5 L PURGED. COLLECT MEASUREMENTS FOR SV04

CERS

Location STCA SITE 21 Date 4/9/11

Project / Client CTO WE47 / NAVFAC

TIME	CH_4(%)	CO_2(%)	O_2(%)	CO ppm	H_2S ppm
1133	00.0	08.7	09.7	0002	0000
1134	00.0	08.8	09.1	0002	0000
1135	00.0	08.9	09.0	0002	0000

1138 MOBS TO IA/SV07. BEGIN MEASUREMENTS FOR IA07. BACKGROUND PID: 0.0

1138	00.0	00.0	20.8	0000	0000
1139	00.0	00.0	20.8	0000	0000
1140	00.0	00.0	20.8	0000	0000

1140 BEGIN PURGE SV07. PURGE VAC: -6" Hg

1148 END PURGE SV07. ~1.5 L COLLECTED. HE: 0% PID: 1.6 ppm PASS COLLECT MEASUREMENTS FOR SV07

1148	00.0	00.2	20.6	0000	0000
1149	00.0	00.2	20.7	0000	0000
1150	00.0	00.2	20.7	0000	0000

1151 MOBS TO SV/IA08. BCKGD PID: 0.0 ppm COLLECT IA08

1152	00.0	00.0	20.7	0000	0000
1153	00.0	00.0	20.8	0000	0000
1154	00.0	00.0	20.7	0000	0000

NOTE: SV08 SURROUNDED BY WATER. USED PAPERTOWELS AND MOP TO DRY STANDING WATER INSIDE BUILDING. REPLACE

APJ

Location SJCA SITE 21 Date 4/9/11

Project / Client CTO WE47/NAVFAC

TEFLON COATED HEX-LOCK plug W/BRASS GOLD SCREW DUE TO RUST

1157 Begin purge SV08. Pump making strange noises. SWITCH OUT PUMPS TO ENSURE SAFETY (pump handled correctly, sounds like something caught up in fan). NOW USE ASL 49FMPU TO purge ports.

1208 Begin purge SV08. Purge vac -6" Hg

1215 END purge SV08. COLLECT ~1.5L He: 0.0% PID: 1.4 ppm PASS

1220 Collect SV08

Time	CH_4(%)	CO_2(%)	O_2(%)	CO	H_2S
1221	00.0	00.0	20.5	0000	0000
1222	00.0	00.1%	20.5	0000	0000
1223	00.0	00.1	20.5	0000	0000

1225 MOB TO SV10. Background PID: 0.01 ppm

1228 Begin IA10 28°

1229	00.0	00.0	20.7	0000	0000
1230	00.0	00.0	20.6	0000	0000
1231	00.0	00.0	20.6	0000	0000

1232 Begin purge SV10. Purge vac -7" Hg

1239 END purge. SV10. ~1.5 L collected. He: 0% PID: 1.7 ppm. PASS

APJ

Location SJCA SITE 21 Date 4/9/11

Project / Client CTO WE47/NAVFAC

1240 Collect SV10 measurements

Time	CH_4(%)	CO_2(%)	O_2(%)	CO ppm	H_2S ppm
1242	00.0	06.9	13.1	0000	0000
1243	00.0	07.1	12.5	0000	0000
1244	00.0	07.1	12.5	0000	0000

1250 Begin packing up. Remaining pressure in He cylinder ~ 600 psi. Will store for next round of sampling. Run through sample table to check list - All samples accounted for.

1258 NO BUILDING OCCUPANTS IN BUILDING. SHUT DOOR BEHIND OURSELVES. Call A. Jones TO FIND Marcus (POC) phone # 636-4179.

1308 Call Marcus Scott. Informed him we are leaving BLDG. He indicated Base security will come secure it & we may leave.

1315 R. Straw & AP Jones OFFSITE.

AP Jones
4/9/11

Location GSCA SITE 21 Date 1/30/2012

Project / Client CTO WE47/NAVFAC

0710 Personnel onsite: G. Buckley & A. Jones
Objective: Conduct Building surveys and collect explosive gas measurements.
Weather: chilly, clear ~40°F.
Conduct H&S meeting: pinch points and traffic awareness while at internal and external points of buildings
0718 Meet Dan Powers/NNSY for camera pass. Conduct Briefing.
0727 D. Powers offsite
0728 W. Bell called. Should be onsite in ~20 minutes.
0729 Call M. Scott - okay to enter Building 47 when needed.
0732 Call M. Robbins. Will have access to Bldg 54 at 10 AM.
0740 Calibrate Multirae - Argus Hazco # 0000899
Mixed gas manufacture date 6/11
Log # GAL41216
CO_2: 49 O_2: 20.9 Methane: 29
H_2S: 15 ~~ISO~~ - 98
0745 W. Bell/NAVFAC offsite

ART

Location SJCA Site 21 Date 1/30/12

Project / Client CTO - WE47 / NAVFAC

0820 Begin Leak Check at SVOL6.
purge vac - 0". Collect ~1 L @ 200 mL/min
End leak check. Helium: 0%
O_2: 12.3 VOC: 0.0 LEL 12
CO_2: 1 H_2S: 0 *PASS
* Helium Detector: Argus Hazco SN# 041253
Helium: Argus Hazco #GD20-100-P-1035
Exp: 1/2015
Air pump: ASL 4036 PLL
Manifold - 4106 MA
GEM 2000 Plus: CH2MHill C-102144
0835 Begin collect SVOL6

	CH_4	CO_2	O_2	Bal	H_2S
0836	0.0	10.8	8.9	80.6	0000
0837	0.0	10.9	7.3	81.8	0000
0838	0.0	10.9	6.9	82.2	0000

0840 W. Bell/NAVFAC offsite
0840 Begin purge SV . purge vac 0"
Collect ~1L at 200 mL/min
0845 He: 0% PASS Multirae:
O_2: 12 VOC: 0 H_2S: 0
CO_2: 1 CH_4: 7

ART

Location SJCA Site 21 Date 1/30/12

Project / Client CTO-WE47 / NAVFAC

0845 Begin collect SV10

	CH_4	CO_2	O_2	BAL	H_2S
0845	0.0%	7.3%	14.1%	78.6%	0000
0846	0.0%	7.3%	14.0%	78.7%	0000
0847	0.0%	7.3%	13.9%	78.8%	0000

0855 Begin leak check SV07. Purge vac: 0"
Collect 1L at 200 mL/min
END leak check. Helium: 25 ppmv
Multirae: O_2 21.2 VOC 0.4 H_2S 0
CO_2 0 CH_4 0 PASS

0900 Begin collect SV07

	CH_4	CO_2	O_2	BAL	H_2S
0900	00.0%	00.4%	18.2%	80.9%	0000
0901	00.0%	00.4%	19.5%	80.0%	0000
0902	00.0%	00.4%	19.8%	79.8%	0000

0905 Begin purge SV08. Purge vac: 0"
Collect ~300 mL/min for 1L.

0909 END purge SV08. He: 0% Multirae
O_2 21.6% VOC: 0.4 H_2S: 0
CO_2: 0 CH_4 0 PASS

0912 Begin collect SV08

	CH_4 (%)	CO_2 (%)	O_2 (%)	BAL (%)	H_2S (%)
0912	00.0	00.2	19.9	79.9	0000
0913	00.0	00.2	20.1	79.8	0000

AKS

Location SJCA Site 21 Date 1/30/12

Project / Client CTO-WE47 / NAVFAC

Cont'

	CH_4	CO_2	O_2	BAL	H_2S
0914	00.0	00.2	20.1	79.7	0000

0915 Begin revising BLDG survey.
* Back room (SV08) - no longer used for recycling - no used for misc storage of parts. Chemicals.
- Ideal-Gel pulling lubricant
- Polywater Lubricant (For cables)
- ADALET-PLM: Coldfoor CP-0 OIL
- Liquified petroleum gas (w/ lite plants)
- OLD PRINTERS (2)
- Dazzle neutral Floor cleaner
- Enviro Care (washroom cleaner,
* neutral disinfectant, low foam, glass, all purpose cleaner, ~~LIQUI-SCRUB~~ tough to be cleaner
- RNC Liqui-scrub
- printer cartridges
- charcoal lighter fluid

in compressed gas area
- Sulfur Hexafluoride
- Nitrogen
- propane

0935 Complete revising BLDG survey
0940 Begin measure outside of BLDG 81.

AKS

Location SJCA Site 21 Date 1/30/12

Project / Client CTO-WE47 / NAVFAC

0948 BLDG 81 OUTSIDE measurement complete.

0955 MOB TO BLDG 54 TO meet Mark ROBBINS.

1000 Measure OUTSIDE OF BLDG 54.

1005 DOOR UNLOCKED. M ROBBINS was OK w/ us collecting a few measurements and closing DOOR BEHIND FIELD team.

1008 Begin BUILDING survey SJS21-1A21-12A ART 8/7/12

1010 Begin collecting ~~1st 1A measurement.~~ MULTIRAE.

O_2 20.9 VOC 0.0 H_2S 0

CO_2 0.0 CH_4 0

GEM 2000 PLUS

CH_4 0.0 O_2 21.2% H_2S 0000

CO_2 00.1% BAL 78.7%

* H_2S COLLECTED FROM ground SURFACE - CH_4 COLLECTED FROM near CEILING

1015 Begin collecting ~~2nd 1A measurement~~ SJS21-1A20-12A ART 8/7/12

MULTIRAE: O_2 21.3 VOC 0.0

CO_2 0.0 CH_4 0.0 H_2S 0.0

GEM-2000 PLUS: CH_4 0.00% H_2S 0000

CO_2 0.00% O_2 21.2% BAL 78.9%

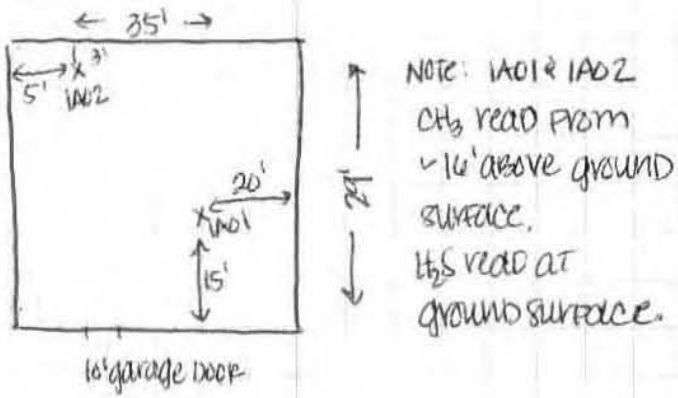
ART

Location SJCA SITE 21 Date 1/30/12

Project / Client CTO WE-47 / NAVFAC

* H_2S COLLECTED FROM ground SURFACE CH_4 COLLECTED FROM near CEILING

1035 END BUILDING SURVEY OF BLDG 54



1040 MOBILIZE TO BLDG 1550.

1045 CHECK-IN WITH FRONT OFFICE AT BLDG 1550. No change in BLDG use/ACTIVITIES.

1053 Begin purge SV02. Purge vac 0"

Collect ~1 L at 200 mL/min

1058 END purge: He = 0 % PASS

MULTIRAE O_2 17.3 VOC 00 H_2S 0.0

CO_2 0 CH_4 0.0

1100 Collect SV02 w/ GEM 2000 +

	CH_4	O_2	CO_2	BAL	H_2S
1100	0.00	15%	5.1	79.0	0000

ART

Location SJCA SITE 21 Date 1/30/12

Project / Client CTO WE-47 / NAVFAC

CON'T	CH_4	CO_2	O_2	BAL	H_2S
1100	0.00	5.1	15.7	79.2	0000
1101	0.00	5.1	15.6	79.4	0000

1110 Begin purge SV03 Purge vac 0"
Collect ~1L at 200 mL/min

1115 End purge: He = 0% PASS
Multirae: O_2 - 9.2 VOC - 0 H_2S = 0
CO_2 0 CH_4 9

1117 Collect SV03 w/ gem 2000+

	CH_4	CO_2	O_2	BAL	H_2S
1117	00.0	12.0	8.1	80.7	0000
1117	00.0	12.1	6.0	81.9	0000
1118	00.0	12.0	5.9	82.1	0000

1127 MOB TO BLDG 603. K. Doran/VDEQ and W. Bell/NAVFAC onsite. Begin BLDG survey.

1205 Collect ~~1st 1A measurement~~ aft 8/1/12 SJS21-1A7-12A

CH_4	CO_2	O_2	BAL	H_2S
0.00	0.00	20.9	79.8	0000
0.00	0.00	21	79.9	0000
0.00	0.00	21	79.9	0000

Multirae: VOC - 0.4 ppmv up HIGH.
* H_2S reading collected within sump ~ 2" below slab CH_4 collected ~ 13' above slab surface

aft

Location SJCA SITE 21 Date 1/30/12

Project / Client CTO WE-47/NAVFAC

1210 Collect ~~2ND 1A~~ SJS21-1A8-12A aft 8/1/12 measurement

CH_4	CO_2	O_2	BAL	H_2S
0	0	21.2	78.8	0
0	0	20.9	78.9	0

VOC 0.2 up high.
* CH_4 measurement ~ 15' above location. H_2S measurement ~ 4" below slab surface

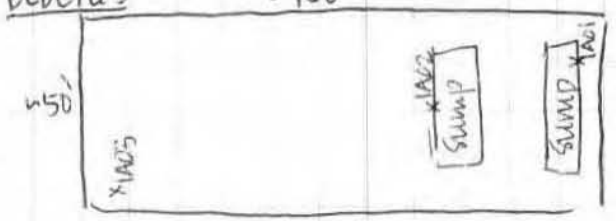
1215 Collect ~~3RD 1A measurement~~ SJS21-1A19-12A aft 8/1/12

CH_4	CO_2	O_2	BAL	H_2S
00.0	00.0	20.9	78.9	0.2
00.0	00.0	20.9	78.9	0.2

VOC 0.2 ppmv up HIGH
* CH_4 measurement ~ 20' above slab surface. H_2S measurement at ground surface.

1235 Measurements complete (indoor air). Measure outside of BLDG.

BLDG 603 ~100'



aft

Location SJCA SITE 21 Date 1/30/2012

Project / Client CTO WE-47 / NAVFAC

* MARC ROBBINS called to ask about building restrictions. Directed phone call to W. Bell. W. Bell will send M. ROBBINS LUC design.

