

OPERATION AND MAINTENANCE AGREEMENT
Between Ohio EPA and UAP Columbus Joint Venture 326132
Regarding the Lane Avenue Shopping Center Property,
Franklin County, Ohio

This Operation and Maintenance Agreement ("Agreement") is entered into by the Director of the Ohio Environmental Protection Agency ("Director") and UAP Columbus Joint Venture 326132, pursuant to Ohio Revised Code ("ORC") Chapter 3746 and Ohio Administrative Code ("OAC") Chapter 3745-300. In consideration of the mutual covenants and subject to the terms and conditions of this Agreement, the parties agree as follows:

1. **The NFA Letter.** A no further action letter (NFA Letter No. 06NFA244; the "NFA Letter") under the Voluntary Action Program ("VAP") was submitted to the Director on behalf of UAP Columbus Joint Venture 326132 Columbus on June 28, 2006, by Christopher Krumm, a certified professional (Certified Professional No. 177), for approximately 11.417 acres of real property owned by UAP Columbus Joint Venture 326132 Columbus and located at 1557-1735 West Lane Avenue, Upper Arlington, Franklin County, Ohio (the "Property"). The legal description of the Property is attached hereto as Exhibit 1, and is incorporated by reference herein. The NFA Letter includes an Operation and Maintenance Plan ("O&M Plan") for the Property. The term "*O&M Plan*" refers to the O&M Plan dated April 5, 2007. The O&M Plan is attached hereto as Exhibit 2 and is incorporated into this Agreement by reference.
2. **Addenda to the NFA Letter.** On October 31, 2006, the first addendum to the NFA Letter was submitted to the Director by Christopher Krumm in response to comments from Ohio EPA. This addendum was in response to Ohio EPA comments dated September 1, 2006 and included a Large Quantity Generator Report, legal surveys and descriptions for the VAP property and the Commercial/Industrial Use Area of the Property, 1st and 2nd quarter 2006 groundwater data, the revised Executive Summary, the revised O&M Plan and other miscellaneous items.

On November 9, 2006, a second addendum to the NFA Letter was submitted to add a figure to the large quantity generator report. The figure was inadvertently left out of the first addendum.

On March 20, 2007, a third addendum to the NFA Letter was submitted in response to the Ohio EPA comments dated January 4, 2007. This addendum included the third & fourth quarter 2006 groundwater data and laboratory affidavits, the revised Executive Summary,

the revised O&M Plan (dated February 2, 2007), the revised Environmental Covenant, and the revised Property legal descriptions.

On April 6, 2007, a fourth addendum to the NFA Letter was received by the Ohio EPA in response to the Ohio EPA comments dated April 3, 2007. This addendum included the revised Executive Summary and the revised O&M Plan (dated April 5, 2007).

3. **Requirement for an Operation and Maintenance Agreement.** This Agreement is required for the Property pursuant to ORC 3746.10(C)(2) or 3746.12(A)(2) and OAC 3745-300-15(A)(3) and 3745-300-15(F)(4).
4. **Remedy for the Property.** The remedy for the Property includes:
 - a. **Interim Measures.** Interim measures for the Property, as provided in the O&M Plan, that include:
 - i. The ongoing source to groundwater in Identified Area 1 was removed from March through June 2002. Excavation activities were initiated to remove all unsaturated soil containing greater than 5 milligrams per kilogram (mg/kg) of tetrachlorethene (PCE) beneath and immediately surrounding the footprint of the former Swan Cleaners. Approximately 1,700 tons of soil were excavated from the unsaturated zone in the Identified Area 1 source area and from the parking lot south of Identified Area 1 and transported off-site for disposal. This excavation continued to below the static water table present at the time of the removal action. Additionally, approximately 8,300 gallons of groundwater were extracted to support excavation activities and transported off-site for disposal.
 - b. **Engineering Controls.** Engineering controls for the Property, as provided in the O&M Plan, that include:
 - i. Following excavation of the source area soil, an in-situ reactive zone (IRZ) system was installed prior to backfilling and capping the excavation area to address Volatile Organic Compounds (VOCs) in groundwater and residual VOCs present in a small area of soil at the bottom of the excavation (below the water table) that could not be excavated due to subsurface structures (pipes and foundations).

3745-300 and in the covenant not to sue issued pursuant to ORC 3746.12 for the Property (the "Covenant").

6. **Implementation of O&M Plan.** UAP Columbus Joint Venture 326132 agrees to perform the engineering controls, interim measures, and ground water remedy in accordance with the O&M Plan, and perform all inspections, repairs, reporting, record keeping, and all other requirements in accordance with the O&M Plan. Further, within five (5) years of the effective date of this Agreement, UAP Columbus Joint Venture 326132 shall submit to Ohio EPA verification that the Property has achieved compliance with the ground water, indoor air vapor intrusion, and soil standards applicable to the Property. Such verification shall be completed in accordance with the O&M Plan and OAC 3745-300-15(E).
7. **Property Access.** UAP Columbus Joint Venture 326132 certifies it has access to the Property sufficient to fully implement the O&M Plan and this Agreement. Further, upon transfer of the Property or portion thereof, UAP Columbus Joint Venture 326132 shall use best efforts to maintain such access.
8. **Recording of Agreement.** UAP Columbus Joint Venture 326132 shall record this Agreement as required by the Covenant and as required by ORC 3746.14.
9. **Effect of Violation of this Agreement.** Failure to comply with this Agreement or the O&M Plan, may constitute the failure to maintain an applicable standard in accordance with ORC 3746.12(B) and OAC Chapter 3745-300, and may be subject to the process outlined in the Compliance Schedule Section of this Agreement. Noncompliance with an institutional control for the Property voids the Covenant, as provided in ORC 3746.05.
10. **Financial Assurance.** UAP Columbus Joint Venture 326132 agrees to ensure that reasonable and adequate funds in the amount of at least One Hundred Seventy Two Thousand, Eight Hundred 00/100 Dollars (\$172,800.00) ("Minimum Amount") are available to comply with this Agreement and the O&M Plan. Examples of acceptable financial assurance include a trust fund, a surety bond guaranteeing payment into a trust fund, a surety bond guaranteeing performance of this Agreement and the O&M Plan, a letter of credit, an insurance policy, a financial test and corporate guarantee, an escrow account or such other financial assurance as approved by Ohio EPA. For its initial financial assurance, UAP Columbus Joint Venture 326132 has established an escrow with The Northwestern Mutual Life Insurance Company ("NM"), as Escrow Agent, for the Minimum Amount pursuant to an Escrow Agreement a copy of which is attached hereto

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as Exhibit 3. UAP Columbus Joint Venture 326132 agrees to maintain the escrow or execute and fund another comparable, acceptable financial assurance, and submit to Ohio EPA a copy of each such financial assurance. In the event the amount or form of financial assurance provided herein is inadequate to comply with the terms of this Agreement, the Director may propose a modification of this paragraph pursuant to the Modification Section of this Agreement.

11. **Notice to Prospective Property Transferees.** At least thirty (30) days prior to the execution of any sales contract or other document transferring ownership of the Property or any portion of the Property, UAP Columbus Joint Venture 326132 agrees to provide written notice to the prospective Property transferee that the Property, or such portion of the Property, is subject to the Covenant, this Agreement, and the O&M Plan.
12. **Notice to the Director of Transfer of Property.** Within fourteen (14) days after a sale or other transfer of the Property, or any portion of the Property, UAP Columbus Joint Venture 326132 shall provide written notice to the Director that the Property, or such portion of the Property, has been sold or otherwise transferred. This notice submitted to the Director shall include:
 - a. the name, address, and telephone number of the new Property owner and the name, address, and telephone number of the contact person for the new Property owner;
 - b. a legal description of the Property or such portion of the Property being transferred; and
 - c. the closing date of the transfer of ownership of the Property or such portion of the Property.
13. **Option to Transfer this Agreement / Notice to Director.** Pursuant to ORC 3746.14(C), UAP Columbus Joint Venture 326132 may transfer this Agreement to any other person (the "Transferee") by assignment or in conjunction with the acquisition of title to the Property. Within fourteen (14) days after such transfer, UAP Columbus Joint Venture 326132 shall provide written notice to the Director of the terms and conditions of the transfer of obligations of this Agreement and the O&M Plan ("Transfer Terms and Conditions"), by submitting:
 - a. the name, address, and telephone number of the Transferee and the name, address, and telephone number of the contact person for the Transferee;

- b. a statement of the extent to which the Transferee has assumed the obligations of this Agreement and the O&M Plan;
- c. a copy of the legal instrument(s) that provide the Transfer Terms and Conditions; and
- d. a copy of the Transferee's fully executed and funded proposed financial assurance that complies with the Financial Assurance Section. The Transferor's financial assurance shall remain effective until the Transferee's financial assurance is fully executed and funded.

Upon the Director's receipt of such notice of the Transfer of Terms and Conditions in accordance with this section of the Agreement, the Transferee shall be considered a party to this Agreement in accordance with the terms hereof.

14. **Subparceling.** Upon written notice submitted by UAP Columbus Joint Venture 326132 to the Director, that one or more parcels of the Property have been divided or subparceled, this Agreement shall apply separately to each subdivided parcel upon the date of subdivision or the date of the submission of written notice, whichever occurs later. UAP Columbus Joint Venture 326132 shall provide such written notice by submitting:

- a. The legal description of the subdivided parcels;
- b. A survey map or maps of the subdivided parcels;
- c. The date of the subdivision;
- d. A copy of the legal instrument(s) providing for the subdivision; and
- e. The names of the new owner, if any, of the subdivided parcels.

Upon the written notice submitted pursuant to this Section, this Agreement shall be deemed to be amended, without modification of this Agreement, to identify the subdivided parcels of the Property. The Covenant shall remain in effect for any subdivided portion of the Property that continues to comply with the requirements of this Agreement and the applicable standards that form the basis of the Covenant. Any revocation of the Covenant for any parcel shall not be based solely on a finding that any

other subdivided parcel of the Property no longer complies with the applicable standards or the requirements of this Agreement.

15. **Document Submittals / Notifications to Parties.** All documents, including but not limited to notices and reports, required to be submitted by UAP Columbus Joint Venture 326132 pursuant to this Agreement shall be identified by NFA Number 06NFA244 and addressed to:

Ohio Environmental Protection Agency
50 West Town Street, Suite 700
P.O. Box 1049
Columbus, OH 43216-1049
Attn: Manager, Voluntary Action Program

and

Ohio Environmental Protection Agency
Central District Office
Division of Emergency and Remedial Response
50 West Town Street, Suite 700
P.O. Box 1049
Columbus, OH 43216-1049
Attn: VAP Site Coordinator

All documents, including any notice required to be submitted by Ohio EPA pursuant to this Agreement, shall be delivered to UAP Columbus Joint Venture 326132. Notice to UAP Columbus Joint Venture 326132 shall be addressed to:

UAP Columbus Joint Venture 326132
720 East Wisconsin Avenue
Milwaukee, Wisconsin 53202-4794
Attn: Brian Bennett
Environmental Analyst

Either party may designate an alternative contact name or mailing address upon written notification to the other party.

16. **Modification of this Agreement or the O&M Plan.** UAP Columbus Joint Venture 326132 shall submit to the Director for review and approval each proposed modification

of this Agreement or the O&M Plan, except for a minor modification, as defined below, or a modification proposed by the Director.

This Agreement or the O&M Plan may be modified by agreement of the appropriate parties. Modifications shall be in writing, signed by the authorized representative of the UAP Columbus Joint Venture 326132 and by the Director, and shall be effective on the date signed by the Director of Ohio EPA.

Ohio EPA reserves the right to require the submittal of a new NFA Letter for a proposed modification that will result in the application of an applicable standard, land use, or a remedy different than that contained in the NFA Letter approved by the Covenant.

For purposes of this Agreement, "modification" means any substantive or material change to a term or condition of this Agreement or the O&M Plan, such as a proposal to revise, replace, or terminate an engineering control, or to revise the Financial Assurance Section of this Agreement.

For purposes of this Agreement, "minor modification" means a non-substantive or non-material, administrative change to a term or condition of this Agreement or the O&M Plan, such as the transfer of this Agreement and the O&M Plan in accordance with the Option to Transfer Section of this Agreement, or a change of a named contact person or an address contained in this Agreement or the O&M Plan. Within fourteen (14) days after implementation of a minor modification to this Agreement or the O&M Plan, UAP Columbus Joint Venture 326132 agrees to provide Ohio EPA written notice of the minor modification.

17. **Compliance Schedule Agreement.** Within thirty (30) days after the mailing of notice from the Director of the finding that the Property or a portion of the Property no longer complies with the applicable standards upon which the issuance of the Covenant was based, UAP Columbus Joint Venture 326132 shall notify the Director of its intention to return the Property or such portion of the Property to compliance with the applicable standards upon which the Covenant was based ("cure") and enter into a compliance schedule agreement with the Director for such cure, in accordance with ORC 3746.12(B).
18. **Compliance with Other Laws.** UAP Columbus Joint Venture 326132 shall conduct all activities pursuant to this Agreement and the O&M Plan in compliance with all local, state, and federal laws and regulations, including but not limited to requirements to obtain permits or authorizations. UAP Columbus Joint Venture 326132 acknowledges that Ohio

EPA's review and approval of any health and safety measures or the risk mitigation plan contained in the O&M Plan is limited to ensuring compliance with the requirements of ORC Chapter 3746 and OAC Chapter 3745-300 and does not extend to determining compliance with the Occupational Safety and Health Act, 29 U.S.C. 651 *et seq.*, the regulations adopted under that act, or any obligation imposed by the Occupational Safety and Health Administration.

19. **Inspections by Ohio EPA.** UAP Columbus Joint Venture 326132 shall allow the Director or his authorized representative to perform inspections to determine compliance with this Agreement. Such inspections shall be consistent with ORC Chapter 3746 and OAC Chapter 3745-300, including but not limited to the reasonableness of inspection timing and frequency in accordance with ORC 3746.21.
20. **Program Costs for Monitoring Compliance with this Agreement.** UAP Columbus Joint Venture 326132 agrees to reimburse Ohio EPA for the actual direct and indirect costs incurred by the Ohio EPA in monitoring compliance with this Agreement pursuant to ORC 3746.04(B)(8) and OAC 3745-300-03(F). Ohio EPA will periodically submit to UAP Columbus Joint Venture 326132 an itemized statement of its monitoring costs for the previous year(s). Monitoring costs include, but are not limited to, costs for reviewing submissions or reports required by this Agreement, conducting Property inspections, and corresponding with the Volunteer or its representative. Within thirty (30) days of receipt of such itemized statement, UAP Columbus Joint Venture 326132 shall remit payment for all of Ohio EPA's monitoring costs for the previous year(s). If UAP Columbus Joint Venture 326132 disputes the accuracy of items on the itemized statement, a request for review of the statement may be made within thirty (30) days of receipt of the statement. After review, Ohio EPA will resubmit to UAP Columbus Joint Venture 326132 an itemized statement with appropriate revisions to UAP Columbus Joint Venture 326132. UAP Columbus Joint Venture 326132 shall remit payment within fourteen (14) days of receipt of the resubmitted statement.
21. UAP Columbus Joint Venture 326132 shall remit payments to Ohio EPA pursuant to this Section of the Agreement as follows:
 - a. Payment shall be made by an official (or certified) check made payable to "Treasurer, State of Ohio." The official check shall be submitted to Ohio EPA, Office of Fiscal Administration, P.O. Box 1049, 50 West Town Street, Suite 700, Columbus, Ohio 43216-1049.

- b. A copy of the transmittal letter and check shall be sent to the Fiscal Officer, DERR, Ohio EPA, P.O. Box 1049, 50 West Town Street, Suite 700, Columbus, Ohio 43216-1049.
 - c. A copy of the transmittal letter and check shall be sent to the Program Manager of the Voluntary Action Program, DERR, Ohio EPA, P.O. Box 1049, 50 West Town Street, Suite 700, Columbus, Ohio 43216-1049.
- 22. **Termination.** This Agreement shall terminate upon (a) revocation or voidance of the Covenant, (b) a demonstration, in accordance with OAC 3745-300-15(E) and Section 10 of the O&M Plan, that implementation of this Agreement and the O&M Plan is no longer necessary for the Property to comply with applicable standards, upon written acknowledgment by the Manager of the Voluntary Action Program of the demonstration, or (c) otherwise upon the written approval of the Director of the Ohio EPA.
- 23. **Waiver.** UAP Columbus Joint Venture 326132 agrees that the terms and conditions of this Agreement are lawful and reasonable and agrees to comply with this Agreement. UAP Columbus Joint Venture 326132 hereby waives its right to appeal the terms and conditions of this Agreement, and hereby waives any and all rights it might have to seek judicial or administrative review of this Agreement either in law or equity. UAP Columbus Joint Venture 326132 reserves its right to participate in any appeal by a third party to the Environmental Review Appeals Commission or to any court.
- 24. **Entire Agreement.** The terms and conditions of this Agreement, including the O&M Plan, constitute the entire agreement of the parties. No oral or written representation shall be binding unless approved as a modification pursuant to the Modification Section of this Agreement. The terms and conditions of this Agreement shall be interpreted consistent with ORC Chapter 3746 and OAC Chapter 3745-300.
- 25. **Authorized Signatories.** Each undersigned representative of a signatory to this Agreement represents that he or she is fully authorized to execute this Agreement and to legally bind such signatory to this Agreement.
- 25. **Effective Date.** Upon execution of this Agreement by both parties, this Agreement shall be a valid and binding obligation enforceable in accordance with its terms and conditions and effective upon the date of the Director's signature.

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In witness whereof, the parties hereto have executed this Agreement.

UAP Columbus Joint Venture 326132:

By: The Northwestern Mutual Life Insurance Co., a Wisconsin corporation, its
managing general partner

By: Northwestern Investment Management Company, LLC, a Delaware
limited liability company, its wholly-owned affiliate and authorized
representative



By: [Signature]

Date: 4-9-07

Thomas D. Zale, Managing Director

Attest: [Signature]

Date: 4/9/07

Paul J. Hanson, Assistant Secretary

OHIO ENVIRONMENTAL PROTECTION AGENCY:

By: [Signature] Date: 4/25/07

Chris Korleski
Director of Ohio EPA

Exhibit 1 – Legal Description
DESCRIPTION OF 11.417 ACRES
CITY OF UPPER ARLINGTON, OHIO

Situated in the State of Ohio, Franklin County, City of Upper Arlington, lying in Section 4, Township 1, Range 19, United States Military Lands and being 11.417 acres out of a 12.481 acre tract as conveyed to UAP-COLUMBUS JV 326132 by deed of record in Volume 3700, Page 338 (all records herein are from the Recorder's Office, Franklin County, Ohio) and being more particularly described as follows:

BEGINNING at a iron pin found at the southwest corner of said 12.481 acre tract, being at the northwesterly corner of Reserve D of the "THE UNIVERSITY ADDITION" a subdivision of record in Plat Book 16, Page 39;

Thence North 02°46'07" East, a distance of 392.25 feet along the westerly line of said 12.481 acre tract to a point;

Thence the following three (3) courses and distance over and across said 12.481 acres tract;

1. Thence South 86°25'53" East, a distance of 1148.81 feet, across said 12.481 acre tract to a point;

2. South 03°34'00" West a distance of 218.43 feet to a point;

3. South 86°25'53" East, a distance of 147.08 feet to a point on the westerly line of Reserve F of said "THE UNIVERSITY ADDITION";

Thence South 01°58'04" West, a distance of 240.13 feet, along said westerly line of Reserve F, to a point;

Thence North 86°25'53" West, a distance of 329.96 feet along the southerly line of the "THE UNIVERSITY ADDITION" to a point, being on the northerly line of Lot Number 14 of said subdivision;

Thence North 02°11'07" East, a distance of 66.26 feet along the easterly line of said Lot Number 14 of said subdivision to a point;

Thence North 86°25'53" West, a distance of 965.56 feet along the northerly line of Reserve D of the "THE UNIVERSITY ADDITION", to the **POINT OF BEGINNING**, containing 11.417 acres, more or less, and being subject to all easements, restrictions and rights-of-way of record.

Bearings on the above description are based on the grid bearing of South 89° 18 ½' East for the centerline of Lane Avenue as delineated on said subdivision of record.

EXHIBIT 2
O&M Plan



Infrastructure, environment, facilities

Imagine the result

UAP Columbus

**Ohio Voluntary Action Program
Operation & Maintenance Plan**

Lane Avenue Shopping Center
1557-1735 West Lane Avenue
Upper Arlington, Ohio

April 2007

ARCADIS

ARCADIS U.S., Inc.



William M. Golla, PE
Certified Project Manager



James J. Reid, PE
Environmental Business Practice Manager

R.D. Zande & Associates, Inc.



Christopher W. Knighm, P.G., C.P.
Senior Hydrogeologist/Certified Professional No. 177

Ohio Voluntary Action Program
Operation & Maintenance Plan

Lane Avenue Shopping Center
1557-1735 West Lane Avenue
Upper Arlington, Ohio

Prepared for:
UAP Columbus

Prepared by:
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Ohio 43017
Tel 614 764 2310
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Our Ref:
OH000534.0016

Date:
5 April 2007

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- 2 General Property Layout and Identified Areas Map, Lane Avenue Shopping Center, 1557-1735 West Lane Avenue, Upper Arlington, Ohio.
- 3 Pre-Remediation Groundwater Plume Configuration, Lane Avenue Shopping Center, 1557-1735 West Lane Avenue, Upper Arlington, Ohio.
- 4 Remediation System Layout, Lane Avenue Shopping Center, 1557-1735 West Lane Avenue, Upper Arlington, Ohio.
- 5 Introduction Point Detail, Lane Avenue Shopping Center, 1557-1735 West Lane Avenue, Upper Arlington, Ohio.
- 6 Schematic of Carbon Solution Mixing and Introduction Trailer, Lane Avenue Shopping Center, 1557-1735 West Lane Avenue, Upper Arlington, Ohio.

Appendices

- A Risk Mitigation Plan
- B Letters from the Ohio EPA/UIC Group Authorizing Introduction of Carbon Solution and On-Site Groundwater Extraction/Treatment
- C Carbon Solution Introduction Log and Introduction Equipment Inspection Form

1. Introduction

ARCADIS was retained by UAP Columbus Joint Venture 326132 of Milwaukee, Wisconsin (UAP Columbus) to prepare this Operation and Maintenance (O&M) Plan for the Lane Avenue Shopping Center Property at 1557 - 1735 West Lane Avenue in Upper Arlington, Ohio (Property) (see Figure 1). UAP Columbus is the current owner of the Property, and the "Volunteer" as defined by the Ohio Environmental Protection Agency (Ohio EPA) Voluntary Action Program (VAP), promulgated as Ohio Administrative Code (OAC) 3745-300-01 through -15. Ohio Equities, LLC of Upper Arlington, Ohio is the current manager of the shopping center, the current layout of which is shown on Figure 2.

This O&M Plan has been prepared in accordance with OAC 3745-300-15(F), on behalf of the Volunteer. This O&M Plan is required by OAC 3745-300-15(D)(2) because groundwater remediation will not be complete at the Property prior to submittal of a No Further Action (NFA) letter by the VAP Certified Professional (Mr. Christopher Krumm, Certified Professional number (no.) 177, R.D. Zande & Associates) and prior to issuance of a VAP Covenant Not to Sue (CNS) by the Ohio EPA. The objectives of this O&M Plan are to demonstrate the following:

- Concentrations of chemicals of concern (COC)s in groundwater will be reduced until they are below the applicable standards to be established by a final risk evaluation for the vapor migration to indoor air pathway within three years from the date of the issuance of the CNS; and
- Concentrations of the COCs in groundwater will be maintained below the applicable standards (to be established in a final risk evaluation) without any statistically significant increases (95% upper confidence level) that will not likely lead to an exceedance of the applicable standards following active remediation.

As discussed below in Section 2, the COCs at the Property were determined to be the chlorinated volatile organic compounds (VOCs): tetrachloroethene (PCE); trichloroethene (TCE); 1,1-dichloroethene (DCE); *cis*-1,2-dichloroethene (*cis*-1,2-DCE); *trans*-1,2-dichloroethene (*trans*-1,2-DCE); and vinyl chloride.

2. Property Background

The Property comprises approximately 11.417 acres of commercial property at 1557 - 1735 West Lane Avenue, in a mixed commercial and residential portion of Upper Arlington, Ohio. The part of the Property which is limited through institutional controls to commercial and/or industrial use is 5.222 acres. The legal description and map of the portion of the property with limited uses is provided in Appendix A of this document.

The Property is bounded to the north by West Lane Avenue, to the east by Beaumont Road, to the south by a fence that separates the Property from residences along Berkshire Road, and to the west by Brandon Road. Although not a portion of the Property, three residential properties that abut the Property to the south are discussed in this O&M Plan. The three properties were purchased by the Volunteer in 2002 and have the following addresses: 1666 Berkshire Road, 1674 Berkshire Road, and 1682 Berkshire Road.

A non-VAP Phase I assessment of the Property was performed by GaiaTech, Inc. of Chicago, Illinois as due diligence for a prospective buyer in June 2000, and ARCADIS performed a Phase I Property Assessment in accordance with OAC 3745-300-06 between November 2003 and October 2005. ARCADIS' Phase I activities are detailed in a report dated October 2005 and entitled *Phase I Property Assessment, Lane Avenue Shopping Center, 1557-1735 West Lane Avenue, Upper Arlington, Ohio* (ARCADIS G&M, Inc. 2005). Phase I activities identified two Identified Areas as defined by OAC 3745-300-06 (F) at the Property (see Figure 2). On the basis of the findings of the Phase I Property Assessment, a Phase II Property Assessment (ARCADIS G&M, Inc. 2006) was performed at the Property and on the three Berkshire Road residential properties to address potential impacts to the subsurface from the identified areas. Based on the Phase II Property Assessment, active remediation was only required to address Identified Area 1 – Former 1655 West Lane Avenue, as discussed below.