250 W.Bell/NAVFAC, K Doran/VDEQ, J Allen/NNSY, & M ROBBINS/NNSY OFFSITE

301 MOBILIZE TO BLDG 1556. MEET POC (LT SETT SHORT).

305 Begin purge SV04. Purge vac 0" Hg. Collect ~1 L @ 200 mL/min.

309 END purge SV04. He 0.0% PASS
Multirae CH_4 0 O_2 19.5% H_2S: 0
CO_2 0 VOC 0

315 Begin collect SV04 w/ GEM 2000+

	CH_4	CO_2	O_2	BAL	H_2S
1315	00.0	0.7	21.5	78.5	0000
1315	00.0	0.9	20.1	78.9	0000
1316	00.0	1.0	19.8	79.2	0000

1335 Begin purge SV05. Purge vac 0" Hg Collect ~1L @ 200 mL/min.

1339 END purge. He 0% PASS
Multirae: O_2 20.0% VOC 0.0 H_2S: 0.0
CO_2: 0.0 CH_4: 0.0

1345 Begin collect SV05 w/ GEM 3000 (+)

APJ

Location SJCA SITE 21 Date 1/30/2012

Project / Client CTO WE-47/NAVFAC

	CH_4	CO_2	O_2	BAL	H_2S
1346	0.0	0.9	20.3	78.9	0000
1347	0.0	1.0	19.9	79.2	0000
1348	0.0	1.0	19.8	79.2	0000

1355 Begin purge SV01. Purge vac 0" Hg Collect ~1 L @ 200 mL/min

1400 END purge. He PASS
Multirae O_2: 17.4 VOC: 0.2 H_2S: 0.0
CO: 0 CH_4: 0

1405 Begin collect SV01 w/ GEM 2000+

	CH_4	CO_2	O_2	BAL	H_2S
1405	0.00	5.3	16.7	78.1	0000
1405	0.00	5.4	16.0	78.6	0000
1406	0.00	5.3	16.2	78.6	0000

1409 Collect IA sample from elevator shaft per request of VDEQ

	CH_4	CO_2	O_2	BAL	H_2S	VOC
1409	0.00	0.0	20.6	78.6	0000	0.0
1409	0.00	0.0	20.6	78.6	0000	0.0
1410	0.00	0.0	20.5	78.6	0000	0.0

1411 SIGN-OUT OF BLDG 1556. MOB TO BLDG 81.

1415 Begin BLDG Survey

APJ

Location SJCA - SITE 21 Date 1/30/12

Project / Client CTO-WC47 / NAVFAC

SJS21-IA14-12A adt 8/7/12

1430 Collect ~~measurement~~ 1 IN BLDG 81.

	CH_4	CO_2	O_2	BAL	H_2S
1430	0.0	0.0	20.5	79.5	0000
1430	0.0	0.0	20.6	79.4	0000
1431	0.0	0.0	20.6	79.4	0000

* MULTIRAE VOC 0.2 ppmv
* Collect CH_4 FROM ~10' FROM SLAB SURFACE. H_2S COLLECTED AT SLAB SURFACE.

SJS21-IA5-12A adt 8/7/12

1435 Collect ~~measurement 2~~ in Building 81

	CH_4	CO_2	O_2	BAL	H_2S
1435	0.0	0.0	20.7	79.3	0.0
1436	0.0	0.0	20.9	79.2	0.0
1436	0.0	0.0	20.7	79.3	0.0

Multirae VOC: 0.4 ppmv
* Collect CH_4 FROM ~8' FROM SLAB SURFACE. COLLECT H_2S AT SLAB SURFACE

SJS21-IA16-12A adt 8/7/12

1442 Collect ~~measurement 3~~ IN BLDG 81

	CH_4	CO_2	O_2	BAL	H_2S
1442	0.0	0.0	20.9	79.1	0000
1442	0.0	0.0	20.9	79.1	0000
1443	0.0	0.0	20.9	79.1	0000

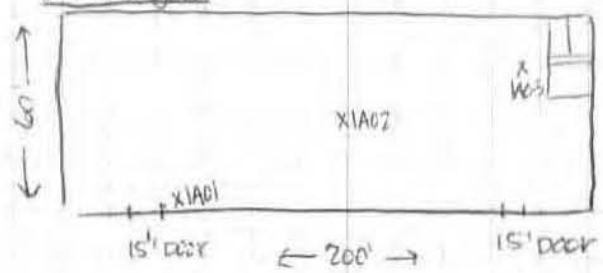
* Multirae 0.7 ppmv Collect CH_4/H_2S same as measurement 2 (BLDG 81).

adt

Location SJCA SITE 21 Date 1/30/12

Project / Client CTO WC47 / NAVFAC

BUILDING 81.



1505 MOB TO BLDG 68. BEGIN BUILDING SURVEY. SJS21-IA11-12A adt 8/7/12

1515 Collect ~~measurement~~ 1 W/ GEM 2000(+)

	CH_4	CO_2	O_2	BAL	H_2S
1515	0.0	0.0	20.9	79.0	0000
1515	0.0	0.0	20.9	79.0	0000
1516	0.0	0.0	20.8	78.9	0000

* MULTIRAE VOC: 0.0 ppmv. CH_4 collected ~7' above slab adt H_2S collected AT SLAB SURFACE.

1523 Collect ~~measurement 2~~ AT BLDG 68 W/ GEM 2000 + CH_4 ~7' above slab. SJS21-IA12-12A

	CH_4	CO_2	O_2	BAL	H_2S
1523	0.0	0.0	20.8	79.0	0000
1524	0.0	0.0	20.9	79.0	0000
1524	0.0	0.0	20.9	79.0	0000

adt

Location SJCA-Site 21 Date 1/30/12

Project / Client CTO WE47 / NAVFAC

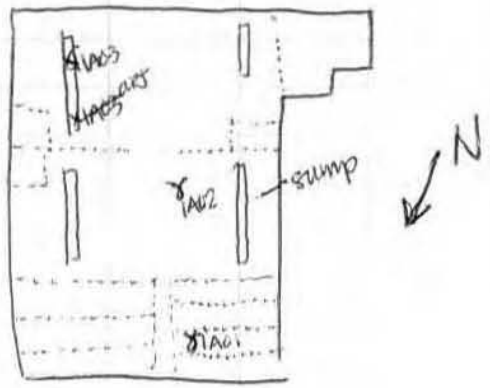
SJS21-IA17-12A APT 8/7/12

1530 COLLECT ~~measurement~~ #3 WITHIN BLDG 68. WITH GEM 2000+.

	CH_4	CO_2	O_2	BAL	H_2S
1530	00.0	00.0	20.7	79.2	0000
1536	00.0	00.0	20.8	79.2	0000
1537	00.0	00.0	20.8	79.2	0000

* MULTIRAE 0.0 ppmv. COLLECT H_2S FROM SUMP ~-3' BELOW SLAB SURFACE. CH_4 COLLECT FROM ~7' ABOVE SLAB SURFACE.

BLDG 68



1610 BUILDING SURVEY COMPLETE.

1615 W. BELL/NAVFAC CALLED TO CHECK ON STATUS. FIELD WORK COMPLETE AND ALL BUILDING CONTACTS EASY TO WORK WITH.

APT

Location SJCA-Site 21 Date 1/30/12

Project / Client CTO WE47/NAVFAC

1619 CALL PM (A. JONES) - VERIFY INFORMATION DISCUSSED WITH W. BELL. FIELD WORK COMPLETE.

1620 FIELD TEAM OFFSITE.

APPROVED 1/30/2012

Location SJCA SITE 21 Date 2/12/12

Project / Client CTO 47 / NAVFAC

0910 Depart office to head for SJCA

0915 Arrive at SJCA site 21 - BLDG 1556. Walt Bell/NAVFAC onsite to be building contact liason.

0950 Conduct H&S tailgate meeting. TOPIC: Slip, Trips, Falls and staying warm. Personnel: Aquones & G Moore. OBJECTIVES: Setup 10 1A Summa canisters. Will return tomorrow morning to collect canisters. WEATHER: Cold, Sunny, ~30°F. & patches of snow on ground from snow fall last night. Wind ~30 mph. Barometric pressure: 30.12" (AP) Source: Weather Underground

0957 Press air calibrate Multirae Plus IRS Environmental #1049115

1011 W Bell offsite - PO Smoot onsite to provide access to BLDG 1556.

1015 Setup 1A01. Can: JS-071. FC: JAX-R-53 IP: -30".

1022 Setup 1A02 | 1A02D. 1A02: Can: JS-064. Flow: JAX-R-02 1A02D: Can: JSC78. Flow JAX-R-54

apj

Location SJCA SITE 21 Date 2/12/12

Project / Client CTO WE47 / NAVFAC

T-junction: JT-007

Multirae reading: 0.0 ppmv (VOC)

1030 Setup 1A09. Can: JS-083 Flow: JAX-R-64 Multirae VOC: 0.0 ppmv

1035 Setup 1A03. Can JS-084 Flow JAX-R-60 Multirae VOC: 0.0 ppmv

1040 Setup 1A04. Can: JS-067 Flow: JAX-R-52 Multirae: 0.0 ppmv

1044 Setup 1A05. Can: JS-040 Flow: JAX-R-03 Multirae: 0.1 ppmv

1046 Begin collect SJS21-1A05-12A IP: -28.0" Hg.

1048 Begin collect SJS21-1A04-12A IP -30.0" Hg

1049 Begin collect SJS21-1A03-12A IP -30.0" Hg

1051 Begin collect SJS21-1A09-12A IP -30.0"

1053 Begin collect SJS21-1A02-12A IP: -29.5 SJS21-1A02D-12A IP -30

1055 Begin collect SJS21-1A01-12A IP: -30" Hg

1057 Depart BLDG 1556. CHECKED OUT W/ P.O. Smoot.

apj

Location SJCA SITE 21 Date 2/12/12

Project / Client CTO WE47 - NAVFAC

1100 MOB TO BLDG 47. DOOR UNLOCKED.

1103 SETUP SJS21-1AD6-12A (Begin collect).
Can JS-079 Flow JAX-R-12 IP: -28" Hg
Multirae VOC: 0.0 ppmv

1105 Begin collect SJS21-1A10-12A
Can: JS-094 Flow: JAX-R-62 IP: -30" Hg

1108 Begin collect SJS21-1A07-12A.
Can: JS-068 Flow: JAX-R-15 IP: -30" Hg

1112 Begin collect SJS21-1A08-12A
Can: JS-066 Flow: JAX-R-55 IP: -32" Hg

1120 Depart BLDG 47. SHUT DOOR BEHIND US AND CALL MARCUS SCOTT. HE WILL SEND SOMEONE OUT BEHIND US TO SECURE THE BUILDING.
* Marcus Scott POC for BLDG 47.

1130 Depart SJCA. TO RETURN TO OFFICE.
* Call M. Morrison to discuss missing Tedlar bags. Leave voicemail.

A.P Jones
2/12/12

Location SJCA SITE 21 Date 2/13/12

Project / Client CTO WE47 - NAVFAC

0555 Leave office

0630 Arrive onsite. Personnel.
A.P Jones and G. Moore / Cdr2HILL

0633 Conduct H&S meeting. Cold stress / complacency
OBJECTIVES: Collect indoor air samples (10 total) with buildings 47 & 1556.
Weather: COLD ~20°F. Clear. Wind ~3 MPH. pressure: 30.24 inches. Source. Weather Underground for Chesapeake, VA

0640 Check in at BLDG 1556. Samples range from -5" to -18" of pressure.

0648 Collect SJS21-1A05-12A FP: -5" Hg. for select VOCs by TO-15.

0653 Depart BLDG 1556 - MOB to BLDG 47. Check samples - pressure range from -0.5" to -12.5"

0700 Collect SJS21-1A01-12A FP -5" Hg for select VOCs by TO-15

0900 Check on canisters within BLDG 1556 and walk building again to confirm building survey

APJ

CONDUCTED LAST WEEK. * NOTE - CURRENT OCCUPANTS ARE MOVING OUT.
FIND 2 ADDITIONAL 'GRATE AREAS', SEVERAL ADDITIONAL FLOOR DRAINS, DAYLIGHTING EXPANSION JOINTS, AN OPEN SEWER DRAIN OUT (DEPTH ~4', COLLECT MULTIRAE VOC READING ~ 22" INTO HOLE - MAX READING 0.4 ppmv. ANOTHER PENETRATION THROUGH SLABS LOCATED NEAR OPEN SEWER CLEANOUT - LOOSE COVER OVER TOP. MULTIRAE VOC = 0.0 ppmv.) AND CHANGES IN ROOM USE (i.e. BREAK ROOM NO LONGER PRESENT - NO FILE ROOM).

0933 COLLECT SJS21-IA03-12A AT -5" Hg. FOR SELECT VOCS BY TO-15.

0955 ~~HCS~~ ART COLLECT SJS21-IA01-12A AT -5" Hg FOR SELECT VOCS BY TO-15.

* CALLED M MORRISON TO DETERMINE MINIMUM PRESSURE FOR CANISTER TO ACHIEVE PALS.

1010 CHECK OUT AT BLDG 1556. MOB TO BLDG 47. CALL A. JONES | PM TO

APT

CHECK FOR DELIVERY FROM CAS (TEDLAR BAGS); TEDLAR BAGS DID NOT ARRIVE.

1030 ALL SAMPLES remaining IN BLDG 47 RANGE IN PRESSURE FROM -9.5" TO -12"
* NOTE TRUCKS pulling in AND OUT OF BUILDING DURING SAMPLE COLLECTION PERIOD (BUILDING 47).

1140 M. MORRISON CALLED. CAS HAS NOT SENT TEDLAR BAGS OUT. WILL SEND OVERNIGHT TO END ~~SAMPLE COLLECT~~ APT SAMPLE COLLECTION (H2S SAMPLES TOMORROW). ADDITIONALLY, ENCO

APT 1200 INDICATED THE SAMPLES SHOULD BE COLLECTED AT 24 HRS BUT MAY BE DILUTED AND PALS MAY NOT BE ACHIEVED.