2.1 Identified Area 1: Former 1655 West Lane Avenue

Identified Area 1 is the former 1655 West Lane Avenue address in the west-central portion of the main shopping center building and a portion of the parking lot south of this address. A dry cleaner occupied the shopping center from 1957 to 1985 at this location. Soil and groundwater within and south (hydraulically downgradient) of the dry cleaner extending as far as the 1674 Berkshire Road property were impacted with chlorinated VOCs from a release(s) of dry cleaning fluids.

The findings of the Phase II Property Assessment indicate that active soil remediation was required to eliminate an ongoing source to groundwater. Additionally, active groundwater remediation was required within and south of Identified Area 1 and on the 1674 Berkshire Road residential property.

The source to groundwater in Identified Area 1 was the unsaturated soil located beneath the portion of the shopping center building that was formerly occupied by a dry cleaner. The active soil remediation in the Identified Area 1 source area involved excavating unsaturated soil containing greater than 5.0 milligrams per kilogram (mg/kg) of PCE and transporting the soil off-site for disposal. The 5-mg/kg cleanup criteria was calculated to be protective of residents who might be exposed through the groundwater to indoor air pathway downgradient of Identified Area 1 using information contained in the *Ohio EPA Derived Leach-Based Soil Values Technical Guidance Document, July 1996* and Property -specific input parameters. Due to structural constraints during source area removal activities, a few areas with soil concentrations greater than 5.0 mg/kg of PCE immediately above the groundwater table could not be excavated. Therefore, after excavation activities, additional measures were implemented to remediate these localized areas of residual VOCs and eliminate any potential exposure pathways.

First, a carbon introduction piping system was installed within a layer of permeable backfill in the base of the excavation to allow for treatment of the VOCs in the groundwater and soil smear zone. Next, the excavation was backfilled with a 2 foot-thick compacted clay cap over the carbon introduction remediation system components, and a ventilation system was constructed over the compacted clay cap, immediately below the concrete floor slab. The clay cap minimizes potential volatile emissions from residual PCE-containing groundwater and soil that may be present in the Identified Area 1 source area, and the ventilation system provides an additional layer of protection to remove vapors that might accumulate beneath the concrete floor during remediation. Finally, the Identified Area 1 source area is beneath the mall building; therefore, the roof, floor slab, and clay cap eliminate surface water leaching through the soil containing residual PCE concentrations that could serve as a future source of COCs to groundwater, and the carbon introduction system placed within the excavation will remediate any potential leaching caused by groundwater encountering the residual COCs that may be present within the saturated soil.

In addition to the engineering controls described above, a property-specific risk assessment was performed that determined the soils are not going to contribute an exceedence of the applicable groundwater standards (property-specific risk-based

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goals). The risk assessment is discussed in Section 8 and provided in Appendix O of the ARCADIS' March 2006 report entitled *Phase II Property Assessment, Lane Avenue Shopping Center, 1557-1735 West Lane Avenue, Upper Arlington, Ohio (Phase II)* (ARCADIS G&M, Inc. 2006).

These soil remediation activities were performed between March 21 and June 26, 2002, eliminating the ongoing source to groundwater in Identified Area 1. Based on Property soil data, soil remediation was not required beyond the source removal activities completed in 2002. Details of these active soil remediation activities are presented in ARCADIS' October 14, 2004 report entitled *Source Area Excavation Report, Former Swan Cleaners Site, Lane Avenue Shopping Center, 1655 West Lane Avenue, Upper Arlington, Ohio*, which is appended to the Phase II (ARCADIS G&M, Inc. 2005).

Active groundwater remediation was required within and south of Identified Area 1 and on 1674 Berkshire Road property because the concentrations of COCs if left untreated may have posed a risk to downgradient residential receptors in the future. Active groundwater remediation commenced at the Property in August 2002, is ongoing, and is the focus of this O&M Plan. Groundwater remediation involves in-situ reactive zone (IRZ) enhanced bioremediation, a technology that is converting the COCs into innocuous, non-toxic end products through the process of enhanced reductive dechlorination (ERD). Continued operation of the IRZ system will bring Property groundwater into compliance with applicable standards (to be established in a final risk evaluation) within three years from the submission of this O&M Plan and will maintain statistical compliance with the applicable standards after remediation ceases.

2.2 Engineering Controls

The following engineering controls shall be maintained at the site until the remediation at the site achieves the groundwater applicable standards to be established in a final risk assessment.

2.2.1 Ventilation System

The operation of the ventilation system constructed over the compacted clay cap discussed in the previous section will be operated continuously until a final risk assessment demonstrates that the risk associated with the vapor migration exposure pathway meets applicable standards.

2.2.2 Utility Trenches

If utility trenches are excavated within an IA, the granular material typically used to backfill the trenches could create a preferential pathway for the migration of vapors containing COCs. In the event that utility trenches are installed prior to demonstrating that the risk associated with the vapor migration exposure pathway meets applicable standards, the excavation and construction contractors must develop and implement procedures to prevent the creation of a preferential flow pathway from an IA. Such procedures should include, at a minimum, contracting a qualified environmental professional to be present during excavation activities, and assigning the environmental professional responsibility for examining the walls and floor of the excavation and for determining whether the utility trench is routed through groundwater or soil containing COCs.

If COCs are present in excess of risk based standards, one procedure that may be utilized to prevent the creation of a preferential flow pathway is the installation of a low permeable material (i.e. flowable fill) at the extents of the IA or RMP boundary which will inhibit the migration of VOCs through the utility trench.

2.3 Institutional Control

As required by OAC 3745-300-07(D)(1)(g), UAP Columbus (the Property owner and VAP Volunteer) has identified the reasonably anticipated future use of the Property as commercial, although Property conditions do not preclude use for future residential purposes within the area of the property not controlled by the Risk Mitigation Plan (RMP). The Property will need an Environmental Covenant in order to implement institutional controls that comply with Ohio Revised Code Chapter 3746 and OAC Chapter 3745-300. UAP Columbus will file an Environmental Covenant with the Franklin County Recorder when the Ohio EPA issues the CNS and signs the Environmental Covenant for the Property. The Environmental Covenant will include a copy of this O&M Plan.

An institutional control in the form of an Environmental Covenant will prohibit the extraction of groundwater for potable use and limit the Property to commercial use within the area controlled by the RMP. The area of the property outside of the RMP is not limited to commercial uses. As discussed in the remainder of this O&M Plan, the Environmental Covenant and the remediation activities performed (and ongoing) at the Property will eliminate the future exposure pathway to on-site receptors of the COCs, eliminate the future exposure pathway to off-site receptors of groundwater containing

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COCs in excess of the applicable standards, and demonstrate that the Property will be protective of human health, public safety, and the environment during remediation.

In addition to the use restrictions, RMP has been written in accordance with OAC 3745-300-15(G) describing the procedures that will be used to mitigate the risks to receptor populations performing excavation or other subsurface construction activities at the Property during the remediation period. The RMP is included in Appendix A and states that any subsurface activities will be conducted in a manner that reduces potential risks and eliminates human exposure to COCs that are above the target risks or hazard goals as defined in OAC 3745-300-08 or 3745-300-09.

3. Groundwater Remediation Goals

As discussed in Section 1, Phase II Property Assessment activities identified the need for active soil remediation in the Identified Area 1 source area and active groundwater remediation within and south of Identified Area 1 (see Figure 3) and on the 1674 Berkshire Road property. Active soil remediation was completed in Identified Area 1; therefore, this section only presents the groundwater remediation screening standards for the COCs in Identified Area 1.

The remediation screening standards for groundwater were calculated by performing a risk evaluation and a multiple-chemical adjustment. The remediation screening standards were developed in consideration of the fact that Property groundwater is not a source of potable water, and volatile emission from groundwater to indoor air is the only potentially complete exposure pathway at the Property that is a threat to public health and safety.

It should be noted that remediation screening standards were used to direct the groundwater remediation efforts at the site. A final risk assessment will be completed to develop the site's final groundwater standards.

3.1 Calculation of Risk-Based Single-Chemical Remediation Goals Based on Vapor Intrusion Modeling

The potential cancer risk and non-cancer risk associated with exposure to the COCs in Identified Area 1 groundwater were evaluated. The risk evaluation is appended to the Phase II Property Assessment. The risk evaluation met the requirements for a Property-specific risk assessment that are presented in OAC 3745-300-07 and 3745-300-09. Property-specific, single-chemical, risk-based remediation goals (RBGs) that would be protective of residents exposed to volatile emission through the groundwater to indoor air pathway were calculated for the COCs considering cancer risk and non-cancer risk. The calculation followed the format of a Property-specific risk assessment, including the completion of an exposure assessment and a toxicity assessment.

The RBGs were calculated using Version 3 of the Johnson and Ettinger vapor migration model, dated 1991. Included in the calculation is the assumption of acceptable risk levels for carcinogenic and non-carcinogenic effects. In accordance with OAC 3745-300-09(C)(1)(b)(ii) and OAC 3745-300-09(C)(2), the acceptable cancer risk is 1×10^{-5} , and the acceptable cumulative non-cancer hazard index is 1. Using the Johnson and Ettinger model, the calculated Property-specific groundwater RBGs that

are protective of residents exposed to volatile emissions through the groundwater to indoor air pathway for each chemical of concern were as follows:

- Cancer risk – 924 micrograms per liter ($\mu\text{g/L}$) for PCE; 2,976 $\mu\text{g/L}$ for TCE; for 1,1-DCE 33 $\mu\text{g/L}$ and 151 $\mu\text{g/L}$ for vinyl chloride; and
- Non-cancer risk – 37,500 $\mu\text{g/L}$ for PCE; 14,000 for 1,1-DCE; 129,000 $\mu\text{g/L}$ for TCE; 17,300 $\mu\text{g/L}$ for *cis*-1,2-DCE; 15,500 $\mu\text{g/L}$ for *trans*-1,2-DCE; and 5,700 $\mu\text{g/L}$ for vinyl chloride.

3.2 Calculation of Proposed Remediation Goals Based on Cumulative Cancer and Non-Cancer Risk

Because the calculation of the RBGs did not include an estimate of potential cumulative cancer and cumulative non-cancer risks for the volatile emission from groundwater to indoor air pathway, it will be necessary to derive applicable standards and perform a multiple-chemical evaluation in accordance with OAC 3745-300-09(D)(3)(d).

Due to uncertainty regarding the degradation of PCE and its daughter products, applicable standards will be determined by a final risk assessment to demonstrate the completion of the Property remedial activities. The standards will be determined based on the summation of the risks for each exposure pathway using actual Property data for the following exposure scenarios:

- Residential scenario that includes the vapor migration to indoor air pathway;
- Commercial worker scenario that includes direct contact with soil pathway and the indoor air pathway for soil and groundwater;
- On-site excavation worker that includes direct contact with soil and groundwater; and
- Off-site utility worker that includes direct contact with groundwater.

4. Groundwater Remediation Implementation Plan

The preferred groundwater remediation technology for Identified Area 1 and the 1674 Berkshire Road property was determined to be IRZ enhanced bioremediation. IRZ technology theory is presented in the Phase II report. Installation and O&M of the IRZ system to address VOCs from Identified Area 1 is discussed in this section.

4.1 Remediation System Layout and Locations of Reactive Zones

The IRZ remediation system that has been operating since August 2002 was installed between May and August 2002. Reactive zones are areas in the saturated subsurface environment in which conditions are created that are favorable for the degradation or destruction of the constituents of concern. For groundwater in Identified Area 1, and on the 1674 Berkshire Road property, the reactive zones were created through the introduction of a degradable carbon source (molasses) that enable chlorinated VOCs to be converted to innocuous, non-toxic compounds through the process of ERD. Reactive zones are typically aligned perpendicular to the groundwater flow path, and their spacing is a function of groundwater flow velocity and the estimated length of time it takes for a given volume of organic carbon to be consumed by indigenous microbes. Five reactive zones (RZs) have been installed within the Identified Area 1 plume using a combination of introduction laterals (ILs) and introduction points (IPs), as follows (see Figure 4):

- RZ-1 – Includes IP-16 and IP-17, which are aligned north to south and located in the alley on the south side of the shopping center building, introduction laterals IL-1 through IL-3, which run beneath the shopping center building in Identified Area 1, and former monitoring well CO-9;
- RZ-2 – Includes IP-12, IP-13, IP-14, and IP-15, which are aligned east to west and located in the northern portion of the parking lot on the south side of the shopping center building, immediately south of Identified Area -1;
- RZ-3 – Includes IP-08, IP -09, IP-10, and IP-11, which are aligned east to west and located in the central portion of the parking lot on the south side of the shopping center building;
- RZ-4 – Includes IP-04, IP-05, IP-06, and IP-07, and former groundwater monitoring well CO-16, which are arranged in a triangular configuration along the southern Property line; and

- RZ- 5 – Includes IP-01, IP-02, and IP-03, which are arranged in a triangular configuration on the 1674 Berkshire Road property.