1300 CALL A JONES | PM TO RELAY INFO. A RETREE JONES TASKED WITH CALCULATING PERIOD TO ACHIEVE -10" FOR IA09.

1305 CHECK PRESSURE ON REMAINING CANISTERS AT BLDG 47. - PRESSURE RANGE FROM -8" TO -9".

1310 MOB TO Bldg 1556. CHECK IN.

APT

1220 Remaining pressure at IA09 is -14".
Calculate approximate flow rate:
Initial pressure - current canister pressure
Sample collection period
Sample start 1051 on 2/12/12
Sample check 1220 2/13/12
Collection period ~ 25.5 HRS
→ -30 - (-14) = 16" Hg / 25.5 HRS
Collection rate ~ 0.63" / Hr.
To achieve F_p of -10" Hg:
$\frac{0.63"}{1\ Hr} = \frac{4"}{X\ Hr}$ ⇒ 6.3 HRS
It will take ~ 6.3 HRS to achieve F_p of -10" Hg. This corresponds to ~ 1900 HRS.
1223 Inform PM (A. Jones) about IA09. Decision to collect the sample based on the following facts:
① Lab has been able to extract undiluted sample from canister achieving -15" Hg (different lab).
② ENCO scud to collect at end of 24 Hr period
③ Sample during RI phase collected and analyzed w/ pressure of -19" Hg.
④ Sample location 'IA09' is considered 'extra' sample location.
1224 Collect SJS21-IA04-12A at -7" Hg for select VOCs by TO-15
1245 Collect SJS21-IA02-12A at -6" Hg (and SJS21-IA02R-12A at -8" Hg for select VOCs by TO-15.
1250 Collect SJS21-IA01-12A at -14" Hg. for select VOCs by TO-15.
1302 Collect SJS21-IA08-12A at -8.75" Hg. for select VOCs by TO-15.
* Did not use JS-008 and JAX-R-01. I_p for canister -18" Hg.
1310 Collect SJS21-IA10-12A at -7.5" Hg for select VOCs and by TO-15.
1309 Collect SJS21-IA06-12A at -9" Hg. for select VOCs by TO-15.
1320 Depart SJCA to head to office.
* Activities within bldg 1550 the morning of 2/13/12 include forklift operation (battery and propane operated) and packing of materials (everything) to move

Location SJCA Site 21 Date 2/14/12

Project / Client CTO We47 / NAVFAC

1240 Arrive onsite to collect H_2S air samples
Personnel: A.P. Jones and G. Moore
Weather: Partly cloudy ~55°F. Wind ~5 mph Pressure 30.16 in. (wunderground.com)
245 Conduct H&S meeting: PINCH POINTS.
248 Fresh air calibrate Multirae.
TRS environmental #1009115.
300 Begin collect SJS21-1A02-12A.
Air pump: ASL 4057PU
FC: ASL 4087FM
1305 Collect ~1L into Tedlar Bag for sample SJS21-1A02-12A. Collect ~3.5' ~~from~~ above slab surface for H_2S
310 Collect ~1L for SJS21-1A02P-12A ~3.5' above slab surface for H_2S ~~analysis~~ analysis.
318 Collect ~1L for SJS21-1A04-12A ~3.5' above slab surface for H_2S analysis. Collect at a rate of ~200 mL/min.
325 Collect ~1L for SJS21-1A03-12A ~3.5' above slab surface for H_2S analysis. Collection rate ~200 mL/min
1335 Collect ~1L for SJS21-1A04-12 ~3.5' above slab surface for H_2S

cont

Location SJCA Site 21 Date 2/14/12

Project / Client CTO We47 / NAVFAC

analysis at a rate of ~200 mL/min. *Note - garage door open during sample
1343 Collect SJS21-1A05-12A ~1L collected at 200 mL/min ~3.5' above slab surface for H_2S analysis
1355 Collect SJS21-1A01-12A ~1L collected at 200 mL/min ~3.5' above slab surface for H_2S analysis.
* Minimal activity ongoing while samples were collected. 1 propane (AD) ~~operated~~ fueled forklift operated/ran for ~5 minutes while we were not sampling. Garage doors near 1A04 and 1A05 open while sample collected. No H_2S detected throughout the building measured by Multirae.
1356 Mob to Bldg 47; check out of Bldg 1552
1405 Collect SJS21-1A06-12A ~1L collected @ 200 mL/min ~3.5' above slab surface for H_2S analysis.
1410 Collect SJS21-1A10-12A Same details as 1A06 above.

cont

Location SJCA Site 21 Date 2/14/12

Project / Client CTO WC-47

1418 Collect SJS21-IA07-12A same details as IA06.

1425 collect SJS21-IA08-12A same details as IA06.

* No activities ongoing during sample collection. garage door opened near IA08.

1435 Field team offsite to ship samples.

Angela P Times
2/14/12

Location Date

Project / Client

Indoor, Outdoor, and Crawl Space Air Sampling Log - Canister Method

Sheet 1 of __

Project Information

Project Name: SJCA SITE 21 - BUILDING 1556 Project #: 419689.LT.F1

Sampler Name: AP JONES / G MOORE Date: 2/12/2012

Sampling Data Log

Sample Location	Field ID	Canister ID	Flow Controller ID	Initial Canister Pressure ("Hg)	Initial Flow Controller Rate (~~ml/min~~ HRS)	Start Date & Time	End Date & Time	Final Pressure ("Hg)	Final Flow Controller Rate (~~ml/min~~) HRS
1A01	SJS21-1A01-12A	JS-071	JAX-R-53	-30	24	2/12/12 1055	2/13/12 0955	-5	-23
1A02	SJS21-1A02-12A	JS-064	JAX-R-02	-29.5	"	2/12/12 1053	2/13/12 1245	-6	-26
1A02	SJS21-1A02D-12A	JS-078	JAX-R-56	-30	"	2/12/12 1053	2/13/12 1245	-8	-26
1A03	SJS21-1A03-12A	JS-084	JAX-R-60	-30	"	2/12/12 1049	2/13/12 0933	-5	-23
1A04	SJS21-1A04-12A	JS-067	JAX-R-52	-30	"	2/12/12 1048	2/13/12 1224	-7	-25.5
1A05	SJS21-1A05-12A	JS-040	JAX-R-03	-28	"	2/12/12 1046	2/13/12 0648	-5	-20
1A09	SJS21-1A09-12A	JS-083	JAX-R-64	-30	"	2/12/12 1051	2/13/12 1250	-14	-26

Sample Location Diagram

See ULFP-SAP

N

Note:
Draw in outline the structure's foundation and interior walls, identify rooms, and note other defining features. Show location of canister relative to physical objects, etc.

Weather conditions and indoor temperature: OUTSIDE - SUNNY, CLEAR ~30°F. WIND ~30 MPH. BAROMETRIC PRESSURE 30.12" (SOURCE WEATHER UNDERGROUND FOR CHESAPEAKE VA). INDOOR TEMP ~48°F.

Other Observations and Comments (note any unique circumstances): SAMPLES INITIATED ON SUNDAY WITH NO ONE IN BLDG. INCLUDED 'DO NOT DISTURB' AND FACT SHEETS W/ CANISTERS

QC and Reviewed 8/2011

Indoor, Outdoor, and Crawl Space Air Sampling Log - Canister Method

Sheet 1 of __

Project Information

Project Name: SJCA SITE 21 - BUILDING 47 Project # : 449689.4.1 FI

Sampler Name: A.P. Jones / G. Moore Date: 2/12/2012

Sampling Data Log

Sample Location	Field ID	Canister ID	Flow Controller ID	Initial Canister Pressure ("Hg)	Initial Flow Controller Rate (~~ml/min~~)	Start Date & Time	End Date & Time	Final Pressure ("Hg)	Final Flow Controller Rate (~~ml/min~~)
IA06	SJS21-IA06-12A	JS-079	JAX-R-12	-28	24	2/12/12 1108	2/13/12 1309	-9	~26
IA07	SJS21-IA07-12A	JS-068	JAX-R-15	-30	"	2/12/12 1108	2/13/12 0700	-0.5	~20
IA08	SJS21-IA08-12A	JS-066	JAX-R-55	-32	"	2/12/12 1102	2/13/12 1302	-8.75	~26
IA10	SJS21-IA10-12A	JS-094	JAX-R-62	-30	"	2/12/12 1105	2/13/12 1304	-7.5	~26

Sample Location Diagram

See WFP-SAP

N

Note:

Draw in outline the structure's foundation and interior walls, identify rooms, and note other defining features. Show location of canister relative to physical objects, etc.

Weather conditions and indoor temperature: outside: sunny, clear ~30°F, WIND ~30 MPH. Barometric pressure 30.12" (source Weather Underground for Chesapeake, VA). Indoor temp ~50°F.

Other Observations and Comments (note any unique circumstances): Samples initiated on Sunday with no one in bldg. Cars parked inside building during sample collection period. Fact sheets and "DO NOT DISTURB" signs setup w/ canisters.

QC and Reviewed 8/2011

Attachment B

Building 47

Photo 1 – January 30, 2012
Building 47: Garage and storage area

Photo 2 – January 30, 2012
Building 47: Storage area

Photo 3 – January 30, 2012
Building 47: Seating area and storage area in the center of the building

Photo 4 – January 30, 2012
Building 47: Exercise area located in the center of the building

Photo 5 – January 30, 2012
Building 47: Caged-off storage area in center of the building; containing flammable lock box #1 and #2

Photo 6 – January 30, 2012
Building 47: Locker room in center of the building

Photo 7 – January 30, 2012
Building 47: Supply room

Photo 8– January 30, 2012
Building 47: Storage area

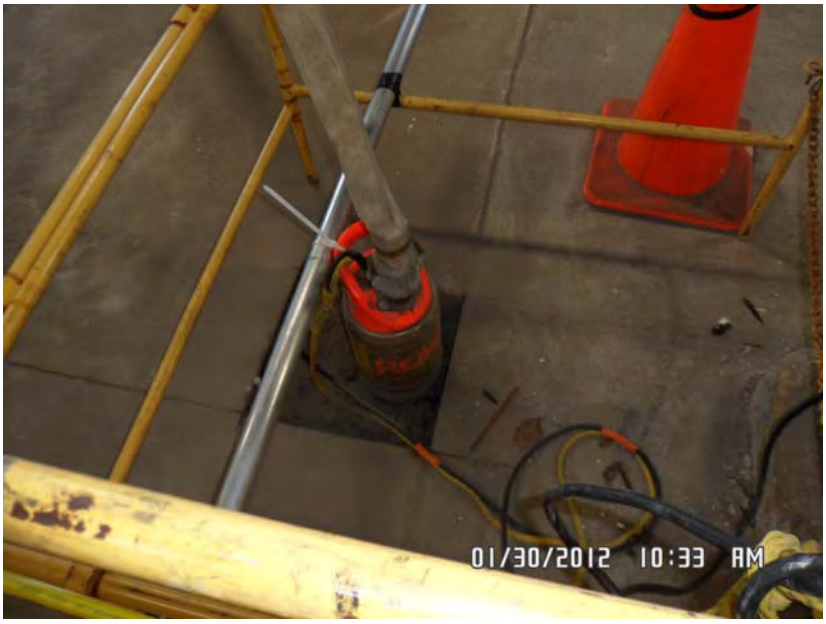


Photo 9 – January 30, 2012
Building 47: Missing portion of slab

Photo 10 – February 13, 2012
Building 47: Cut in slab outside of breakroom

Building 54

Photo 11 – January 30, 2012
Building 54: Steam pipe discharge on northeast corner of building

Photo 12 – January 30, 2012
Building 54: Outside view of building

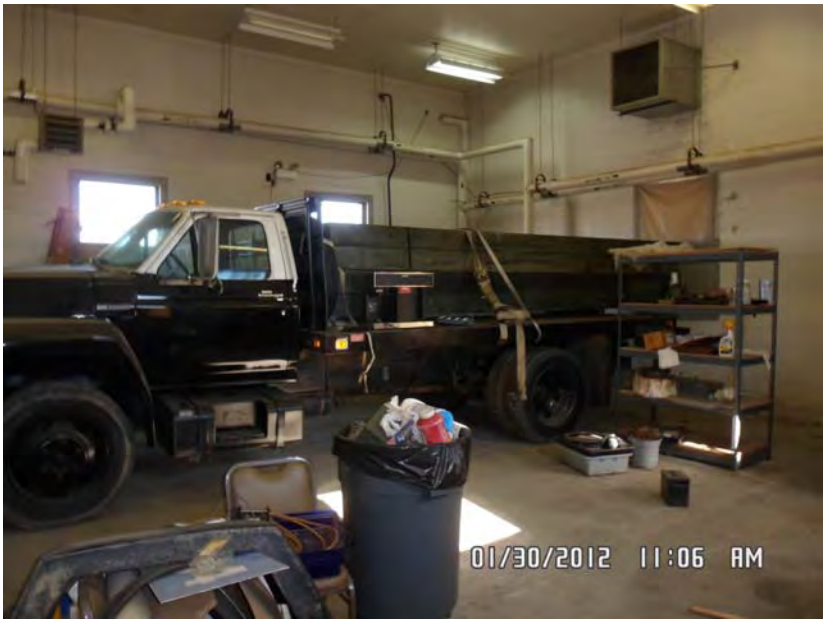


Photo 13 – January 30, 2012
Building 54: Inside view of building

Photo 14 – January 30, 2012
Building 54: Inside view of building with hand crafted office space

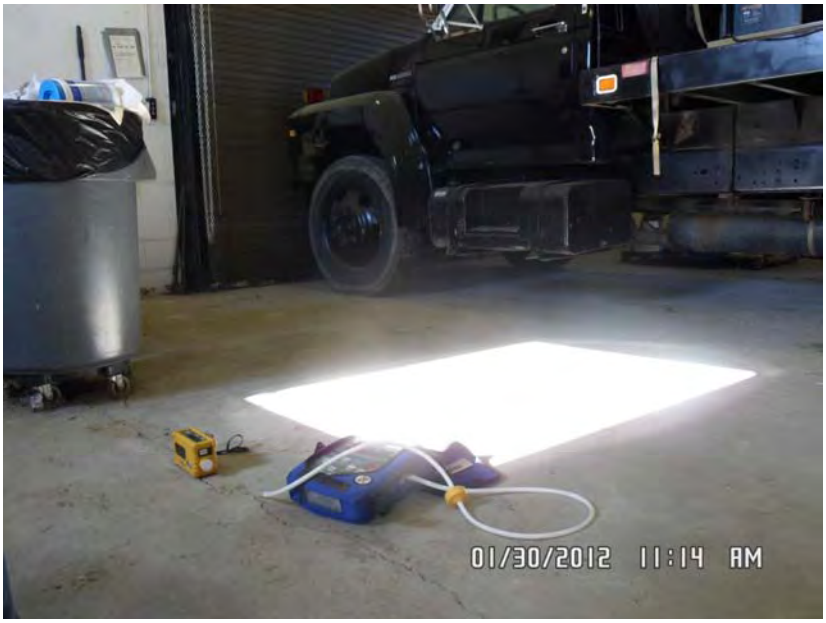


Photo 15 – January 30, 2012
Building 54: Measurement of hydrogen sulfide in indoor air to assess potential explosive hazard
b

Photo 16 – January 30, 2012
Building 54: Steam pipe construction

Building 63

Photo 17 – January 30, 2012
Building 63: Steel plates covering discharge area

Photo 18 – January 30, 2012
Building 63: Floor grates at discharge area

Photo 19 – January 30, 2012
Building 63: Steel plates covering grates in the floor

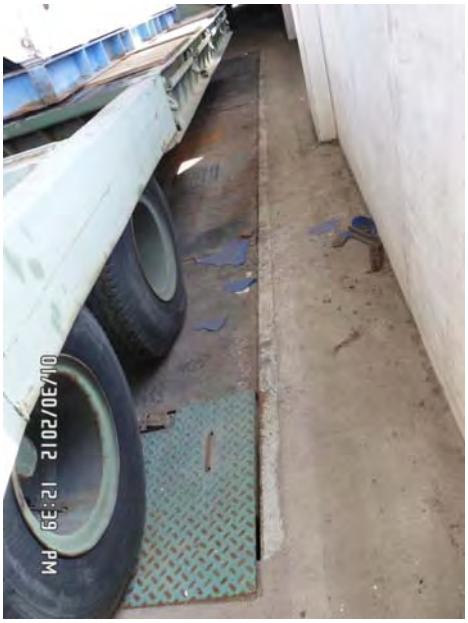


Photo 20 – January 30, 2012
Building 63: Steel plates covering grates in the floor

Photo 21 – January 30, 2012
Building 63: View of building ceilings

Photo 22 – January 30, 2012
Building 63: Drainage in shower/decontamination area

Photo 23 - January 30, 2012
Building 63: High pressure water system; pipes penetrate slab