The reactive zones are created using a combination of introduction laterals and introduction points. The introduction laterals were installed in saturated soil in the former Identified Area 1 source area, just below the groundwater table, and were routed through the locations where the highest PCE concentrations in unsaturated soil were detected. The laterals are constructed of 4-inch diameter, perforated Schedule 80 polyvinyl chloride (PVC) screen and solid pipe. Trenches were excavated for the laterals, and a bedding of sand was placed in the excavations. The lateral pipes were then placed and covered with sand and filter fabric. A layer of clay was placed over the filter fabric. The lateral pipes were connected to header pipes that can be accessed in a vault located in the alley on the south side of the shopping center.

Introduction points were installed in hollow-stem auger boreholes advanced to a depth ranging from 9 to 14 feet below land surface (bls). Logs of these borings and the introduction point construction logs are provided in the Phase II report. The introduction points are constructed of 3-inch diameter, slotted Schedule 80 PVC screen and solid riser pipe. The screen in each introduction point is 5 feet long and extends across the water-bearing zone. A schematic showing completion details and the fittings connected to the top of the introduction point pipe to facilitate carbon solution introduction is provided as Figure 5.

4.2 Remediation System Ventilation System

Following the excavation of the source area, PVC pipes were installed immediately beneath the shopping center building concrete slab at the former location of the Identified Area 1 source area after the source removal excavation. The pipes were attached to a blower located inside the shopping center building immediately west of the alley on the south side of the building. The pipes and blower comprise a system to extract methane and other gases that potentially could accumulate as indigenous microbes metabolize the organic solution introduced during active groundwater remediation at that location. By the continuous extraction of soil gas from beneath the building during carbon source introductions, the potential for this condition to occur is eliminated. As required by OAC 3745-300-15(F)(2)(a)(iv), this demonstrates one measure that has been implemented to protect public health and safety during active groundwater remediation.

On a monthly basis, the blower is inspected to ensure proper operation. A vacuum reading on the influent side of the blower is recorded on the monthly O&M logs (Appendix C). A vacuum reading greater than or equal to 1 inch of water indicates that the system is operating as designed by inducing a negative pressure (vacuum) within the subsurface slab. In addition, the recovered vapors from the system are sampled periodically as described in detail in Section 5.3.

4.3 In-situ Reactive Zone Operation Activities

Active groundwater remediation is being accomplished by introducing a solution containing molasses (the organic carbon source) and potable water from a municipal water supply (or treated groundwater). Authorization to introduce a carbon solution into groundwater at the Property was requested in June 2002 in a letter from ARCADIS to the Ohio EPA Division of Drinking and Ground Water/Underground Injection Control Group (UIC). The Ohio EPA/UIC authorized the carbon solution introductions in a letter from the Ohio EPA/UIC to Mr. William Golla of ARCADIS dated June 19, 2002. A copy of the letter is provided in Appendix B.

The molasses is supplied by Westway Feed Products of Cincinnati, Ohio (or other molasses vendor as appropriate) and stored in an aboveground, 1,500-gallon polyethylene holding tank located in the southeastern portion of the Property. The municipal water supply is a hydrant located northwest of the main shopping center building. An appropriate volume of potable water (or treated groundwater) is pumped into a 1,000-gallon polyethylene tank mounted on the carbon solution introduction trailer, and an appropriate volume of molasses is then pumped from the holding tank into the trailer-mounted tank. The resulting solution ranging from 3 to 10 percent molasses by volume is mixed using a recirculation pump. Water for mixing the carbon solution is sometimes obtained from extracting and treating groundwater from on-site monitoring wells. Treatment involves pumping the extracted groundwater through two drums in series containing granular activated carbon. Samples of treated groundwater are periodically collected (both after the first drum and after the second drum) and submitted for laboratory analysis of VOCs, and the carbon is replaced if VOCs are detected in the samples. These activities are performed as authorized by the Ohio EPA/UIC in a letter from the Ohio EPA/UIC to Mr. Golla of ARCADIS dated June 16, 2004. A copy of the letter is provided in Appendix B.

When the appropriate volume of molasses solution has been prepared, the introduction trailer is transported to an introduction point, and the solution is introduced by pumping or by gravity-feed. The solution is pumped into the introduction points in RZ-1, RZ-2,

RZ-3, and RZ-4 because the introduction points that comprise these reactive zones accept the solution at a satisfactory relatively high rate, and the solution is gravity-fed or pumped into the introduction points in RZ-5 because the introduction points that comprise this reactive zone accept the solution at a relatively low rate. A copy of the carbon solution introduction log which is completed in the field during the introduction activities is provided in Phase II report.

At RZ-1, RZ-2, RZ-3, and RZ-4, the introduction hose is attached to a 1-inch diameter galvanized steel introduction assembly equipped with a ball-valve, pressure indicator, and pressure relief valve, and the assembly is attached to the introduction point riser pipe. All attachments are made using camlock fittings. Approximately 100 gallons of molasses solution are pumped into the introduction points in RZ-1, RZ-2, RZ-3, and RZ-4, and approximately 300 gallons of solution are pumped into the introduction laterals in RZ-1. When the appropriate volume of solution has been introduced, the assembly is removed from the introduction point or lateral, and the point or lateral is resealed.

At RZ-5, the introduction hose is typically used to fill a 55-gallon steel drum equipped with a ball valve and flexible hose. After filling the drum with molasses solution, the valve on the drum is opened just enough to allow the solution to seep into the introduction point. The valve is left open so that gravity introduction of solution is continuous.

Operation of the system involves repeated introductions of the organic carbon (molasses) solution into introduction points and laterals, configured to develop five in-situ reactive zones within the footprint of the groundwater plume (see Figure 3). Table 1 lists the volume of solution introduced into each introduction point and lateral from the beginning of introductions in August of 2002 through 2005. Additionally, in February and July 2005, approximately 1,300 to 1,500 gallons of molasses solution were introduced using direct-push techniques in the vicinity of RZ-4 and RZ-5.

4.4 Inspection and Maintenance Tasks

Regular inspection and proper maintenance of the IRZ system will ensure that the system operates efficiently and effectively and that operation of the system is protective of public safety and health and the environment. An advantage of IRZ enhanced bioremediation is that systems that deploy this technology have minimal equipment requirements and are not maintenance intensive. There are only four components to the IRZ system at the Property: the solution mixing and introduction

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trailer which is used to prepare batches of carbon solution and introduce the solution into groundwater; a bulk molasses holding tank; the introduction points and laterals, which receive the carbon solution; and the monitoring wells, which are used to monitor the effectiveness of the system. This section describes the equipment requirements and normal inspection and maintenance tasks associated with each of these components. In this section, no distinction is made between the gravity-feed and pumping introduction systems because, from the standpoint of equipment requirements, inspection, and maintenance, there is essentially no difference between the two systems.

4.4.1 Inspection Schedule

The inspection and maintenance tasks described below are performed after each introduction event, or one to two times per month on average, depending on the carbon solution introduction schedule. During each inspection, an equipment inspection form (see Appendix C) is completed and filed.

4.4.2 Carbon Solution Mixing and Introduction Trailer and Bulk Storage Tank

Most of the equipment that comprises the IRZ system is associated with the solution mixing and introduction trailer, and the bulk storage tank. A schematic flow diagram showing the configuration of the trailer is presented as Figure 6. The following equipment comprises the carbon solution mixing and introduction trailer (including the bulk storage tank):

- Introduction Trailer – One 12,000-pound capacity, dual-axle trailer on which the equipment is mounted to mix and introduce carbon solution. This trailer is stored off-site and is towed to the Property using a pickup truck.
- Polyethylene Tanks – One 1,500-gallon bulk molasses holding tank (heat traced and insulated) located in a loading dock on the east side of the building in the southeastern portion of the Property, and one 1,000-gallon mixing tank mounted on the introduction trailer.
- Pumps – One pump located on the trailer that is rated for 10 gallons per minute (gpm) at 25 pounds per square inch (psi) and used to transfer molasses from the holding tank to the mixing tank, and two pumps mounted on the introduction trailer that are rated for 25 gpm at 75 psi and used to transfer carbon solution from the mixing tank to the introduction points and laterals.

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- Electric Rewind Hose Reels – Two reels mounted on the introduction trailer, each carrying 50 feet of 1-inch diameter hose that transfers the carbon solution from the introduction trailer to the introduction points and laterals.
- Hose-to-Well Assembly – One unit, constructed of 1-inch diameter galvanized steel pipe equipped with female camlock fittings, a flow regulating gate valve, a pressure indicator gauge, and a pressure relief valve.
- Pressure Indicator Gauges – Three gauges, located on each carbon solution transfer pumps.
- Totalizing Flow Meters – Two meters, located after the two pressure indicators on the carbon solution introduction lines.
- Plumbing – Miscellaneous plumbing including 2-inch hose, valves camlock fittings and reducers.

The following inspection and maintenance tasks are performed on the above-listed equipment:

- The area on-site near and around the molasses holding tank and the introduction trailer storage area at ARCADIS' Dublin, Ohio office are kept clean and uncluttered to eliminate physical hazards to inspection/maintenance personnel and prevent cross-contamination (a Material Safety Data Sheet for feed-grade molasses is kept in the mixing trailer support vehicle and is referenced to ensure that the molasses is being handled and stored safely).
- The brakes and tail lights on the introduction trailer are checked to ensure that they are in operating order.
- The support vehicle is maintained in accordance with manufacturer recommendations.
- The molasses holding tank and solution mixing tank are vented so that vapors that may collect above the molasses and molasses solution do not create a pressure hazard when the lid of the tank is removed, and the tanks are inspected for evidence of leaks or signs of unusual wear or vandalism.

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- The fittings, gaskets, and pumps are kept in good condition, and the pumps are oiled regularly and drained completely after each use.
- The engines driving the molasses transfer pump and carbon solution transfer pumps are maintained according to the manufacturer's instructions on a routine basis.
- The hose reels are tested to make sure that they are functioning properly, that the hoses can be extended and rewound freely and without damaging the hoses.
- All hoses and plumbing fittings on the trailer and the hose-to-well assembly are kept in good condition; the camlock fittings on the introduction hoses and on the introduction point riser pipes are kept in good condition; and the hoses are drained completely after each use.

4.4.3 Introduction Points/Laterals and Monitoring Wells

The following equipment comprises the carbon solution introduction points and laterals:

- Casings – Each introduction point and lateral is constructed of 3-inch diameter slotted PVC screen and solid PVC riser pipe (CO-9 and CO-16 are 2-inch diameter PVC).
- Camlock Fittings (Adapter and dust caps) – Male camlock fittings are attached to the solid PVC riser pipe at each introduction point and lateral.
- Vaults – The introduction points and laterals are in flush-mounted in-ground protective vaults with lockable covers.
- Pressure Relief Valves – Each introduction point and lateral is equipped with a pressure relief valve mounted on the casing or cap.

The following inspection and maintenance tasks are performed on the introduction laterals and introduction points:

- The inside of the introduction points are periodically scrubbed clean and/or surged or pumped to ensure that solution can move freely through the screen and into the saturated formation.

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- The camlock fittings are kept in good condition and inspected for leaks or signs of unusual wear or vandalism during carbon solution introduction.
- The locking bolts on the vaults are replaced when needed; fluid (carbon solution and/or runoff) is pumped out of the vault when it interferes with the introduction process (fluid is pumped more regularly during winter months to prevent damage from freeze/thaw); and the vaults are inspected for signs of unusual wear or vandalism.
- The pressure relief valves are opened to relieve any pressure in the introduction points or laterals prior to opening the caps.

4.4.4 System Modification

During the course of the active groundwater remediation activities, the performance of the IRZ remediation system is monitored on a regular basis. The normal system operation tasks described above will be modified when performance monitoring data indicate that remediation goals have been achieved in a certain area, when monitoring data indicate that the progress of remediation is not acceptable, or when field observation indicates that an introduction point or lateral is not accepting carbon solution efficiently. If one of these circumstances arises, one or more of the following system modifications may be implemented:

- Conduct direct-injection events;
- Extract groundwater to encourage lateral migration of carbon solution;
- Install additional introduction points or laterals;
- Increase or decrease the frequency of carbon solution introduction;
- Increase or decrease the volume of solution introduced into an introduction point or lateral;
- Increase or decrease the concentration of molasses in the carbon solution;
- Switch the delivery system from pumping to gravity-feed, or vice versa; or

5. Effectiveness Evaluation Plan

The effectiveness of IRZ enhanced bioremediation will be monitored and demonstrated by collecting and evaluating the following information.

5.1 Carbon Solution Introduction Volume Tracking

During introduction events, the volume of solution introduced into each introduction point and lateral will be tracked to determine whether the rate at which solution is accepted by the introduction points and laterals needs to be improved. If it is deemed necessary to improve the solution acceptance rate, one or more of the maintenance tasks (Section 6) and/or one or more of the system modification tasks described in Section 4.4.4 will be performed.

5.2 In-situ Reactive Zone Remediation System Monitoring

To monitor the progress of the IRZ remediation, a baseline sampling event and ongoing monitoring have been conducted to provide data necessary to evaluate the effectiveness of the remediation. The VOC and performance parameter data have been generated on approximately a quarterly basis since active groundwater remediation began in August 2002 (with the exception of semi-annually for the first year). These VOC data provide a quantitative measure of the reductions in the concentrations of the COCs (specifically, the conversion of the parent COC, PCE, into the daughter COCs TCE; DCE; *cis*-1,2-DCE; *trans*-1,2-DCE; and vinyl chloride).