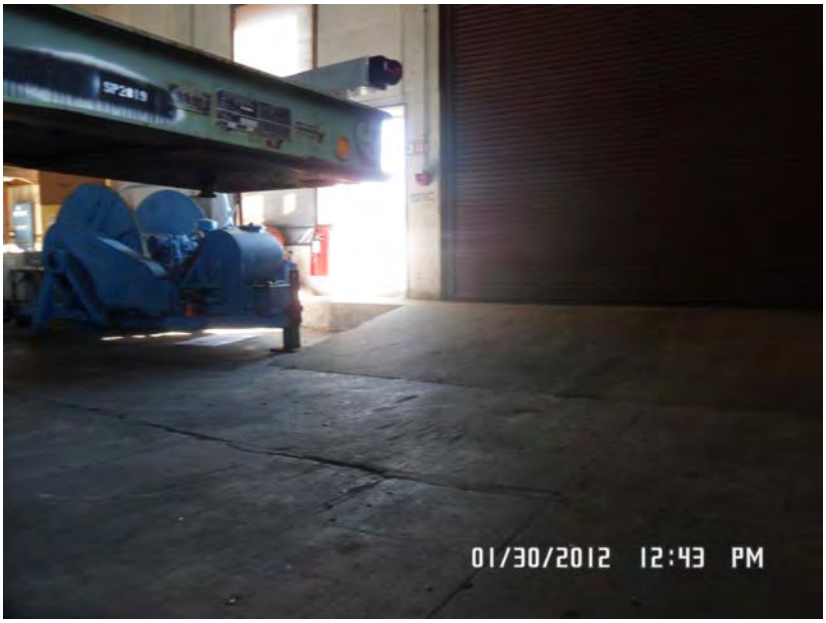


Photo 24 – January 30, 2012
Building 63: Main floor; located about 1.5 ft below ground surface

Photo 25 - January 30, 2012
Building 63: Storage area

Photo 26 – January 30, 2012
Building 63: Measurement of hydrogen sulfide in indoor air to assess potential explosive hazard

Photo 27 – January 30, 2012
Building 63: Measurement of methane in indoor air to assess potential explosive hazard

Photo 28 – January 30, 2012
Building 63: Loading dock area

Photo 29 – January 30, 2012
Building 63: Outside view of building

Photo 30 – January 30, 2012
Building 63: Outside view of building

Photo 31 – January 30, 2012
Building 63: Loading dock area outside of building

Building 68

Photo 32 – January 30, 2012
Building 68: Outside view of building

Photo 33 – January 30, 2012
Building 68: Sub-foundation drainage access

Photo 34 – January 30, 2012
Building 68: Outside view of building

Photo 35 – January 30, 2012
Building 68: Open pipe penetrating slab

Photo 36 – January 30, 2012
Building 68: Abandoned storage unit inside building

Photo 37 – January 30, 2012
Building 68: Abandoned storage room

Photo 38– January 30, 2012
Building 68: High voltage machinery; without power

Photo 39 – January 30, 2012
Building 68: Abandoned storage room inside building

Photo 40 – January 30, 2012
Building 68: Office space with hand-crafted office located above

Photo 41 – January 30, 2012
Building 68: Exposed pipes penetrating the slab

Photo 42 – January 30, 2012
Building 68: Hand-crafted office located on "2nd floor"

Photo 43 – January 30, 2012
Building 68: Hand-crafted office located on "2nd floor"

Photo 44 – January 30, 2012
Building 68: Abandoned restroom

Photo 45 – January 30, 2012
Building 68: Hand-crafted office located on "2nd floor"

Photo 46 – January 30, 2012
Building 68: Storage area

Photo 47 – January 30, 2012
Building 68: Steel plate covering subflooring pipes

Photo 48 – January 30, 2012
Building 68: Storage area

Photo 49 – January 30, 2012
Building 68: Abandoned office area

Photo 50 – January 30, 2012
Building 68: Abandoned office area

Photo 51 – January 30, 2012
Building 68: Steel plate covering subflooring pipes

Photo 52 – January 30, 2012
Building 68: Abandoned office area

Photo 53 – January 30, 2012
Building 68: Abandoned storage space

Photo 54 – January 30, 2012
Building 68: Inside view of building

Photo 55 – January 30, 2012
Building 68: Paint can storage

Building 81

Photo 56 – January 30, 2012
Building 81: Outdoor view of the building

Photo 57 – January 30, 2012
Building 81: Caged-in storage area within the building

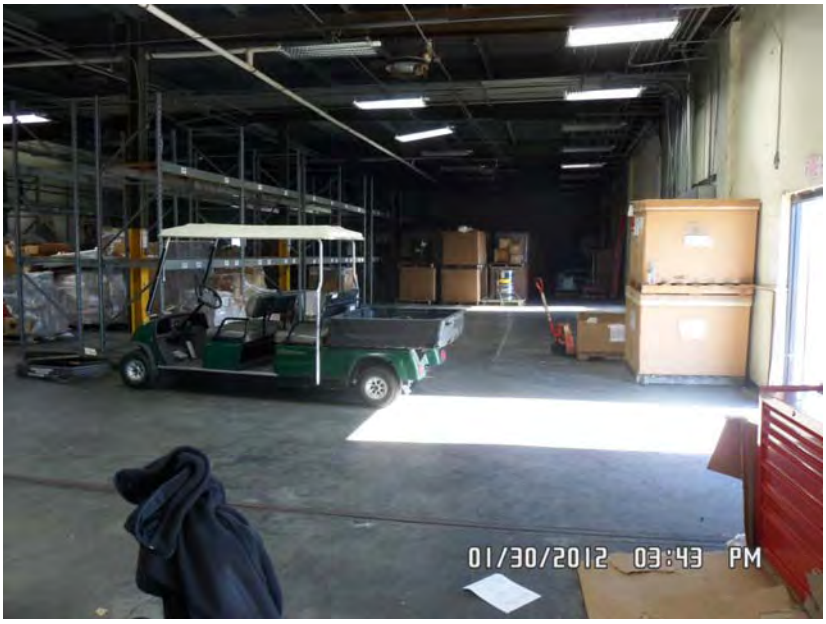


Photo 58 – January 30, 2012
Building 81: Storage area

Photo 59 – January 30, 2012
Building 81: Measurement of hydrogen sulfide in indoor air to assess potential explosive hazard

Photo 60 – January 30, 2012
Building 81: Crack in the slab

Photo 61 – January 30, 2012
Building 81: Bathroom

Photo 62 – January 30, 2012
Building 81: Storage area

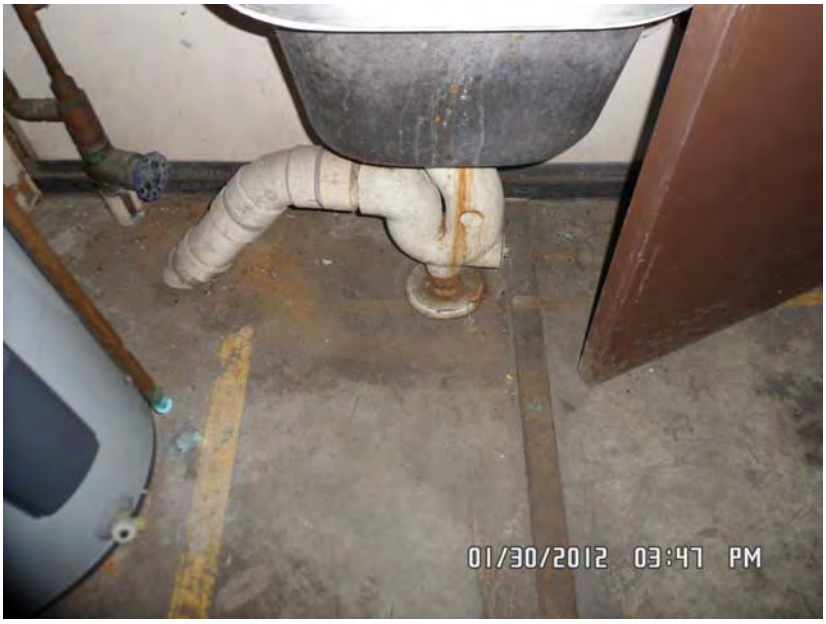


Photo 63 – January 30, 2012
Building 81: Basin wash sink drainage

Photo 64 – January 30, 2012
Building 81: Slab crease

Photo 65 – January 30, 2012
Building 81: Measurement of hydrogen sulfide in indoor air to assess potential explosive hazard

Building 1556

Photo 66 – January 30, 2012
Building 1556: Explosive hazard COI indoor air measurement in elevator shaft

Photo 67 – February 13, 2012
Building 1556: Sealed expansion joint in slab located between IA02 and IA09

Photo 68 – February 13, 2012
Building 1556: Floor drain and are of patched slab near PM01

Photo 69 – February 13, 2012
Building 1556: Additional floor grate section found southwest of IA04; located because current building occupants are packing up the building for relocation

Photo 70 – February 13, 2012
Building 1556: Warehouse area near IA05

Photo 71 – February 13, 2012
Building 1556: Current condition of crack in slab noted in the 2009 building survey

Photo 72 – February 13, 2012
Building 1556: Collection of indoor air sample IA04

Photo 73 – February 13, 2012
Building 1556: Condition of slab southwest of IA04

Photo 74 – February 13, 2012
Building 1556: Open sewer clean-out located southwest of IA05; not identified during previous investigation because equipment was stored overtop of the clean-out

Photo 75 – February 13, 2012
Building 1556: HVAC system for office located southwest of IA04; west of former break room; slab covered by carpet

Photo 76 – February 13, 2012
Building 1556: Seal in slab outside of the men's restroom (central portion of building)

Photo 77 – February 13, 2012
Building 1556: Seal in slab south of IA04

Photo 78 – February 13, 2012
Building 1556: Seal around grounds for electrical box; located outside of former break room entrance

Photo 79 – February 13, 2012
Building 1556: Electric room (labeled Batter Room 132) located along the middle/western portion of the building

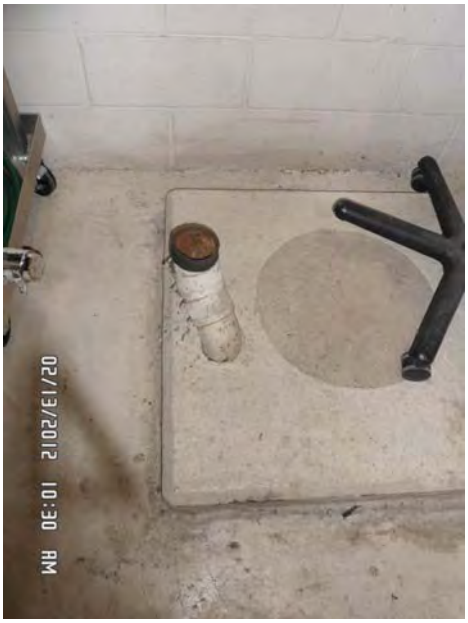


Photo 80 – February 13, 2012
Building 1556: Exposed pipe protruding from slab surface southeast of IA03

Photo 81 – February 13, 2012
Building 1556: Replaced area of slab; seals in fair condition; manhole cover bolted to slab

Photo 82 – February 13, 2012
Building 1556: Seal behind grounds for electric box near front entrance (west of IA02, north of IA01)

Photo 83 – February 13, 2012
Building 1556: Slab seal near front entrance (west of IA02, north of IA01)

Attachment C

ATTACHMENT C

Data Usability Assessment

Indoor air samples were collected by CH2M HILL staff following the standard operating procedures outlined in the project-specific uniform federal policy – sampling and analysis plan (UFP-SAP) (CH2M HILL, 2011). The samples were submitted to independent off-site laboratories for the analysis of select Volatile Organic Compounds (VOCs) by United States Environmental Protection Agency (USEPA) TO-15 at Environmental Conservation Laboratories and hydrogen sulfide by the American Society of Testing and Materials (ASTM) method D5504 at Columbia Analytical Services.

In accordance with the *Final Sampling and Analysis Plan (Field Sampling Plan and Quality Assurance Project Plan) Site 21- Industrial Area Vapor Intrusion Monitoring, St. Juliens Creek Annex, Chesapeake, Virginia* (CH2M HILL, 2011), a data usability assessment was performed for the data collected on February 13-14, 2012 . As described in the UFP-SAP worksheets #34-36, this data has gone through several levels of data verification and validation. This includes internal laboratory quality control (QC) checks, CH2M HILL verification procedures, internal CH2M HILL Level III validation on all analytical results, and internal CH2M HILL Level IV validation (re-calculation of results) on 10% of the analytical results.

This data usability assessment evaluates the overall measurement performance results and their potential effects on data availability for decision-making. “Availability” in this context refers to whether results can be used by the project team based on their analytical soundness. If a result is analytically sound, it is available to use for evaluating the potential releases, nature and extent of contamination, and estimating potentially associated human health and ecological risks.

1.1 Quality Assurance/Quality Control Samples

Quality Assurance (QA)/QC samples were collected in the field and sent to the laboratory to document the quality of field sampling. One field duplicate was collected to assess precision between parent and duplicate samples.

Laboratory QA/QC samples were prepared and analyzed to measure the precision and accuracy of their analytical results and aid in the usability assessment process. The laboratory QA/QC samples consisted of method blanks, laboratory control samples, surrogates, internal standards, and laboratory duplicates.

1.2 Data Validation Process

During the data validation process, QA/QC criteria established in the UFP-SAP or in the analytical method were used to evaluate the data quality in a process similar to that outlined in *Contract Laboratory Program Region III Modifications to National Functional Guidelines for Organic Data Review, Multi Media Multi Concentration* (USEPA, 1994).

The data validation included a recalculation of 10% of the analytical results and consisted of review of the following:

- Holding times
- Completeness

- Method blank contamination
- Initial and continuing calibration accuracy and precision
- Laboratory control sample accuracy and precision
- Internal standard response and retention time accuracy
- Surrogate spike recovery accuracy
- Field and laboratory duplicate precision

In cases where acceptance criteria for these aspects of data quality were not met, the validator applied a data qualifier to the data. The qualifiers that may be used are defined in Section 1.2.1.

1.2.1 Primary Validation Qualifiers

Validation qualifiers were assigned to the data subsequent to the laboratory analysis; the list of qualifiers available to the validator is defined in Table 1, the frequency with which qualifiers were applied is presented in Table 2; not all available qualifiers were applied to this dataset.

Table 1 - Primary Validation Qualifiers

Qualifier	Description
[none]	The analyte is present at the concentration reported.
U	Analyte not detected at a concentration greater than the detection limit (DL).
J	Analyte is present; concentration is estimated because it is below the quantitation limit or because of an associated QC exceedance and may be inaccurate or imprecise.
K	Analyte is present; concentration is estimated and may be biased high.
B	Analyte is present; concentration is not significantly greater than that found in an associated field or laboratory blank and the result is usable as a non-detect.
L	Analyte is present; concentration is estimated and may be biased low.
UL	Analyte is not present; quantitation limit is biased low.
UJ	Analyte is not present; quantitation limit may be inaccurate or imprecise.
R	Presence of analyte unknown; result is rejected because the data is unreliable and not available for decision-making.

1.3 Data Usability Assessment Findings

A select list of VOCs was analyzed by EPA TO-15: 1,1-dichloroethene, 1,2-dichloroethane, cis-1,2-dichloroethene, trans-1,2-dichloroethene, trichloroethene, and vinyl chloride. Additionally, hydrogen sulfide was analyzed using ASTM D5504. Excluding lab and field QA/QC samples, 77 data results were generated; Table 2 shows the distribution of qualified results. The following is a review of QC issues that warranted data qualification. All data were considered usable.

Table 2 Validation Qualifiers Applied to Site 21 VI Data

Validation Qualifier	Count	Percent
U	73	94.81%
J	4	5.19%
	77	100.00%

100.00% not R-qualified and is available for use

Data that have a U- or a J-qualifier are usable as reported by the laboratory. The 73 U-qualified results were not detected by the laboratory. All J-qualifiers (4 results) were due to the result being between the Limit of Quantitation (LOQ) and DL. J-qualified results are to be considered "estimated" and are usable as detects by risk assessors.

The method detection limit (MDL) reported by Columbia Analytical Services for hydrogen sulfide was higher than that listed in the UFP-SAP. This was addressed with the laboratory, who confirmed that they performed a new MDL study between the time of UFP-SAP production and field sampling, resulting in a slightly higher MDL.

The quality of the data reported for the indoor air sampling at St. Juliens Creek Annex Site 21 is of excellent quality. The entire dataset is available for use as reported.

1.4 References

CH2M HILL. 2011. *Final Sampling and Analysis Plan (Field Sampling Plan and Quality Assurance Project Plan) Site 21- Industrial Area Vapor Intrusion Monitoring, St. Juliens Creek Annex, Chesapeake,, Virginia.* November.

USEPA. 1994. *USEPA Contract Laboratory Program Region III Modification to National Functional Guidelines for Organic Data Review, Multi Media Multi Concentration.* September.

Attachment D

Industrial / Commercial Building Survey for Vapor Intrusion Evaluation

Date: 2/3/2012 Project Name / #.: STCA SITE 21 WE 47

Preparer(s): AP JONES G. BUCKLEY 4196849. LTIF1

Facility Name: STCA

Building ID: 47

Address: SITE 21

Contact Person: MARCUS SCOTT

Phone Number: ~~757 500~~ 757.396.5700

e-mail address:

Building Description

Building or Room Identifier: BLDG 47

Primary Activity within Building (select one):

☐ Manufacturing ☒ Storage ☐ Other

☐ Chemical processing ☐ Chemical Storage

☐ Administrative ☐ Instrumentation/Control

Historical Activities within Building (if different from above): PAINT SHOP PREVIOUSLY AND POSSIBLY AUTO REPAIR OPERATIONS

Notes:

Construction/Remodel Date(s) NONE KNOWN

Approximate floor space

Number of floors 1 Ceiling height(s) ~20' ON SIDES; ~30' IN CENTER

Multi-room building ☒ or Single room ☐

Aboveground Construction ☒ Wood ☐ Concrete

☐ Brick ☐ Cinderblock

☐ Other CORRUGATED METAL SIDING

Floor plan attached? ☒ Yes ☐ No

Notes:

Evaluation of Potential Conduits from Soil

Building ID: 47

Floor/foundation description (check all that apply)

- [ ] Wood
- [X] Concrete
- [X] Elevated above grade? Feet above grade: ~0.5'
- [ ] Other: some areas where floor cutout - see previous bldg surveys
- [ ] Below grade? Feet above grade:
- [ ] Slab on grade?

Expansion joints present (if concrete floor)?	[X] Yes	[ ] No	[ ] N/A
Are expansion joints sealed?	[ ] Yes	[X] No	[ ] N/A
Are sumps or floor drains present?	[X] Yes	[ ] No	[ ] N/A restrooms
Are basements or subsurface vaults present?	[ ] Yes	[X] No	[ ] N/A
Are there subsurface drainage problems?	[ ] Yes	[X] No	[ ] N/A

Notes/Explanation for N/A responses: A' ceiling contains multiple leaks so water gathers in low depressions within concrete.

Evaluation of Potential Pathways/Driving Forces

Are there locations with elevated positive or negative pressure (look for doors not opening/closing properly, perceptible airflow, audible fan noise)? yes. back room near SVOC door will not shut

Is there one air conditioning zone or multiple zones (if in a multi-room building)?

- [ ] Single zone
- [X] Multi-zone
- [ ] Other: small offices/ break room have individual window units

(Building management may know; another tip: presence of multiple thermostats = multiple zones)

Sources of outdoor air

- [ ] Mechanical (air handling unit)
- [ ] Attic Fans
- [X] Windows
- [X] Doors

large exhaust fans noted in previous building survey)

Are windows/doors left open routinely? [X] Yes [ ] No

Notes: several windows remain open at all times - tarps setup near locations in ceiling where leaks are present and attached to windows to direct the water through the window.

Evaluation of Potential Existing Chemical Sources Indoors

Building ID: 47

List principal solvent or VOC-containing products used (obtain MSDSs if available)

See photo - petroleum based solvents

Are any of the target analytes used in this building/room?

☐ Yes ☐ No

none observed

Are pesticides used indoors for pest control? ☐ Yes ☒ No

Names of pesticide products used? none known

Has there been a pesticide application within the past 6 months? ☐ Yes ☒ No

Is smoking permitted in the building? ☐ Yes ☒ No

smoking permitted inside gazebo in north parking lot

Description of Vapor Mitigation Systems

Has a radon or vapor mitigation system been installed in this building/room? ☐ Yes ☒ No

Date of installation? _____

Type of system?

☐ Passive venting ☐ Active subslab depressurization

☐ Crack/crevice sealing ☐ Dilution ventilation control

☐ N/A

Notes: _____

Additional Notes **Building ID:** 47

① Southern portion of building no longer used for recycling. No other changes noted.

② MSDS sheets / chemical inventory taped on outside of each firetime locker (see photos).

③ In area that roof leaks badly (northern portion of building - a small square was cutout of slab and a small/medium pump was installed to pump water outside - see photos.

Industrial / Commercial Building Survey for Vapor Intrusion Evaluation

Date: 1/30/2012 Project Name / #: 409689.LT.F1

Preparer(s): AP PONCE & BUCKLEY

Facility Name: SJCA-SITE 21

Building ID: 54

Address: SJCA-SITE 21

Contact Person: MARK ROBBINS

Phone Number: 757.353.1823

e-mail address:

Building Description

Building or Room Identifier: 54

Primary Activity within Building (select one):

- ☐ Manufacturing
- ☒ Storage
- ☐ Other
- ☐ Chemical processing
- ☐ Chemical Storage
- UNOCCUPIED
- ☐ Administrative
- ☐ Instrumentation/Control

Historical Activities within Building (if different from above): NONE KNOWN PREVIOUSLY OCCUPIED

Notes:

Construction/Remodel Date(s): —

Approximate floor space: ~1015 FT²

Number of floors: 1 Ceiling height(s): ~ 20'

Multi-room building ☐ or Single room ☒

Aboveground Construction

- ☐ Wood
- ☒ Concrete
- ☐ Brick
- ☐ Cinderblock
- ☐ Other

Floor plan attached? ☒ Yes ☐ No - SEE PG 6

Notes:

Evaluation of Potential Conduits from Soil

Building ID: 54

Floor/foundation description (check all that apply)

- [ ] Wood
- [x] Concrete
- [ ] Other _____
- [ ] Elevated above grade? Feet above grade: _____
- [ ] Below grade? Feet above grade: _____
- [x] Slab on grade?

Expansion joints present (if concrete floor)?	[ ] Yes	[x] No	[ ] N/A
Are expansion joints sealed?	[ ] Yes	[ ] No	[x] N/A
Are sumps or floor drains present?	[ ] Yes	[x] No	[x] N/A
Are basements or subsurface vaults present?	[ ] Yes	[x] No	[x] N/A
Are there subsurface drainage problems?	[ ] Yes	[ ] No	[ ] N/A none observed

Notes/Explanation for N/A responses: NO expansion joint noted

Evaluation of Potential Pathways/Driving Forces

Are there locations with elevated positive or negative pressure (look for doors not opening/closing properly, perceptible airflow, audible fan noise)? none observed

Is there one air conditioning zone or multiple zones (if in a multi-room building)? none observed

- [ ] Single zone
- [ ] Multi-zone
- [ ] Other _____

(Building management may know, another tip: presence of multiple thermostats = multiple zones)

Sources of outdoor air

- [ ] Mechanical (air handling unit)
- [ ] Attic Fans
- [x] Windows
- [x] Doors

Are windows/doors left open routinely? [ ] Yes [ ] No

Notes: NO - BLDG UNOCCUPIED

Evaluation of Potential Existing Chemical Sources Indoors

Building ID: 54

List principal solvent or VOC-containing products used (obtain MSDSs if available)

See pg 5

Are any of the target analytes used in this building/room?

☐ Yes ☒ No

none observed

Are pesticides used indoors for pest control? ☐ Yes ☒ No

Names of pesticide products used? _____

Has there been a pesticide application within the past 6 months? ☐ Yes ☒ No

Is smoking permitted in the building? ☐ Yes ☒ No

Description of Vapor Mitigation Systems

Has a radon or vapor mitigation system been installed in this building/room? ☐ Yes ☒ No

Date of installation? _____

Type of system?

☐ Passive venting ☐ Active subslab depressurization

☐ Crack/crevice sealing ☐ Dilution ventilation control

☐ N/A

Notes _____

Additional Notes — Building ID: 54

—CHEMICAL INVENTORY—
OFF DEEP WOODS - UNSCENTED

Clean air purge
permanent markers (Sharpies)
Endust - No-wax cleaning & dusting spray
GOJO Towelettes
Masking tape
ABC Fire Hydrant
Arm & Hammer Deodorizer w/ Baking Soda
Armor All Protectant - Original
Spray Nine - Tough Task Cleaner
Large Flat Bed Truck

Additional Notes

Building ID: 54

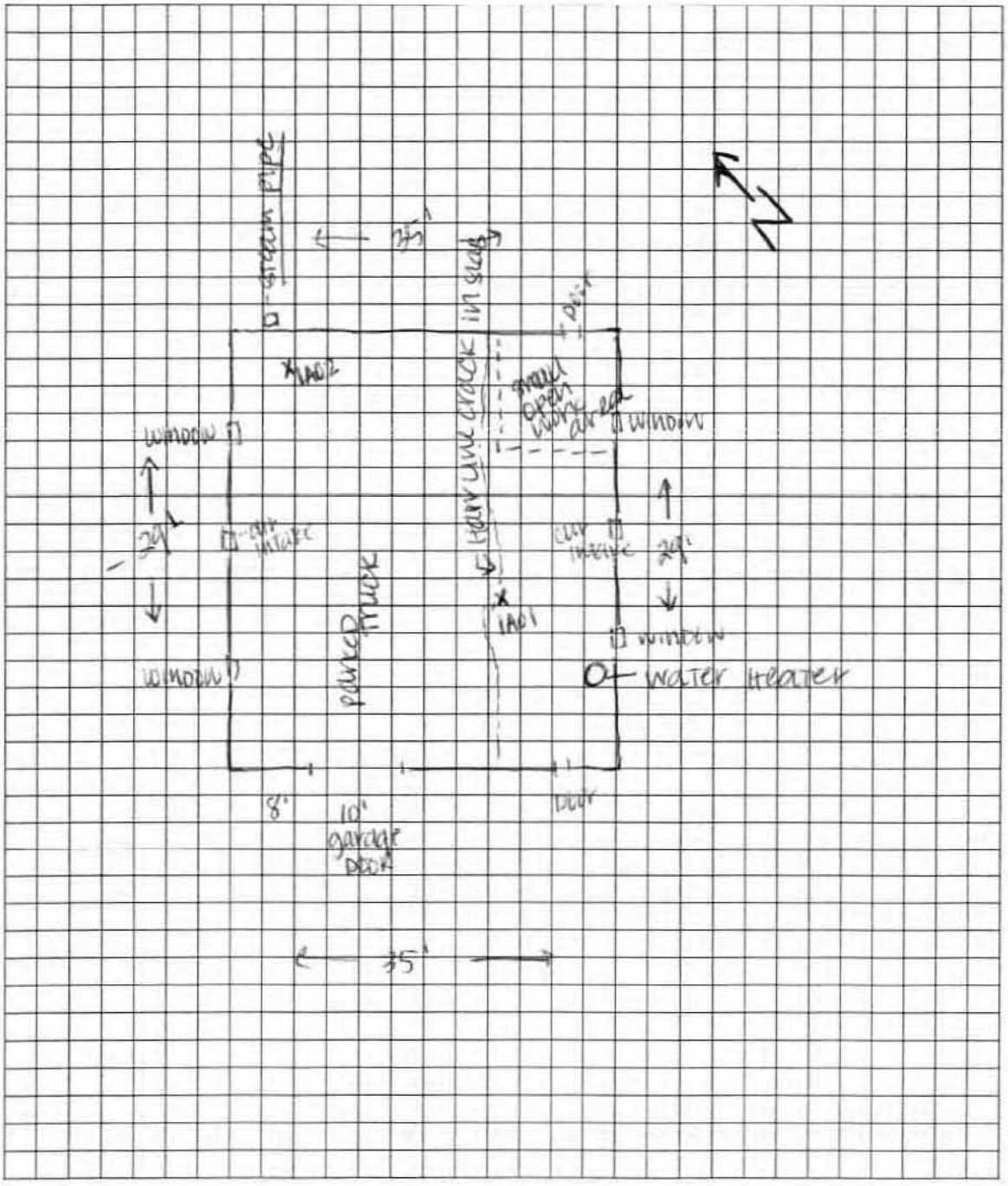
Date: 1/30/2012

Preparer: AP Jones & Buckley

Facility: SJCA - Site 21 BLDG 54

Description (floor): 1st Floor

Floor Plan Information



Industrial / Commercial Building Survey for Vapor Intrusion Evaluation

Date: 1/30/2012 Project Name / #.: 441683.LT.F1

Preparer(s): AP Jones CJ Buckley

Facility Name: SJCA - Site 21

Building ID: b3

Address: SJCA Site 21

Contact Person: John Allen

Phone Number: 757 485 6403

e-mail address:

Building Description

Building or Room Identifier: b3

Primary Activity within Building (select one):

☐ Manufacturing ☒ Storage ☐ Other Heavy equipment

☐ Chemical processing ☐ Chemical Storage

☐ Administrative ☐ Instrumentation/Control

Historical Activities within Building (if different from above):

Sand blasting area ~20-25 yrs ago

Storage of heavy equipment (very light maintenance) ~10 yrs to present

Notes:

Construction/Remodel Date(s) —

Approximate floor space

Number of floors 1 Ceiling height(s) ~20 25' to 30'

Multi-room building ☐ or Single room ☒

Aboveground Construction ☐ Wood ☒ Concrete

☐ Brick ☐ Cinderblock

☐ Other

Floor plan attached? ☒ Yes ☐ No

Notes:

Evaluation of Potential Conduits from Soil

Building ID: 63

Floor/foundation description (check all that apply)

- [ ] Wood
- [x] Concrete
- [ ] Other _____
- [ ] Elevated above grade? Feet above grade: _____
- [ ] Below grade? Feet above grade: _____
- [ ] Slab on grade?

Expansion joints present (if concrete floor)?	[x] Yes	[ ] No	[ ] N/A
Are expansion joints sealed?	[ ] Yes	[x] No	[ ] N/A
Are sumps or floor drains present?	[x] Yes	[ ] No	[ ] N/A
Are basements or subsurface vaults present?	[x] Yes	[ ] No	[ ] N/A
Are there subsurface drainage problems?	[ ] Yes	[x] No	[ ] N/A

Notes/Explanation for N/A responses: _____

Evaluation of Potential Pathways/Driving Forces

Are there locations with elevated positive or negative pressure (look for doors not opening/closing properly, perceptible airflow, audible fan noise)? NONE OBSERVED

Is there one air conditioning zone or multiple zones (if in a multi-room building)?