5.2.1 Ongoing In-situ Reactive Zone System Monitoring

The performance of the active groundwater remediation system is monitored by repeated sampling of groundwater from monitoring wells located between the five reactive zones created within and south of Identified Area 1. The compliance monitoring network consists of monitoring wells CO-7, CO-6, CO-18, MW-4, MW-12 and MW-14. These wells are aligned north to south within the Identified Area 1 groundwater plume, beginning with well CO-7 at the southern margin of the Identified Area 1 source area and ending with well MW-14 on the 1674 Berkshire Road property.

The objectives of the monitoring activities are to track the progress of remediation and to determine whether modification of the carbon solution introduction procedures or introduction frequency is warranted. Performance monitoring involves collecting groundwater samples from select monitoring wells located between the reactive zones,

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testing the samples in the field for pH, specific conductivity, and temperature using a portable multi-probe meter, and periodically submitting samples for laboratory analysis of total organic carbon (TOC), methane, ethene, and ethane. Groundwater sample collection activities are performed in accordance with OAC 3745-300-07(E)(3) and will be conducted on a quarterly basis during remediation. Ultimately, the COC concentrations in groundwater samples from the wells in the monitoring network mentioned above will be used to determine if the site is in compliance with the site's PRGs to be determined in the final risk assessment.

Field parameter data such as pH are monitored to confirm that conditions favorable for ERD to occur are present. Field data such as pH, specific conductivity, and temperature are also collected to confirm that parameters have stabilized while purging, indicating that a sample representative of groundwater can be collected. TOC data provide a qualitative indication of whether a surplus of molasses solution is being made available to the microbial population within the groundwater. Methane data are monitored to confirm that reducing conditions necessary for ERD to occur have been created, and are being maintained, in the area of active groundwater remediation. VOC data provide a quantitative measure of the conversion of the parent constituents, PCE, into the daughter products TCE; *cis*-1,2-DCE; and vinyl chloride. Ethene and ethane data provide quantitative measures that ERD is being accomplished through completion. Section 5.2.2 presents the criteria used to determine if favorable conditions are being satisfied and the potential response action if the criteria are not being achieved.

Groundwater samples are collected for measurement of field parameters during well purging, and samples for TOC, methane, VOCs, ethene, and ethane analyses are collected when purging is complete. To reduce the potential risk of cross-contamination, monitoring wells with historically low total VOC concentrations are sampled first, followed by wells with increasing historical VOC concentrations. Groundwater samples are placed in ice-filled coolers and shipped to TestAmerica (VAP-certified laboratory number CL0018) for analysis of all parameters except ethane, ethene, and methane, which are analyzed by Microseeps, Inc.

5.2.2 In-situ Reactive Zone System Monitoring Results Evaluation

The table presented below summarizes the field parameters which are sampled and evaluated on a quarterly basis and the criteria in which they are evaluated to ensure proper operation of the IRZs.

Monitored Parameter	Evaluation Criteria (Favorable Conditions)	Potential response if criteria are not met.
Field collected pH	pH > 5 standard units immediately downgradient	Decrease injected carbon concentration, consider adding buffering agent.
Field collected pH, temperature and specific conductivity	For determination of low flow purging parameter stabilization prior to sampling.	Not applicable.
Total organic carbon (TOC)	TOC > background levels, (most effective if TOC > 25 mg/L immediately downgradient)	Increase injected volume or concentration, consider direct push injection event.
Methane	Methane > background levels, (most effective if methane > 5 mg/L immediately downgradient)	Increase injected volume or concentration, consider direct push injection event.
VOCs	Compare to mass based screening criteria developed in Phase II report. Compare on a molar basis to parent products to confirm sequential degradation.	Continue injections until screening criteria or final PRGs are met. If sequential degradation is not observed over several sampling events, consider increasing injection volume, concentration or direct push injection event.
Ethane/Ethene	Compare on a molar basis to parent & intermediate degradation products to confirm sequential degradation.	If sequential degradation not observed over several sampling events, consider increasing injection volume, concentration or direct push injection event.

Graphs of the key performance indicator data used to evaluate remediation performance are presented in the Phase II report monitoring wells CO-7, CO-6, CO-18, MW-4, and MW-12. These data indicate that the remediation at the Property is proceeding as planned, with the reduction of the parent product (PCE) converting to the primary degradation products (TCE; *cis*-1,2-DCE; and vinyl chloride), and these degradation compounds further reducing to the innocuous end products of ethene and ethane. It is anticipated that the concentrations of the degradation products will continue to diminish now that the concentration of parent product has been decreased to below the laboratory detection levels. These performance monitoring graphs will be updated and used to evaluate progress as the remediation continues.

5.2.3 Post-Remediation Monitoring

Following remediation, post-remediation compliance monitoring will commence. The criteria that will be used to determine that post-remediation compliance monitoring can begin are as follows:

- Applicable standards (to be established in the final risk assessment) are achieved in groundwater at the compliance monitoring wells;
- Carbon solution is no longer being introduced; and,
- TOC concentrations have reduced to levels outside of the range for significant enhanced reductive dechlorination to occur (approximately 25 mg/L in the network monitoring wells). Although alternative line(s) of evidence can be used to demonstrate that increasing aerobic and oxidizing conditions have been restored and/or significant ERD is no longer occurring, with the approval of the Ohio EPA.

Post-remediation monitoring of groundwater will be conducted at least quarterly following the remediation period at monitoring wells MW-4, MW-12, CO-6, CO-7, and CO-18 to verify compliance with the applicable standards to be established in the final risk assessment. Post-remediation ground water monitoring may be terminated once concentrations are below applicable standards and stable or statistically significant decreasing concentrations are observed in all wells (listed above). If statistically significant increases (to 95% upper confidence level) in COC concentrations are observed in any well (listed above), termination of post-remediation ground water monitoring will be dependant on a demonstration that the increase in COC concentrations will not likely lead to an exceedance of applicable standards, or additional monitoring will need to be conducted until stable or decreasing concentrations are achieved. Such demonstration is subject to the approval by the Ohio EPA. The appropriate method(s) used for the statistical evaluation will be determined after a review of the post-remediation monitoring data and are subject to the Ohio EPA approval."

Note that carbon introductions may cease in a particular reactive zone if the applicable standards are met for that reactive zone (within and/or downgradient). However, the applicable standards (to be established in the final risk assessment) will need to be met at all the wells in the monitoring network prior to ceasing all remediation activities.

5.2.4 Water-Level Measurement and Groundwater Flow Direction Determination

The depth to groundwater will be measured on a semi-annual basis in the following select groundwater monitoring wells within and south of Identified Area 1 using an electronic water-level indicator.

- Identified Area 1 Shallow Wells: CO-6, CO-7, CO-18, and MW-4; and,
- Berkshire Road Residence Shallow Wells: MW-12 through MW-15.

The depth-to-groundwater measurements will be converted to relative groundwater elevations, and the elevations will be plotted and contoured to evaluate whether groundwater flow conditions have changed, or are changing, within and south of Identified Area 1. Data generated since October 2000 have been consistent and indicate that groundwater within and south of Identified Area 1 flows slightly east of due south.

5.3 Remediation System Ventilation System Monitoring

The subslab ventilation system will be sampled semi-annually for the first year and annually thereafter until the applicable standards (to be determined in the final risk assessment) are achieved. Sampling will involve the collection of one vapor sample from the influent of the ventilation blower into a Tedlar bag or vacuum bottle for laboratory analysis of PCE and its degradation products that are present in the site groundwater using US EPA Method TO-15.

If the ventilation system sample exceeds the conservative US EPA soil gas screening levels [*OSWER Draft Guidance for Evaluating the Vapor Intrusion to Indoor Air Pathway from Groundwater and Soils*, November 2002, Table 2b - target shallow soil gas (attenuation factor 0.1)], a confirmation sampling event will be completed. If the confirmation sample exceeds these screening levels, a property specific risk assessment (using the 2004 J&E model or comparable model) for the soil gas to indoor air exposure pathway will be completed to derive risk-based subslab standards. If ventilation system sample laboratory results exceed the site specific risk-based subslab standards, then indoor air sampling will be required. Indoor air sampling will be accomplished by placing two summa containers within the same room over the source area. One container will be placed in the middle of the room and one near an inside wall or any cracks that may be observed in the floor. Upon receipt of the laboratory results from the indoor air sampling, identification of other potential

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"sources" of COCs will be evaluated if suspected. In the event that a COC is detected in the indoor air samples above the site specific risk based indoor air standards, confirmation sampling and/or modifications to the ventilation system will be initiated as discuss in Section 7.0 Contingency Plan.

6. Anticipated Problems and Responses

Despite the simplicity of the IRZ enhanced bioremediation technology compared to other groundwater remediation technologies and despite the fact that the technology has already achieved the PRGs for the COCs throughout most of the Identified Area 1 groundwater plume, there is the potential for problems (besides equipment-related problems) to occur during future remediation activities. These problems, and the appropriate responses, are discussed in this section.

6.1 Anticipated Problems

The problems discussed in this section relate to the carbon solution introduction system, the changing biogeochemistry of the saturated formation into which the solution is introduced, and potential changes in the direction of groundwater flow beneath the area of the Identified Area 1 groundwater plume.

6.1.1 Carbon Solution Introduction System

There are two potential problems related to the storage and repeated introduction of batches of molasses solution:

- Biomass in holding tank. Biomass could grow in the molasses holding tank, consuming and/or fouling the molasses. The potential for this problem is considered insignificant because there are stabilizers in the molasses and because the molasses has a short residence time in the holding tank. In fact, molasses in pure form (undiluted) is extremely stable and can be stored without significant degradation for years.
- Biofouling of Introduction Point screens. It is possible that bacteria could clog the screens in the introduction points or laterals.

6.1.2 Saturated Formation Biogeochemical Conditions

The repeated introduction of batches of carbon solution changes biogeochemical conditions in the saturated zone. There are three potential problems that could arise:

- Decreased Carbon Solution Acceptance Rate Attributable to Methane Gas Accumulation. As remediation progresses to the point that methane gas begins to accumulate in the saturated formation, the resulting gas pressure could

significantly lower the rate at which nearby introduction points or laterals accept carbon solution.

- Decreasing Groundwater pH. Excessive introduction of carbon could result in the production and buildup of organic acids through fermentation processes. The organic acids could lower groundwater pH. If the groundwater pH falls below 5.0, the process of ERD could potentially be hindered and therefore decrease the effectiveness of the IRZ system.
- Desorption. The repeated introduction of batches of carbon solution increases the rate at which natural biosurfactants are produced by indigenous microbes. The biosurfactants liberate (desorb) chlorinated VOCs that are adsorbed to soil particles in the saturated zone. This is the phenomenon that can cause an increase in parent chemical concentrations during the early stages of remediation.

6.1.3 Changes in Groundwater Flow Direction

It is possible that groundwater mounding may occur within the Identified Area 1 groundwater plume as a result of the repeated introduction of batches of carbon solution, or on the 1674 Berkshire Road property as a result of unusually heavy precipitation in the unpaved portions of this property and surrounding properties along Berkshire Road. Determination of the direction of groundwater flow beneath Identified Area 1 (refer to Section 5.2.4) will continue to be performed during future active groundwater remediation activities. Groundwater mounding could change the direction of groundwater flow that has been observed consistently since 2000. Groundwater mounding has not been observed to date in the Identified Area 1 groundwater plume, and it is considered highly unlikely that this condition will occur in the future.

6.2 Anticipated Responses

6.2.1 Carbon Solution Introduction System

For the carbon solution introduction system, the following responses would be made if one of the problems listed in Section 6.1.1 arose:

- Biomass in holding tank. The holding tank would be inspected to verify that it was being vented adequately. The biomass would be removed and drummed. The remaining molasses would be used as soon as possible. The molasses supplier would be contacted and asked how to prevent a similar situation from occurring in

the future. The residence time of the molasses in the holding tank would be reduced.

- Biofouling of introduction screens. The inside of the slotted section of the introduction point or lateral would be scrubbed clean, and the introduction point or lateral would be surged and/or pumped. If these response actions did not eliminate the problem, a decision would be made as to whether the introduction point or lateral should be abandoned and replaced.

6.2.2 Saturated Formation Biogeochemical Conditions

The following responses would be made if the potential problems listed in Section 6.1.2 arose:

- Decreased Carbon Solution Acceptance Rate Attributable to Methane Gas Accumulation. Pressure caused by methane gas accumulation in the aquifer in the area in question would be reduced by pumping groundwater from the nearest groundwater monitoring well(s). The groundwater would be treated on-site using granular activated carbon and used to mix a future batch(es) of carbon solution for introduction into the area in question. The Ohio EPA authorized these groundwater extraction, on-site treatment, and reintroduction activities in a letter to ARCADIS dated June 16, 2004. Additionally, use of a carbon solution with a lower percentage of molasses would also be considered as this would cause less gassing within the formation.
- Decreasing Groundwater pH. If the groundwater pH falls below 5.0, the molasses concentration and/or frequency of introduction would be decreased to allow pH to stabilize. Alternatively, a buffering agent such as sodium carbonate or sodium bicarbonate could be added to the carbon solution to raise and stabilize aquifer pH. Sodium carbonate and sodium bicarbonate are innocuous, nonhazardous substances that do not require special storing or handling, and only a very small quantity (approximately 10 pounds or less) of either substance would need to be added to the carbon solution mixing tank. The Ohio EPA would be notified before a buffering agent was used, but use of a buffering agent would not require modification of the UIC Class V Well Permit Exemption. The pH of the buffered solution would be measured before the solution was pumped into an introduction point or lateral, and the solution would not be introduced unless the pH was less than 9.0.

- Desorption. Performance monitoring data would be tracked closely to verify that the initial increase in parent chemical concentration was followed by a significant decrease. A concentration decrease would be taken as evidence that the IRZ remediation system was operating as intended. If a concentration decrease was not observed, the biogeochemical conditions near the location in question would be reevaluated by collecting a groundwater sample from the nearest groundwater monitoring network well; testing the sample in the field for pH, specific conductance, and temperature; and submitting the sample for laboratory analysis of VOCs, TOC, ethene/ethane, and methane, at a minimum. Additional biogeochemical indicator parameters such as sulfate, sulfide, and metals (manganese and iron) may also be analyzed. Additionally, steps might be taken to increase the organic carbon load at the location in question.

6.2.3 Changes in Groundwater Flow Direction

If groundwater mounding occurs, the carbon solution introduction volume will be decreased to enable natural groundwater flow conditions to be reestablished. The volume decrease will be achieved by decreasing the frequency of introduction and/or decreasing the volume introduced into each introduction point or lateral.

7. Contingency Plan

Due to the nature of the remedial system, the possibility of an event occurring that would prohibit the injection of molasses is low. In addition, due to the success of the ongoing remediation at the site, the likelihood of this technology achieving the groundwater applicable standards (to be established in the final risk assessment) is probable. This section discusses the contingencies if an event would occur that would prohibit the injection of a carbon solution (Section 7.1) and the contingencies if it is determined that this technology will be unable to reach the target groundwater applicable standards in the specified time period (Section 7.2).

7.1 Contingency Plan - ERD Implementation

Possible events that could hinder system operation include damage to monitoring well(s) or remedial system mechanical problems. In either of these situations, repair time would be less than one month, during which time compliance with applicable standards and protection of public health, public safety and the environment would not be jeopardized.

To reduce potential problems, the following periodic preventive measures are conducted at the Property:

- Introduction point maintenance – Well caps have been replaced; relief valves have been installed for pressure buildup; and well screens are regularly cleaned (see Section 4.4.3).
- Equipment maintenance – All equipment is checked before each use, and equipment left at the Property is locked (see Section 4.4.2).
- Property Housekeeping – The parking lot is washed if necessary after a molasses injection,
- Property Hydrogeology – In times of excessive rainfall, the water table may be elevated so that it is not possible to inject molasses. When this occurs, MW-4 and MW-12 are dewatered to induce flow downgradient of the former source area. The water is treated by a carbon filter system and used for mixing of the carbon solution.
- System Modifications (see Section 4.4.4).

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7.2 Contingency Plan – Alternative Remedy

If within 3 years, or earlier as necessary, it is determined that the Property does not meet applicable standards and the post-remedial confirmation sampling (up to eight consecutive quarters) as specified in Section 5.2.3 can not begin, a contingent remedial plan will be submitted to Ohio EPA for approval within 45 days of the determination. Implementation of the approved contingent remedy will begin within 90 days of the determination. Such contingent remedy may include one or more of the following:

- Change to a different organic carbon source (e.g., use cheese whey or vegetable oil instead of molasses);
- Hot spot excavation(s);
- Enhanced aerobic degradation to address cis-DCE and vinyl chloride which are known to degrade aerobically; and,
- Chemical oxidation with a low strength chemical due to presence of above ground structures.

Any selected alternative strategy will be presented to Ohio EPA (for approval) in the contingent remedy plan which will include schematic drawings prior to implementing.

8. Reporting

As stated in Section 4.2, the Ohio EPA/UIC Group authorized repeated batch introductions of carbon solution into groundwater at the Property by issuing a Class V Well Permit Exemption on June 19, 2002. As required by the permit exemption, monthly reports have been submitted to the Ohio EPA/UIC Group. The reports summarize the carbon solution introduction activities performed during the previous month and present tables listing the volume of carbon solution introduced into each introduction point and lateral during the previous month and the performance monitoring data collected during the previous month (if any). The reports will continue to be submitted to the UIC group as long as the IRZ remediation system is in operation. In addition, the annual report submitted to the Ohio VAP group (discussed in the following paragraphs) will be submitted to the UIC group.

Following the Ohio EPA's issuance of a CNS for the Property, an annual report will be submitted to the Ohio EPA in accordance with OAC 3745-300-15(F)(2) until the active groundwater remediation activities and post-remediation monitoring period demonstrate that the concentrations of all COCs in groundwater are below the PRGs (see Section 3.2). Annual reports will be submitted by March 1 of the year following the reporting period. The report will be submitted under affidavit and will demonstrate the continued operation of the IRZ remediation system in a manner that is protective of public health and safety and the environment, present the information obtained and data generated from completion of the effectiveness evaluation activities described above in Section 5, describe the activities performed under the Contingency Plan (if any) described in Section 7, and demonstrate that compliance with applicable standards is being maintained and will be maintained until all PRGs are achieved throughout the Identified Area 1 groundwater plume. Specifically, the annual reports will include tables presenting groundwater elevation data collected during the previous year, the volume of carbon solution introduced into each introduction point and lateral during the previous year, and the performance monitoring field and laboratory data collected during the previous year; a groundwater contour map for the year showing groundwater flow conditions; any data submitted to Ohio EPA UIC in the previous year's monthly reports and a Property map showing the detected concentrations of the COCs in groundwater during the previous year.

In addition to submittal of monthly and annual reports, the Ohio EPA will be apprised of any significant modification that needs to be made to the IRZ remediation system before the modification is made. Additionally, the Ohio EPA will be apprised of any unexpected system-related condition that occurs during the course of remediation.

9. Recordkeeping

In accordance with OAC 3745-300-15(F)(1)(g), the Volunteer or the Volunteer's designee will maintain the following records to document that the requirements of OAC 3745-300-15(F)(1) and (2) are being met:

- Groundwater sampling logs, which are completed during remediation system performance monitoring events (see Section 4);
- Laboratory reports from VAP-compliant analysis of groundwater samples collected during remediation system performance monitoring events;
- Carbon solution introduction logs including ventilation system data, which are completed during each introduction event (see Appendix C);
- Equipment inspection logs, which are completed after each carbon solution introduction event (see Appendix C);
- The monthly reports prepared in accordance with the Class V Well Permit Exemption, which are described in Section 8;
- The annual reports prepared in accordance with OAC 3745-300-15(F)(2), which are described in Section 8;
- Soil boring logs (see Phase II report) and well construction logs (see Phase II report) for IP-1 through IP-17;
- A Property plan showing the layout of the IRZ remediation system (see Figure 4); and
- Copies of relevant correspondence with the Ohio EPA.

All information submitted to the Ohio EPA will be accompanied by an affidavit certifying that the information being submitted is truthful, accurate, and complete to the best knowledge of the Volunteer. The Volunteer or the Volunteer's designee will provide the Ohio EPA with 45 days' notice by Certified Mail prior to destroying any of the above-listed documents to enable the Ohio EPA to obtain copies of the documents before they are destroyed.

10. Remediation Termination Plan and Post-Remediation Monitoring

This section presents the plan for determining when active groundwater remediation in Identified Area 1 will be terminated. A remediation termination plan is not required for Identified Area 2 because active remediation was not required there. Near the end of the active groundwater remediation (in approximately two years or less), the Property PRGs will be calculated using a Property-specific risk assessment. Active remediation will cease when the PRGs are achieved (to be achieved within 3 years from the date of the CNS unless an extension is granted by the Ohio EPA). Post-remediation monitoring will begin when the PRGs are achieved, there is no visible evidence of the presence of injectate in any of the wells that are monitored, and pH, specific conductance and temperature values in groundwater samples have stabilized. If concentrations rebound, then an evaluation of the need to reinitiate carbon introductions will be conducted.

Groundwater post-remediation monitoring will continue for eight consecutive quarters at monitoring wells MW-4, MW-12, CO-6, CO-7, and CO-18 to allow for a statistical evaluation of the post-remediation groundwater results. If the concentrations of the COCs in groundwater remain below the PRGs developed for the chemicals and there are no statistically increasing trends in the COC concentrations, a request will be made for the Ohio EPA to consider the Property to be closed. When the Ohio EPA approves this request, the RMP will also be terminated. All groundwater monitoring wells and injection points will be abandoned according to the *State of Ohio Technical Guidance for Sealing Unused Wells, 1996*.

When these conditions have been met, further active groundwater remediation will be unnecessary for the Property to remain in compliance with applicable standards. At that time, the Volunteer will provide the Ohio EPA with the following information to demonstrate that further active groundwater remediation is unnecessary:

- A description of the remedial activities being terminated;
 - The information relied upon to demonstrate that the Property will comply with applicable standards without further active groundwater remediation;
 - An affidavit from the Volunteer or the Volunteer's designee certifying that the requirements of OAC 3745-300-15(E)(2) and this O&M Plan have been satisfied;
- and

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Upper Arlington, Ohio

- An affidavit from a VAP Certified Professional certifying that the Property will comply with applicable standards without further active groundwater remediation.

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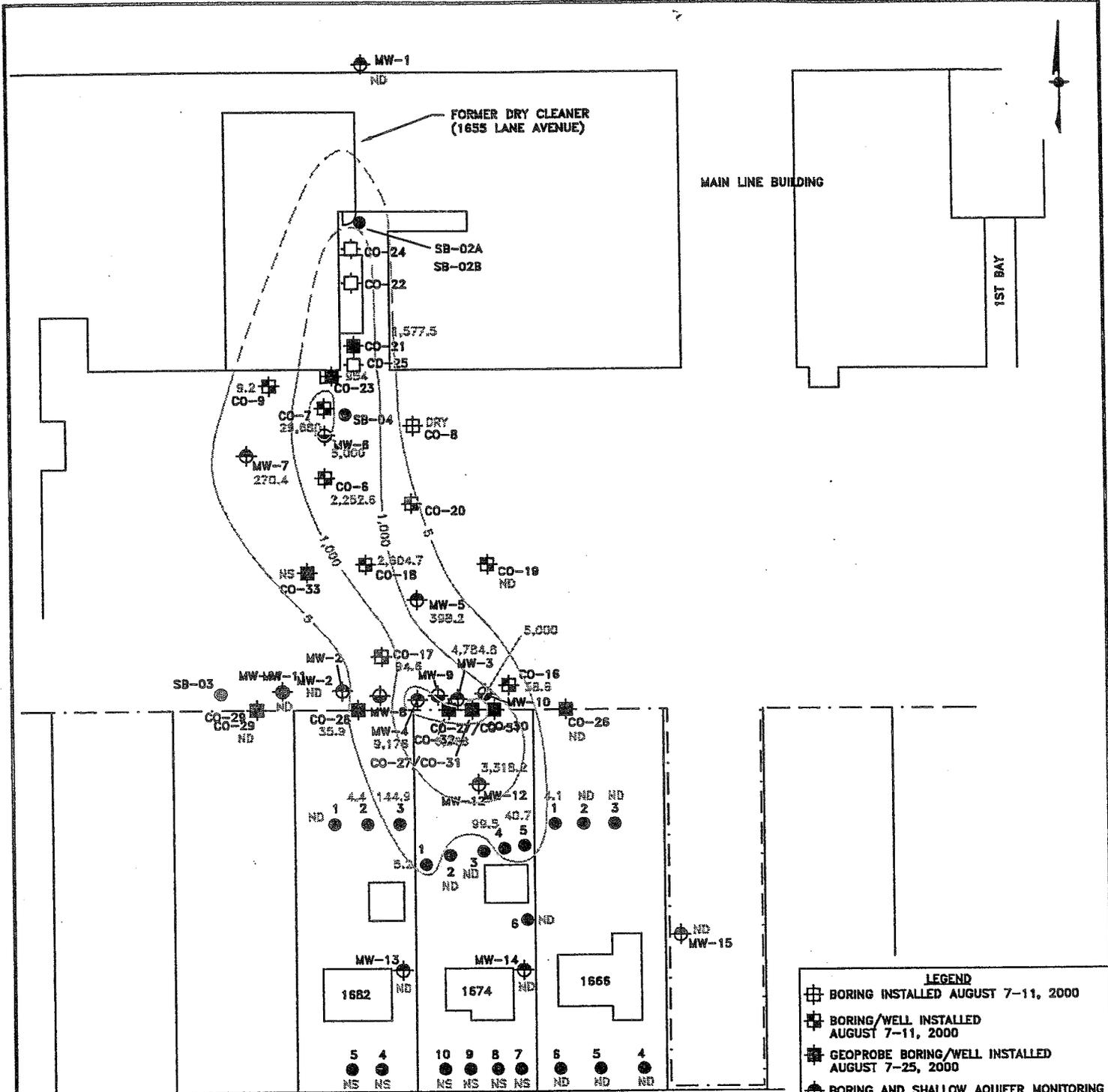
Lane Avenue Shopping Center
1557-1735 West Lane Avenue
Upper Arlington, Ohio

11. References

ARCADIS G&M, Inc. 2005. Ohio Voluntary Action Program, Phase I Property Action Assessment, Lane Avenue Shopping Center, Upper Arlington, Ohio. October 2005.