- [ ] Single zone
- [ ] Multi-zone
- [ ] Other _____

(Building management may know; another tip: presence of multiple thermostats = multiple zones)

Sources of outdoor air

- [ ] Mechanical (air handling unit)
- [x] Windows
- [ ] Attic Fans
- [x] Doors

Are windows/doors left open routinely? [ ] Yes [ ] No

Notes: _____

Evaluation of Potential Existing Chemical Sources Indoors

Building ID: 63

List principal solvent or VOC-containing products used (obtain MSDSs if available)

See pg 4

Are any of the target analytes used in this building/room?

☐ Yes ☐ No - none observed

Are pesticides used indoors for pest control? ☐ Yes ☒ No

Names of pesticide products used? _____

Has there been a pesticide application within the past 6 months? ☐ Yes ☒ No

Is smoking permitted in the building? ☐ Yes ☒ No

Description of Vapor Mitigation Systems

Has a radon or vapor mitigation system been installed in this building/room? ☐ Yes ☒ No

Date of installation? _____

Type of system?

☐ Passive venting ☐ Active subslab depressurization

☐ Crack/crevice sealing ☐ Dilution ventilation control

☐ N/A

Notes: _____

Additional Notes **Building ID:** _____

So sure - white stencil/opaque paint (Type 3)
Spray Nine - cleaner disinfectant
Lubricating oil -
Diesel engine oil - Pitt Penn SAE30 (3)
Lysol kitchen cleaner
WD-40
Anti-seeze compound - Jett-Lube Inc (petroleum base)
Chevron - Ultra-Duty grease EP
Hydraulic Oil 32AW
" " ISO 46

Additional Notes **Building ID:** _____

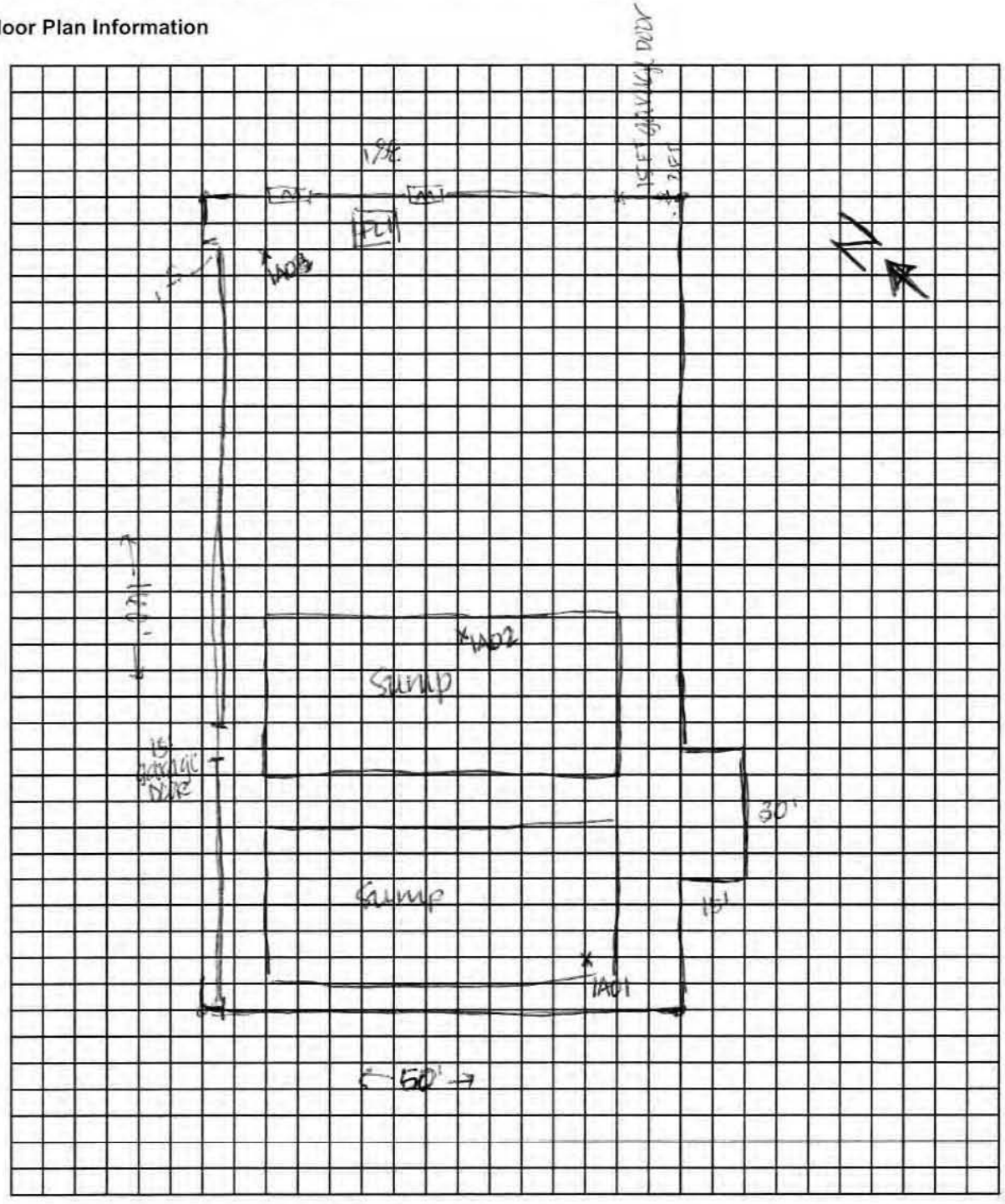
Date: 1/30/2012

Preparer: AP JONES AT G BUCKLEY

Facility: SJCA SITE 21 - BLDG 63

Description (floor): 1ST FLOOR

Floor Plan Information



Industrial / Commercial Building Survey for Vapor Intrusion Evaluation

Date: 11/30/2012 Project Name / #.: 419689.LTIF1

Preparer(s): AP JONES & BUCKLEY

Facility Name: SJCA-SITE 21

Building ID: 68

Address: SJCA - SITE 21

Contact Person: —

Phone Number:

e-mail address:

Building Description

Building or Room Identifier: 68

Primary Activity within Building (select one):

☐ Manufacturing ☐ Storage ☐ Other

☐ Chemical processing ☐ Chemical Storage

☐ Administrative ☐ Instrumentation/Control

Historical Activities within Building (if different from above):

BUILDING ABANDONED - NO USE CURRENTLY

* SANDBAG STORAGE *

Notes:

Construction/Remodel Date(s) —

Approximate floor space

Number of floors 1 Ceiling height(s) 25-30'

Multi-room building ☐ or Single room ☐

Aboveground Construction ☐ Wood ☒ Concrete

☐ Brick ☐ Cinderblock

☐ Other

Floor plan attached? ☒ Yes ☐ No

Notes:

Evaluation of Potential Conduits from Soil

Building ID: _____

Floor/foundation description (check all that apply)

- [ ] Wood
- [x] Concrete
- [ ] Other _____
- [ ] Elevated above grade? Feet above grade: _____
- [ ] Below grade? Feet above grade: _____
- [x] Slab on grade?

	Yes	No	N/A
Expansion joints present (if concrete floor)?	[x]	[ ]	[ ]
Are expansion joints sealed?	[ ]	[x]	[ ]
Are sumps or floor drains present?	[x]	[ ]	[ ]
Are basements or subsurface vaults present?	[x]	[ ]	[ ]
Are there subsurface drainage problems?	[ ]	[ ]	[ ]

Notes/Explanation for N/A responses: areas where roof is leaking & water ponds on slab is evident

Evaluation of Potential Pathways/Driving Forces

Are there locations with elevated positive or negative pressure (look for doors not opening/closing properly, perceptible airflow, audible fan noise)? airflow where garage doors missing/ windows broken

Is there one air conditioning zone or multiple zones (if in a multi-room building)?

- [ ] Single zone
- [ ] Multi-zone
- [ ] Other NO A/C

(Building management may know; another tip: presence of multiple thermostats = multiple zones)

Sources of outdoor air

- [ ] Mechanical (air handling unit)
- [x] Windows
- [ ] Attic Fans
- [x] Doors

Are windows/doors left open routinely? [ ] Yes [ ] No

Notes: some doors missing

Evaluation of Potential Existing Chemical Sources Indoors

Building ID: _____

List principal solvent or VOC-containing products used (obtain MSDSs if available)

See chemical list on pg 5

Are any of the target analytes used in this building/room?

☐ Yes ☒ No

OLD containers/chemicals left behind

Are pesticides used indoors for pest control? ☐ Yes ☒ No

Names of pesticide products used? _____

Has there been a pesticide application within the past 6 months? ☐ Yes ☒ No

Is smoking permitted in the building? ☐ Yes ☒ No

Description of Vapor Mitigation Systems

Has a radon or vapor mitigation system been installed in this building/room? ☐ Yes ☒ No

Date of installation? _____

Type of system?

☐ Passive venting ☐ Active subslab depressurization

☐ Crack/crevice sealing ☐ Dilution ventilation control

☐ N/A

Notes _____

Additional Notes

Building ID: _____

LIQUID-A- RUST CORROSION PREVENTATIVE
DEFT CHEMICAL- HIGH SOLIDS EPOXY COATING
SIGMA COATING- PRIMER
SIGMA COATING- 5404 HARDENER
SHERWIN WILLIAMS- TYPE II CATALYST COMPONENT B
BRUNING SILATHANE GLOSS ENAMEL
PROPANE
~15 CANS OF UNIDENTIFIABLE "PAINT" CONTAINERS
FORMULA 1070 OPEN GEAR LUBRICANT (AEROSOL)
DIBROMOCHLOROMETHANE - COMPRESSED
PB- PENTRATING CATALYST (AEROSOL)

Additional Notes

Building ID: _____

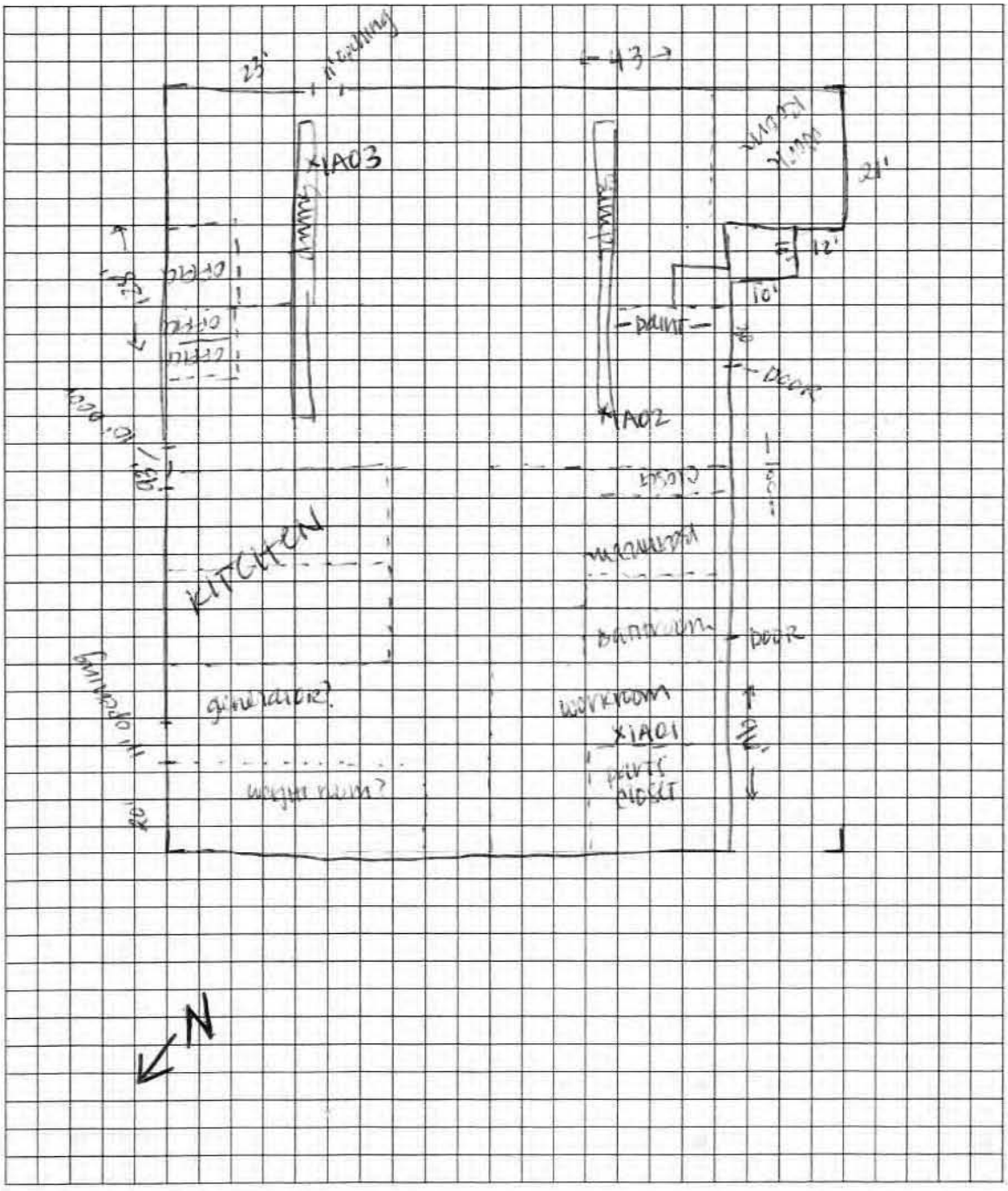
Date: 1/30/2012

Preparer: AP JONES & BUCKLEY

Facility: SJCA SITE 21 BLDG 48

Description (floor): 1ST FLOOR

Floor Plan Information



Industrial / Commercial Building Survey for Vapor Intrusion Evaluation

Date: 1/30/2012 Project Name / #.: 419689. LT. F1

Preparer(s): AP JONES of BUCKLEY

Facility Name: SJCA - SITE 21

Building ID: BLDG 81

Address: SJCA SITE 21

Contact Person: Tyrone Smoot

Phone Number: 757.396.0131 EXT 143

e-mail address:

Building Description

Building or Room Identifier: 81

Primary Activity within Building (select one):

☐ Manufacturing ☒ Storage ☐ Other - OVERFLOW FOR BLDG 1556

☐ Chemical processing ☐ Chemical Storage

☐ Administrative ☐ Instrumentation/Control

Historical Activities within Building (if different from above): STORAGE - CONTACT UNSURE OF ANY HISTORICAL ACTIVITIES

Notes: CURRENT OCCUPANTS MOVING OUT - NATO moving in. Unsure of new use for building.
USED AS OVERFLOW FOR SHIP STORAGE FROM BLDG 1556 (CURRENT USE)

Construction/Remodel Date(s) —

Approximate floor space ~12000

Number of floors 1 Ceiling height(s) 25-30'

Multi-room building ☐ or Single room ☒

Aboveground Construction ☐ Wood ☒ Concrete

☐ Brick ☐ Cinderblock

☐ Other

Floor plan attached? ☒ Yes ☐ No

Notes:

Evaluation of Potential Conduits from Soil

Building ID: 81

Floor/foundation description (check all that apply)

- [ ] Wood
- [x] Concrete
- [ ] Other _____
- [ ] Elevated above grade? Feet above grade: _____
- [ ] Below grade? Feet above grade: _____
- [ ] Slab on grade?