ARCADIS G&M, Inc. 2006. Ohio Voluntary Action Program, Phase II Property Action Assessment, Lane Avenue Shopping Center, Upper Arlington, Ohio. March 2006.

Ohio EPA. 1996. Ohio EPA Derived Leach-Based Soil Values Technical Guidance Document, July 1996 (Revised October 1996, and 2002), Division of Emergency and Remedial Response, Voluntary Action Program.



LEGEND

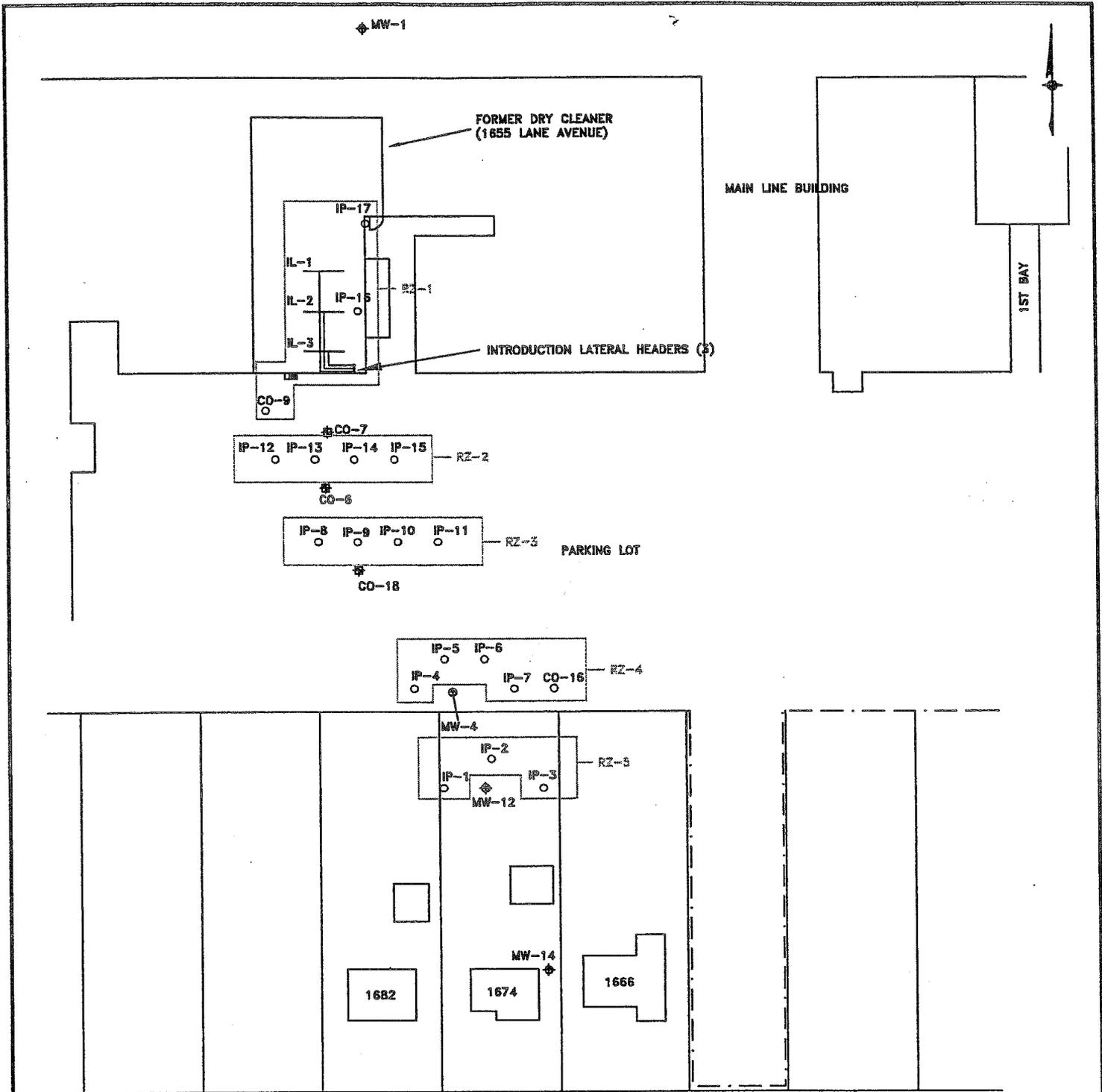
- ☒ BORING INSTALLED AUGUST 7-11, 2000
- ☒ BORING/WELL INSTALLED AUGUST 7-11, 2000
- ☒ GEOPROBE BORING/WELL INSTALLED AUGUST 7-25, 2000
- ⊕ BORING AND SHALLOW AQUIFER MONITORING WELL INSTALLED 10/11, 10/12, AND 10/30/00
- GEOPROBE BORING INSTALLED 2/24/99 AND 10/10/00 (SB-SERIES) OR 12/4-12/5/00 (RESIDENCE BORINGS)

9.2 TOTAL VOC CONCENTRATION
 NS NOT SAMPLED
 ND NOT DETECTED
 ALL CONCENTRATIONS PRESENTED IN MICROGRAMS PER LITER

DATE 11/22/2004	PROJECT MANAGER D. VICAREL	DRAWING NAME LANE AVE/DM/DA05-01
DRAWN R. SMITH	LEAD DESIGN PROF. A. RED	CHECKED D. VICAREL
PROJECT NUMBER OH000534.0012.0003		FIGURE NUMBER 3

ARCADIS
 1307 Emerald Parkway
 Suite 150, Dublin, OH 43018
 Tel: 614/764-2310 Fax: 614/764-1270

**PRE-REMEDIATION GROUNDWATER PLUME CONFIGURATION
 LANE AVENUE SHOPPING CENTER
 1557-1735 WEST LANE AVENUE, UPPER ARLINGTON, OHIO**



BERKSHIRE ROAD

LEGEND

- INTRODUCTION POINT
- ⊕ GalaTech, Inc. MONITORING WELL/BORING
- ⊕ ARCADIS MONITORING WELL/BORING
- IN-SITU REACTIVE ZONE

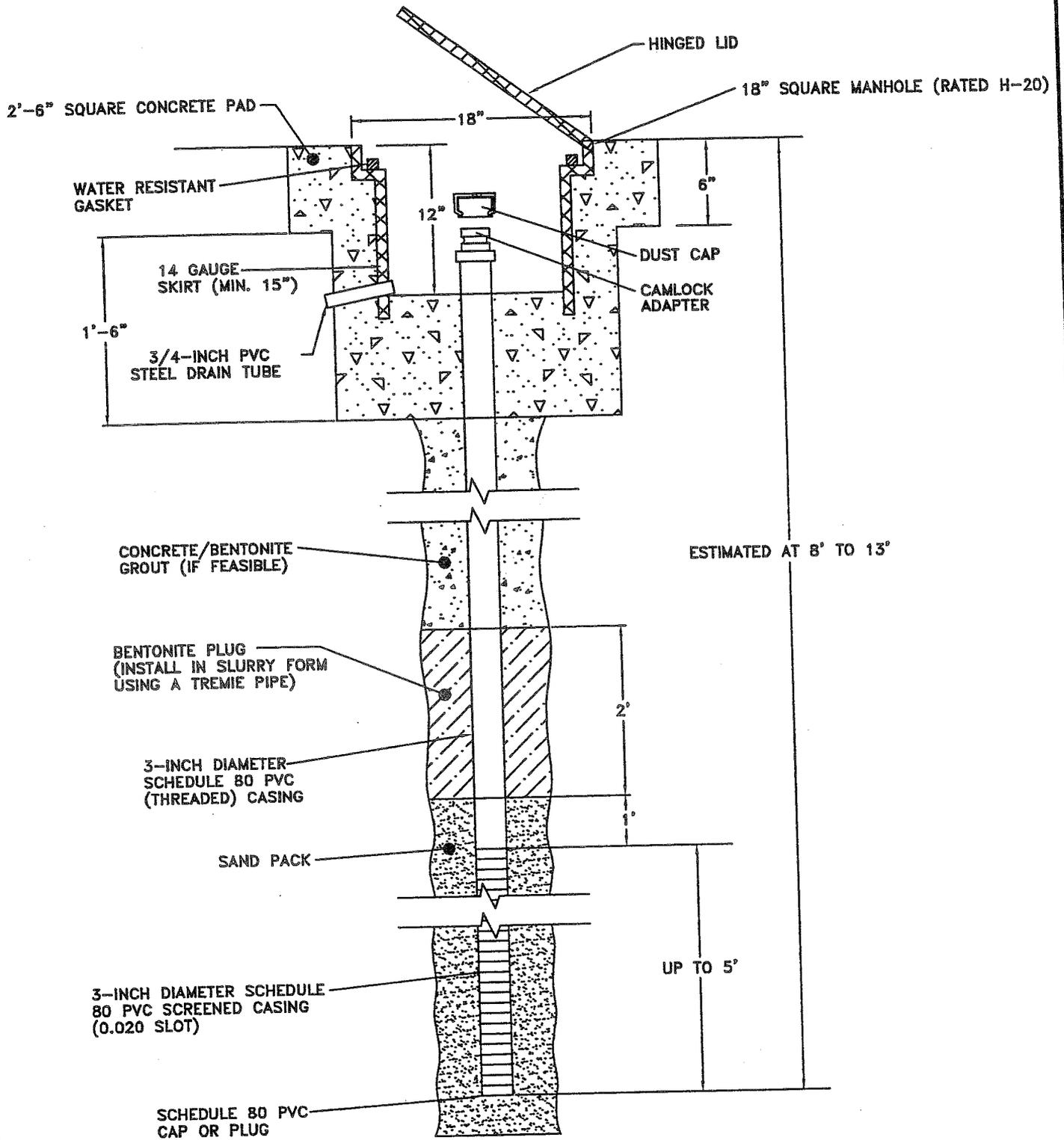
THIS FIGURE SHOWS CONFIGURATION OF SHOPPING CENTER AFTER REMODELING IN 2003-2004

DATE 5/25/2004	PROJECT MANAGER D. VCAREL	DRAWING NAME LANE.AVE./OM/CM05-04
DRAWN R. SMITH	LEAD DESIGN PROF. J. REED	CHECKED D. VCAREL
PROJECT NUMBER OH000534.0012.0003		FIGURE NUMBER 4



6307 Emerald Parkway
Suite 150, Dublin, OH 43016
Tel: 614/764-2310 Fax: 614/764-1270

REMEDATION SYSTEM LAYOUT
LANE AVENUE SHOPPING CENTER
1557-1735 LANE AVENUE, UPPER ARLINGTON, OHIO



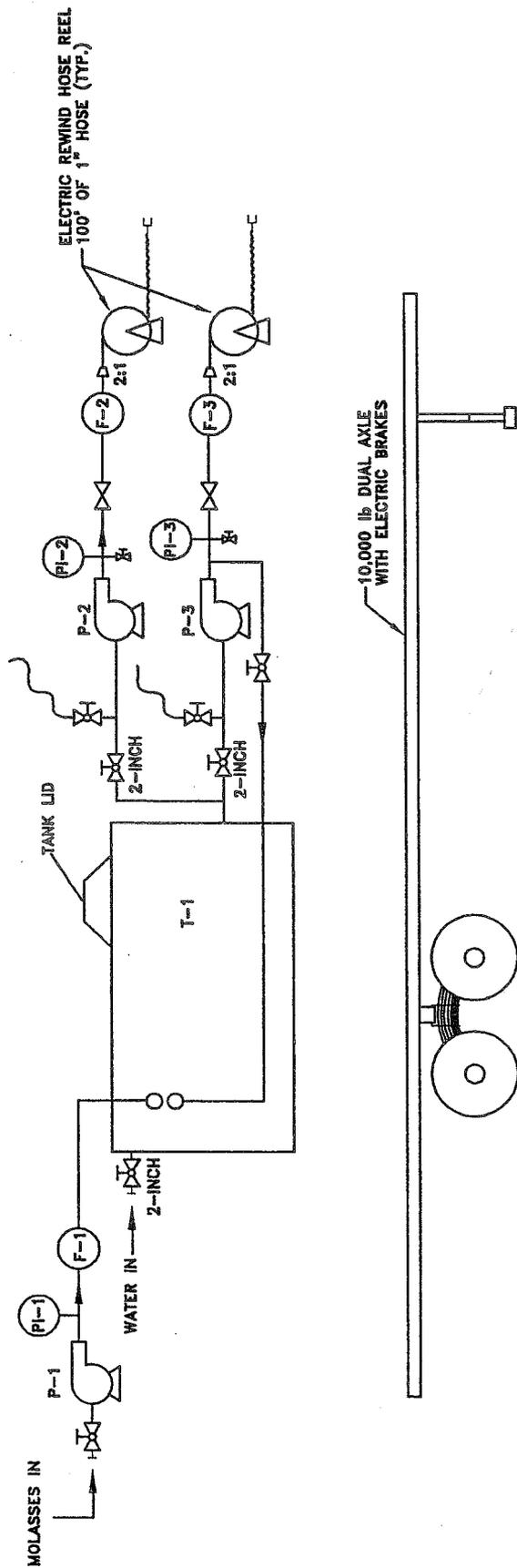
NOT TO SCALE



294 Oranor Creek Court
Dublin, OH 43017
Tel: 614/784-2310 Fax: 614/784-1270

INTRODUCTION POINT DETAIL
LANE AVENUE SHOPPING CENTER
1557-1735 WEST LANE AVENUE, UPPER ARLINGTON, OHIO

DATE 1/25/2005	PROJECT MANAGER D. VICAREL	DRAWING NAME LAN/INTRO-PT-DETAIL2
DRAWN R. SMITH	LEAD DESIGN PROF. J. REID	CHECKED B. GOLLA
PROJECT NUMBER OH000534.0012	FIGURE NUMBER 5	