Expansion joints present (if concrete floor)?	[x] Yes	[ ] No	[ ] N/A	
Are expansion joints sealed?	[x] Yes	[ ] No	[ ] N/A	DETERIORATION SHOWING BUT IN GOOD SHAPE
Are sumps or floor drains present?	[ ] Yes	[x] No	[ ] N/A	
Are basements or subsurface vaults present?	[ ] Yes	[x] No	[ ] N/A	
Are there subsurface drainage problems?	[ ] Yes	[x] No	[ ] N/A	

Notes/Explanation for N/A responses: _____

Evaluation of Potential Pathways/Driving Forces

Are there locations with elevated positive or negative pressure (look for doors not opening/closing properly, perceptible airflow, audible fan noise)? NONE OBSERVED

Is there one air conditioning zone or multiple zones (if in a multi-room building)? - NO HVAC SYSTEM

- [x] Single zone
- [ ] Multi-zone
- [ ] Other _____

(Building management may know; another tip: presence of multiple thermostats = multiple zones)

Sources of outdoor air

- [ ] Mechanical (air handling unit)
- [x] Windows
- [ ] Attic Fans
- [x] Doors

Are windows/doors left open routinely? [ ] Yes [x] No - rarely used

Notes: _____

Evaluation of Potential Existing Chemical Sources Indoors

Building ID: 81

List principal solvent or VOC-containing products used (obtain MSDSs if available)

NONE OBSERVED

Are any of the target analytes used in this building/room?

☐ Yes ☒ No – PARTS STORAGE

Are pesticides used indoors for pest control? ☐ Yes ☒ No

Names of pesticide products used? _____

Has there been a pesticide application within the past 6 months? ☐ Yes ☒ No

Is smoking permitted in the building? ☐ Yes ☒ No

Description of Vapor Mitigation Systems

Has a radon or vapor mitigation system been installed in this building/room? ☐ Yes ☒ No

Date of installation? _____

Type of system?

☐ Passive venting ☐ Active subslab depressurization

☐ Crack/crevice sealing ☐ Dilution ventilation control

☐ N/A

Notes: _____

Additional Notes

Building ID: B1

NO CHEMICAL STORAGE NOTED BY POC or OBSERVED DURING WALK THROUGH

Additional Notes

Building ID: 81

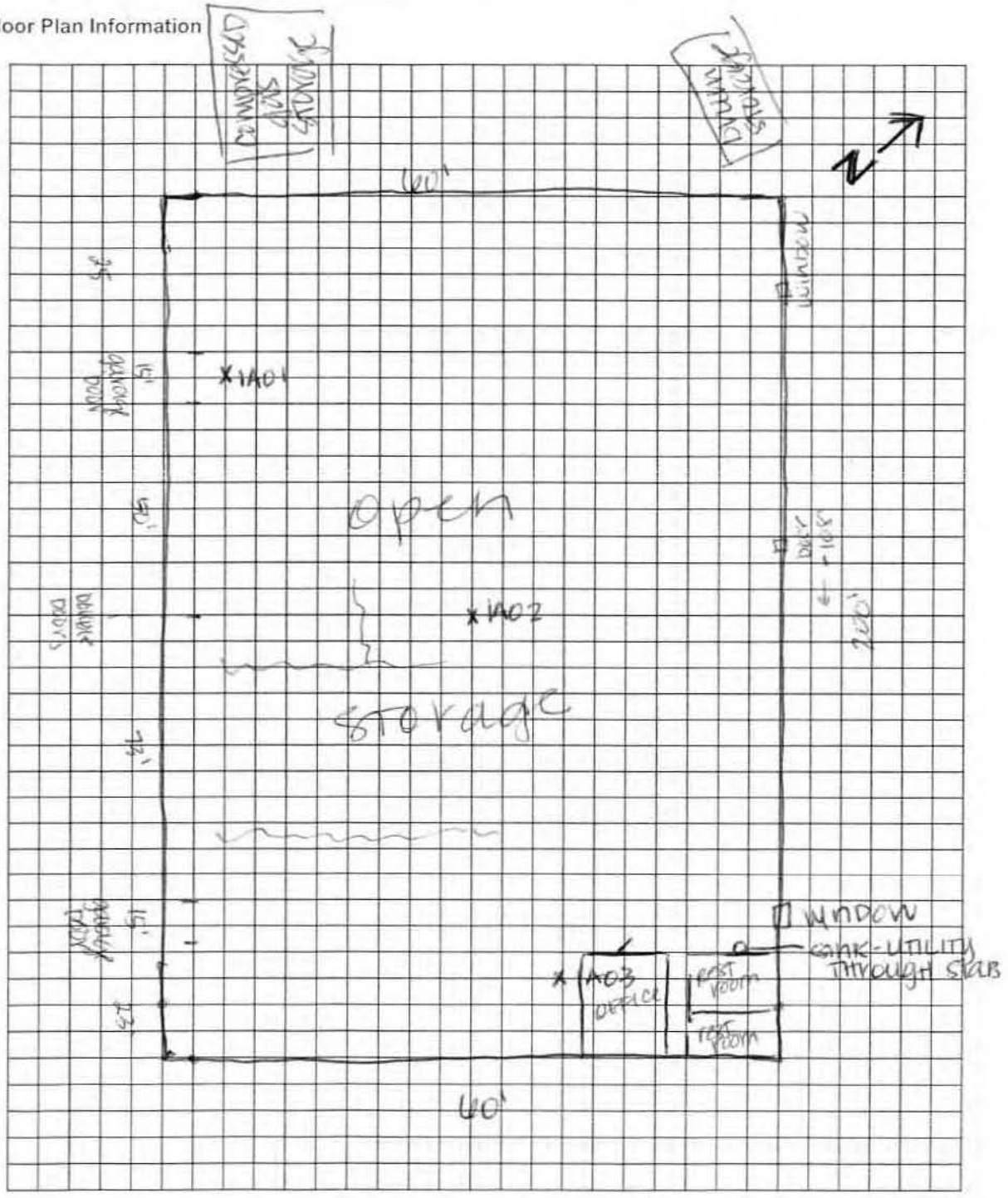
Date: 11/30/2012

Preparer: APJones G.Buckley

Facility: BLDG 81

Description (floor): 1st FLOOR

Floor Plan Information



~ small cracks in concrete

Preliminary Building Survey for Vapor Intrusion Investigation

Date: 2/12/12

Preparer: APJones & MCove

Facility: SJCA | Site 21

Address: SITE 21, BUILDING 1556

Contact Person: PETTY OFFICER SMOOT

Phone Number: _____

e-mail address: _____

Building Description

Building or Room Identifier: 1556

Primary Activity within Building (select one):

- [ ] Manufacturing
- [X] Storage
- [ ] Other — SECOND FLOOR ADMINISTRATIVE
- [ ] Chemical processing
- [ ] Chemical Storage
- [ ] Administrative
- [ ] Instrumentation/Control

Notes: USED FOR STORAGE ~~BY~~ SHIPS GETTING OVERHAULED AT NNSY. CURRENT TENANTS ARE MOVING OUT - DO NOT KNOW WHO NEW TENANTS WILL BE

Approximate floor space: 2.5 acres

Number of floors: 2

Multi-room building [X] or Single room [ ]

Ceiling height: ~ 35'

Aboveground Construction

- [ ] Wood
- [ ] Concrete
- [ ] Brick
- [ ] Cinderblock
- [X] Other — CORRUGATED METAL & CONCRETE BLOCKS

Floor plan attached? [ ] Yes [X] No - SEE PREVIOUS SURVEYS

Notes: _____

Evaluation of Potential Conduits from Soil

Floor/foundation description (check all that apply)

X AT grade

☐ Wood ☒ Concrete ☐ Elevated above grade? ☐ Below grade?

☐ Other

Expansion joints present (if concrete floor)?	☒ Yes	☐ No	☐ N/A
Are expansion joints sealed?	☒ Yes	☐ No	☐ N/A DETERIORATING
Are sumps or floor drains present?	☒ Yes	☐ No	☐ N/A RESTROOMS/FORMER AUTO REPAIR AREAS
Are basements or subsurface vaults present?	☐ Yes	☒ No	☐ N/A
Are there subsurface drainage problems?	☐ Yes	☒ No	☐ N/A

Notes: 2 new areas noted in main storage area w/ sumps & grates - see markup

Evaluation of Potential Pathways/Driving Forces

Are there locations with elevated positive or negative pressure (look for doors not opening/closing properly, perceptible airflow, audible fan noise)

no evidence

Is there one air conditioning zone or multiple zones (if in a multi-room building)?

☐ Single zone ☒ Multi-zone ☐ Other EACH OFFICE HAS DEDICATED WINDOW UNIT - SECOND FLOOR HAS 3 UNITS

(building management may know; another tip-off is the presence of multiple thermostats = multiple zones)

Sources of outdoor air

☐ Mechanical (air handling unit) - central on second floor ☒ Doors

☒ Windows

Are windows/doors left open routinely? [X] Yes [ ] No Seasonal

Notes:

Evaluation of Potential Existing Chemical Sources Indoors

List principal solvent or VOC-containing products used (obtain MSDSs if available)

Typical cleaning products
Green
Liquid
Bleach

Are any of the target analytes used in this building/room?

[ ] Yes [X] No

Are pesticides used indoors for pest control? [X] Yes [ ] No

Names of pesticide products used? Unknown

Has there been a pesticide application within the past 6 months? [ ] Yes [X] No

Is smoking permitted in the building? [ ] Yes [X] No permitted only in gazebos outside bldg

Description of Vapor Mitigation Systems

Has a radon or vapor mitigation system been installed in this building/room? [ ] Yes [X] No

Date of installation?

Type of system?
[ ] Passive venting
[ ] Active subslab depressurization
[ ] Crack/crevice sealing
[ ] Dilution ventilation control
[ ] N/A

Notes:

Additional Notes

① expansion seals deteriorating along central portion of building (see photos)
② 2 new grate/sump are observed since current tenants are moving out

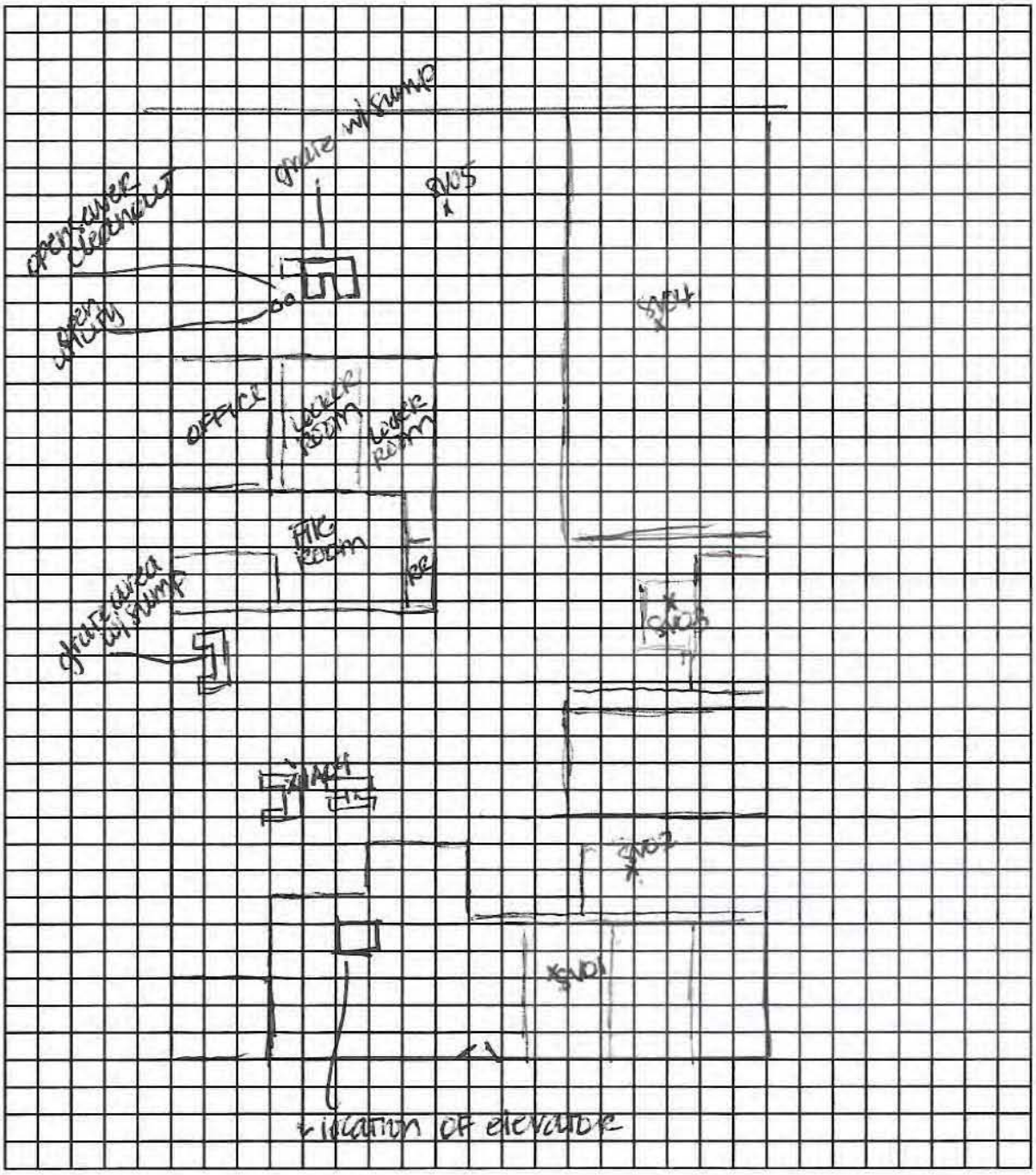
Additional Notes

Date: 2/12/12
Preparer: LP Jones

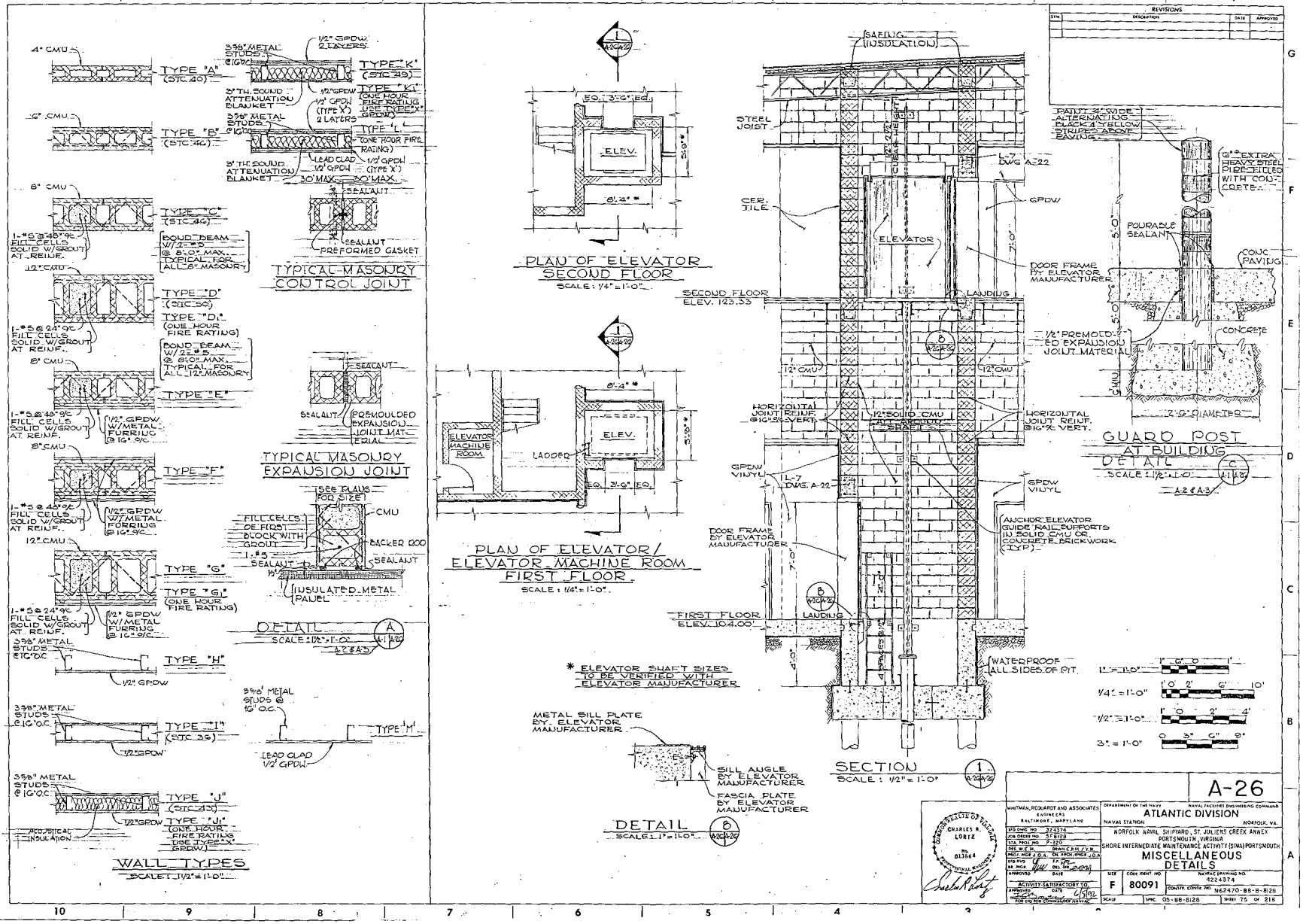
Facility: SJCA SITE 21
Description (floor): 1ST FLOOR

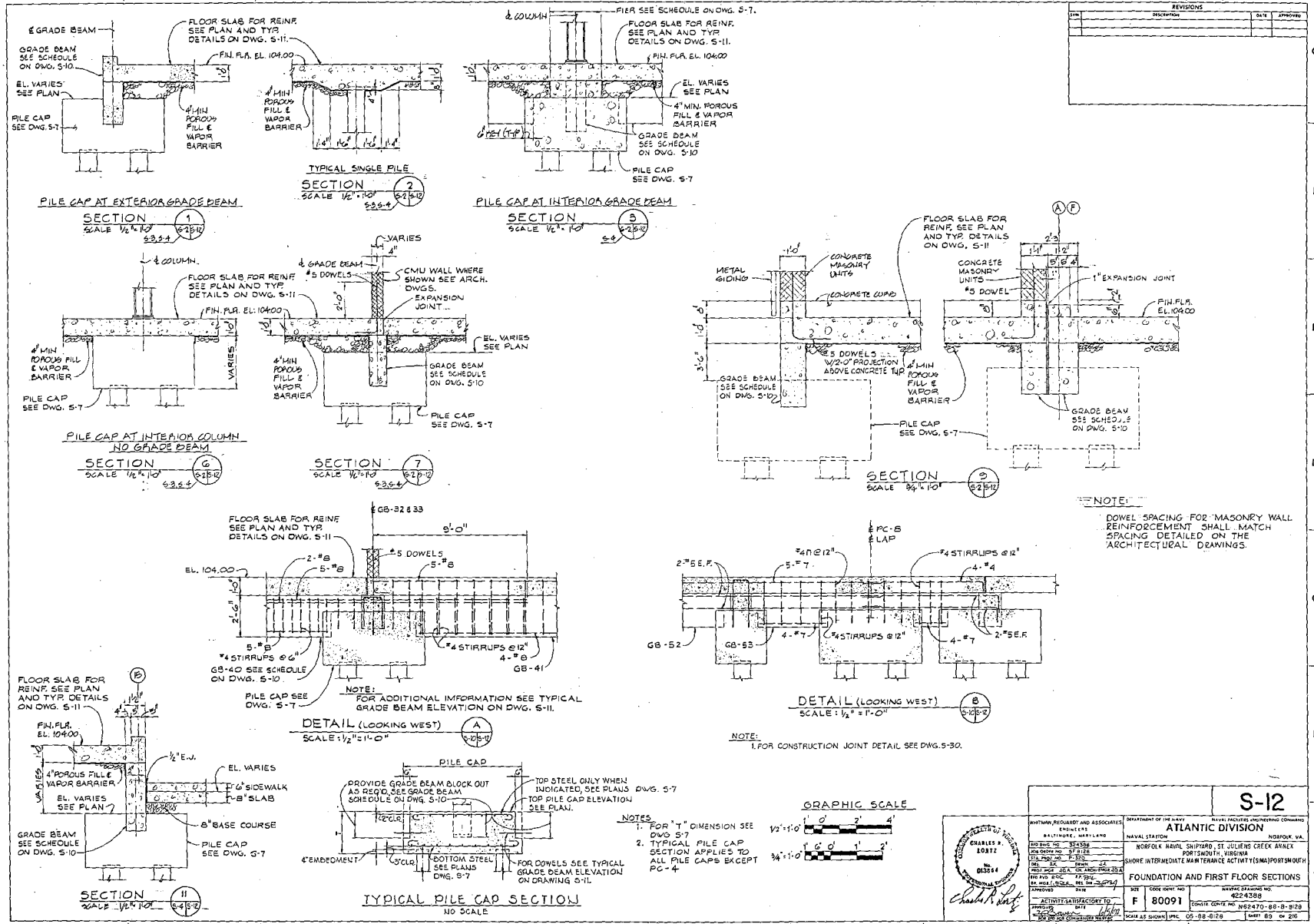
CH2MHILL

Floor Plan Information



Attachment E


4" CMU
TYPE "A" (STC 40)
3⅝" METAL STUDS @16"OC
1/2" GPDW 2 LAYERS
TYPE "K" (STC 39)
2" TH. SOUND ATTENUATION BLANKET
1/2" GPDW
TYPE "K1" (ONE HOUR FIRE RATING USE TYPE "K" GPDW)
6" CMU
TYPE "B" (STC 46)
3⅝" METAL STUDS @16"OC
1/2" GPDW (TYPE X) 2 LAYERS
TYPE "L" (ONE HOUR FIRE RATING)
3" TH. SOUND ATTENUATION BLANKET
LEAD CLAD 1/2" GPDW (TYPE X)
30" MAX.
30" MAX.
8" CMU
TYPE "C" (STC 46)
1-#5 @ 48" O/C FILL CELLS SOLID W/GROUT AT REINF.
BOND BEAM W/2-#5 @ 8'-0" MAX. TYPICAL FOR ALL 8" MASONRY
SEALANT
SEALANT PREFORMED GASKET
TYPICAL MASONRY CONTROL JOINT
12" CMU
TYPE "D" (STC 50)
TYPE "D1" (ONE HOUR FIRE RATING)
1-#5 @ 24" O/C FILL CELLS SOLID W/GROUT AT REINF.
BOND BEAM W/2-#5 @ 8'0" MAX. TYPICAL FOR ALL 12" MASONRY
8" CMU
TYPE "E"
1-#5 @ 48" O/C FILL CELLS SOLID W/GROUT AT REINF.
1/2" GPDW W/METAL FURRING @ 16" O/C
SEALANT
SEALANT PREMOULDED EXPANSION JOINT MATERIAL
TYPICAL MASONRY EXPANSION JOINT
8" CMU
TYPE "F"
1-#5 @ 48" O/C FILL CELLS SOLID W/GROUT AT REINF.
1/2" GPDW W/METAL FURRING @ 16" O/C
12" CMU
TYPE "G"
TYPE "G1" (ONE HOUR FIRE RATING)
1-#5 @ 24" O/C FILL CELLS SOLID W/GROUT AT REINF.
1/2" GPDW W/METAL FURRING @ 16" O/C
SEE PLANS FOR SIZE
CMU
FILL CELLS OF FIRST BLOCK WITH GROUT
BACKER ROD
1-#5
SEALANT
SEALANT
½"
INSULATED METAL PANEL
DETAIL A
SCALE: 1½" = 1'-0"
A7 & A-5
3⅝" METAL STUDS @16"OC
TYPE "H"
1/2" GPDW
3⅝" METAL STUDS @16"OC
TYPE "I" (STC 35)
1/2" GPDW
3⅝" METAL STUDS @ 16" O.C.
TYPE "H"
LEAD CLAD 1/2" GPDW
3⅝" METAL STUDS @16"OC
TYPE "J" (STC 43)
1/2" GPDW
TYPE "J1" (ONE HOUR FIRE RATING USE TYPE "K" GPDW)
ACOUSTICAL INSULATION
WALL TYPES
SCALE: 1½" = 1'-0"
1 A-24 A-26
EQ. 3'-0" EQ.
ELEV.
5'-9"
8'-4" *
PLAN OF ELEVATOR SECOND FLOOR
SCALE: 1/4" = 1'-0"
1 A-24 A-26
8'-4" *
ELEVATOR MACHINE ROOM
ELEV.
5'-9"
LADDER
EQ. 3'-0" EQ.
PLAN OF ELEVATOR / ELEVATOR MACHINE ROOM FIRST FLOOR
SCALE: 1/4" = 1'-0"
* ELEVATOR SHAFT SIZES TO BE VERIFIED WITH ELEVATOR MANUFACTURER
METAL SILL PLATE BY ELEVATOR MANUFACTURER
SILL ANGLE BY ELEVATOR MANUFACTURER
FASCIA PLATE BY ELEVATOR MANUFACTURER
DETAIL B
SCALE: 1" = 1'-0"
A-24 A-26
SAFING INSULATION
STEEL JOIST
CLEAR HEIGHT
L-7 DWG A-22
CER. TILE
GPDW
ELEVATOR
7'-0"
DOOR FRAME BY ELEVATOR MANUFACTURER
SECOND FLOOR ELEV. 123.33
LANDING
B A-24 A-26
12" CMU
12" CMU
HORIZONTAL JOINT REINF. @16"¾ VERT.
12" SOLID CMU AT ARCHED OPENINGS
HORIZONTAL JOINT REINF. @16"¾ VERT.
GPDW VINYL
L-7 DWG. A-22
GPDW VINYL
DOOR FRAME BY ELEVATOR MANUFACTURER
7'-0"
ANCHOR ELEVATOR GUIDE RAIL SUPPORTS IN SOLID CMU OR CONCRETE BRICKWORK (TYP.)
B A-24 A-26
FIRST FLOOR ELEV. 104.00'
LANDING
4" PITS 8'-4"
WATERPROOF ALL SIDES OF PIT
SECTION
SCALE: 1/2" = 1'-0"
1 A-24 A-26
RAILS 2" SQ. DIE ALTERNATING BLACK & YELLOW STRIPES ABOVE PAVING
6" ø EXTRA HEAVY STEEL PIPE FILLED WITH CONCRETE
POURABLE SEALANT
CONC. PAVING
5'-0"
5'-0"
CONCRETE
½" PREMOLDED EXPANSION JOINT MATERIAL
6" CMU
2'-6" DIAMETER
GUARD POST AT BUILDING DETAIL
SCALE: 1½" = 1'-0"
C A-24 A-26
A-2 & A-3
1" = 1'-0"
¼" = 1'-0"
½" = 1'-0"
3" = 1'-0"
REVISIONS
SYM | DESCRIPTION | DATE | APPROVED
A-26
WHITMAN, REQUARDT AND ASSOCIATES (ENGINEERS) BALTIMORE, MARYLAND
CHARLES R. LORTZ No. 013868 REGISTERED ENGINEER
DEPARTMENT OF THE NAVY NAVAL FACILITIES ENGINEERING COMMAND
ATLANTIC DIVISION
NAVAL STATION NORFOLK, VA.
NORFOLK NAVAL SHIPYARD, ST. JULIENS CREEK ANNEX PORTSMOUTH, VIRGINIA
SHORE INTERMEDIATE MAINTENANCE ACTIVITY (SIMA) PORTSMOUTH
MISCELLANEOUS DETAILS
SIZE F
CODE IDENT. NO 80091
NAVFAC DRAWING NO. 4224374
CONTR. CONTR NO N62470-88-B-8126
SCALE
SPEC. 05-88-8126
SHEET 75 OF 216
BID DWG. NO 324374
JOB ORDER NO 57 8128
STA. PROJ. NO P-320
DES. M.E.N. DRAWN C.P.M./V.N.
PROJ. MGR. J.D.A. CH. ENGINEER J.D.K.
STD. FVD
AS BUILT
APPROVED DATE
ACTIVITY-SATISFACTORY TO
APPROVED DATE 4/5/92
FOR CO/OFFICER-IN-CHARGE
FOR CNO FOR COMMANDANT NAVFAC



REVISIONS

SYM	DESCRIPTION	DATE	APPROVED

S-12

WHITMAN, REQUARDT AND ASSOCIATES ENGINEERS BALTIMORE, MARYLAND

DEPARTMENT OF THE NAVY — NAVAL FACILITIES ENGINEERING COMMAND
ATLANTIC DIVISION
NAVAL STATION — NORFOLK, VA.

NORFOLK NAVAL SHIPYARD, ST JULIENS CREEK ANNEX PORTSMOUTH, VIRGINIA
SHORE INTERMEDIATE MAINTENANCE ACTIVITY (SIMA) PORTSMOUTH

FOUNDATION AND FIRST FLOOR SECTIONS

BID DWG NO	324388
NAB DRWG NO	57-8128
FA. PROJ NO	P-302
DES	DRWN
PROJ MGR	CHK ARCH/PROJ ENG
RES RVR ENGR	RES ENGR
BR. MGR. (CSEA)	RES ENGR
APPROVED	DATE
ACTIVITY SATISFACTORY TO	
APPROVED	DATE
ACTIVITY OFFICER	
BCE OR CONTRACTOR REVIEW	

SIZE F | CODE IDENT NO 80091 | NAVFAC DRAWING NO. 4224388
CONTR CONTR NO. N62470-88-B-8128
SCALE AS SHOWN | SPEC. 05-88-8128 | SHEET 89 OF 216

W.O. 80448