LEGEND

PI-#	PRESSURE INDICATOR	D	REDUCER
---	FLEXIBLE HOSE	∩	GATE VALVE
-	FEMALE CAMLOCK ADAPTOR	∩	BALL VALVE
+	MALE CAMLOCK ADAPTOR	☪	PUMP

- I-1 1000 GALLON TANK
CARBON INTRODUCTION TANK
(POLYETHYLENE)
- P-1 ROPER GEAR PUMP
10 GPM@25PSI
- F-1 FLOW TOTALIZER
MAGNETER
- P-2/P-3 CH&E
INTRODUCTION PUMP A & B
25GPM@75PSI
- F-2/F-3 FLOW TOTALIZER

DATE	1/25/2005	PROJECT MANAGER	B. GOLLA	DRAWING NAME	LANE LANEVEZD
DRAWN	R. SMITH	LEAD DESIGN PROF.	J. REID	CHECKED	B. GOLLA
PROJECT NUMBER	OH000534.0012		FIGURE NUMBER	6	

SCHEMATIC OF CARBON SOLUTION MIXING
AND INTRODUCTION TRAILER
LANE AVENUE SHOPPING CENTER
1557-1735 WEST LANE AVENUE
UPPER ARLINGTON, OHIO



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Table 1. Carbon Solution Introduction Volumes by Reactive Zone and Introduction Point -- August 2002 through August 2005, Operation and Maintenance Plan, Lane Avenue Shopping Center, 1657-1735 West Lane Avenue, Upper Arlington, Ohio.

Reactive Zone	Introduction Point	Introduction Volume (gallons)																		
		Aug. 2002	Sept. 2002	Oct. 2002	Nov. 2002	Dec. 2002	Jan. 2003	Feb. 2003	Mar. 2003	Apr. 2003	May 2003	June 2003	July 2003	Oct. 2003	Dec. 2003	Jan. 2004	Feb. 2004	Mar. 2004	Apr. 2004	
RZ-5	IP-1	100	100	200	100	100	100	110	250	207	245	165	110	105	100	120	150	150	350	
RZ-5	IP-2	100	100	200	100	100	71	100	180	209	166	185	105	100	120	150	150	150	350	
RZ-5	IP-3	100	100	200	100	100	100	100	250	130	245	180	110	105	100	120	150	150	350	
RZ-5 Total		300	300	600	300	300	271	310	680	546	656	530	325	315	300	360	450	450	1,050	
RZ-4	IP-4	100	100	225	100	70	100	150	0	103	74	48	30	100	50	0	0	100	0	
RZ-4	IP-5	85	60	110	20	95	30	50	0	35	11	19	27	15	30	45	85	0	0	
RZ-4	IP-6	115	100	285	100	100	105	100	0	110	222	201	101	100	100	100	100	100	0	
RZ-4	IP-7	110	100	200	40	100	40	30	0	15	20	20	22	55	35	85	100	100	375	
RZ-4	CO-16	110	140	200	105	100	100	95	0	110	134	140	101	100	100	100	0	100	100	
RZ-4 Total		520	500	1,000	385	465	375	425	0	373	460	428	280	370	315	310	285	400	475	
RZ-3	IP-8	0	0	0	194	47	21	10	20	20	55	0	25	100	100	0	100	100	0	
RZ-3	IP-9	0	0	0	200	210	106	180	105	100	157	0	119	100	100	0	100	100	0	
RZ-3	IP-10	0	0	0	200	200	104	100	110	100	102	0	101	105	100	100	100	100	0	
RZ-3	IP-11	0	0	0	180	205	101	100	110	100	100	0	96	100	100	100	100	100	0	
RZ-3 Total		0	0	0	774	662	332	390	345	320	414	0	341	405	400	200	400	400	0	
RZ-2	IP-12	0	0	0	95	78	55	35	0	0	64	0	29	100	90	100	65	100	50	
RZ-2	IP-13	0	0	0	200	200	100	100	0	100	155	0	102	100	100	100	100	100	60	
RZ-2	IP-14	0	0	0	200	200	100	50	0	35	28	0	0	100	100	100	100	50	0	
RZ-2	IP-15	0	0	0	180	125	64	50	0	55	47	0	38	100	100	100	60	60	50	
RZ-2 Total		0	0	0	685	600	319	235	0	180	293	0	168	400	390	400	325	270	100	
RZ-1	CO-9	0	0	0	25	33	40	100	0	0	0	0	100	100	100	0	100	100	0	
RZ-1	IP-16	0	0	0	30	45	40	100	0	0	0	0	102	50	100	0	0	100	100	
RZ-1	IP-17	0	0	0	390	295	105	110	0	0	0	0	101	100	110	100	100	100	100	
RZ-1	IL-1	0	0	0	600	810	300	305	0	0	0	0	300	100	110	100	100	300	300	
RZ-1	IL-2	0	0	0	600	820	305	300	0	0	0	0	300	100	110	100	100	300	300	
RZ-1	IL-3	0	0	0	570	725	300	300	0	0	0	0	232	100	120	110	110	50	0	
RZ-1 Total		0	0	0	2,315	2,528	1,090	1,215	0	0	0	0	1,135	550	650	410	510	950	800	
Grand Total (gallons)		820	800	1,600	4,438	4,655	2,387	2,576	1,026	1,429	1,823	950	2,249	2,940	2,065	1,680	1,970	2,470	2,425	

Note: Injection solution ranged from 3% to 10% molasses and 50% to 97% potable water.

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Table 1. Carbon Solution Introduction Volumes by Reactive Zone and Introduction Point – August 2002 through August 2005, Operation and Maintenance Plan, Lana Avenue Shopping Center, 1667-1735 West Lana Avenue, Upper Arlington, Ohio.

Reactive Zone	Introduction Point	Introduction Volume (gallons)												Grand Total (gallons)								
		May 2004	June 2004	July 2004	Aug. 2004	Sept. 2004	Oct. 2004	Nov. 2004	Dec. 2004	Jan. 2005	Feb. 2005	Mar. 2005	Apr. 2005		May-05	Jun-05	Jul-05	Aug-05	Sep-05	Oct-05	Nov-05	Dec-05
RZ-5	IP-1	200	150	150	150	100	155	100	50	0	120	100	155	100	50	0	50	50	100	100	50	4,692
RZ-5	IP-2	175	150	150	150	100	130	100	50	0	110	100	75	100	50	0	50	50	100	100	50	4,381
RZ-5	IP-3	175	150	150	150	100	155	100	50	0	120	100	175	100	50	0	50	50	100	100	50	4,615
RZ-5 Total		550	450	450	450	300	440	300	150	0	350	300	405	300	150	0	150	150	300	300	150	13,688
RZ-4	IP-4	0	0	0	50	0	100	100	100	0	5	0	0	25	100	0	100	100	100	100	100	2,330
RZ-4	IP-5	100	0	100	135	0	100	100	10	100	20	0	20	50	100	0	100	50	100	100	100	2,001
RZ-4	IP-6	100	0	0	100	0	100	100	30	100	110	0	0	150	100	0	100	0	100	100	100	3,309
RZ-4	IP-7	75	0	100	160	0	100	100	80	100	10	5	10	50	100	0	80	0	125	100	20	2,642
RZ-4	CO-16	0	0	0	25	0	0	0	0	100	0	0	100	10	0	0	0	0	100	100	0	2,270
RZ-4 Total		275	0	200	470	0	400	400	220	400	145	5	130	285	400	0	380	150	525	500	320	12,551
RZ-3	IP-8	0	0	0	0	0	125	0	100	100	20	0	100	150	100	100	100	100	100	100	0	1,987
RZ-3	IP-9	200	0	100	50	0	125	0	100	0	150	0	50	200	100	100	100	50	100	100	0	3,102
RZ-3	IP-10	0	0	95	0	0	125	0	100	0	15	0	100	200	120	100	100	100	100	50	0	2,727
RZ-3	IP-11	0	0	0	0	0	100	0	15	0	15	0	0	200	100	100	100	100	0	30	0	2,252
RZ-3 Total		200	0	195	50	0	475	0	315	100	200	0	250	750	420	400	400	350	300	230	0	10,058
RZ-2	IP-12	50	0	0	10	0	0	130	100	100	15	10	30	150	100	100	100	100	20	10	0	1,882
RZ-2	IP-13	210	0	75	10	0	0	0	15	0	100	50	100	150	50	100	100	100	100	12	100	2,689
RZ-2	IP-14	10	0	100	70	0	0	100	100	0	100	100	100	200	80	100	100	100	100	30	100	2,653
RZ-2	IP-15	50	0	0	0	0	0	0	0	0	0	0	100	0	0	0	0	0	0	0	0	1,169
RZ-2 Total		320	0	175	90	0	0	230	215	100	215	180	230	600	230	300	300	300	220	52	200	8,312
RZ-1	CO-8	100	0	0	0	0	0	0	100	67.5	100	30	0	100	0	0	0	100	0	0	100	1,396
RZ-1	IP-16	50	50	0	50	0	125	0	100	100	100	0	100	120	0	100	0	100	0	0	100	1,762
RZ-1	IP-17	100	100	0	100	0	100	100	100	100	100	0	100	120	0	100	0	100	0	0	100	2,931
RZ-1	IL-1	300	250	100	100	0	100	200	300	300	250	300	300	0	200	200	0	0	0	0	300	8,325
RZ-1	IL-2	25	0	50	100	0	0	0	300	0	0	0	300	0	110	300	0	0	0	0	300	4,820
RZ-1	IL-3	360	0	0	0	0	0	0	0	0	0	0	300	0	0	100	0	0	0	0	300	3,777
RZ-1 Total		935	400	150	350	0	325	300	900	567.5	550	330	1100	340	310	800	0	300	0	0	1200	21,011
Grand Total (gallons)		2,289	850	1,170	1,410	300	1,640	1,230	1,880	1,168	1,460	795	2,115	2,275	1,510	1,500	1,238	1,250	1,345	1,132	1,870	65,529

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Appendix A

Risk Mitigation Plan

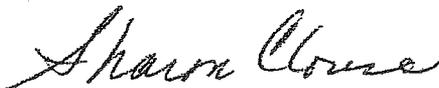
UAP Columbus

Risk Mitigation Plan

Lane Avenue Shopping Center
1557-1735 West Lane Avenue
Upper Arlington, Ohio

October 2006

ARCADIS



Sharon Clouse, PG
Staff Geologist



James J. Reid, PE
Environmental Business Practice Manager

Risk Mitigation Plan

Lane Avenue Shopping Center
1557-1735 West Lane Avenue
Upper Arlington, Ohio

Prepared for:
UAP Columbus

Prepared by:
ARCADIS G&M of Ohio, Inc.
284 Cramer Creek Court
Dublin
Ohio 43017
Tel 614 764 2310
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Our Ref.:
OH000534.0015.00003

Date:
31 October 2006

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- 1 Site Location Map, Lane Avenue Shopping Center, 1557-1735 West Lane Avenue, Upper Arlington, Ohio.
- 2 General Site Layout and Identified Areas Map, Lane Avenue Shopping Center, 1557-1735 West Lane Avenue, Upper Arlington, Ohio.

Appendices

- A Property Legal Descriptions

1. Introduction

ARCADIS was contracted by UAP Columbus Joint Venture 326132 (UAP Columbus), located in Milwaukee, Wisconsin, to prepare this Risk Mitigation Plan (RMP) for the Lane Avenue Shopping Center facility located at 1557-1735 West Lane Avenue in Upper Arlington, Franklin County, Ohio (the site; Figure 1) in accordance with Chapter 15, Section G of the Ohio Voluntary Action Program (VAP) regulations promulgated as Ohio Administrative Code (OAC) 3745-300-15.

The VAP property is totally contained in Parcel 070-004672 but does not encompass the entire parcel. The northeast corner of the parcel received a CNS (Reference # 00NFA103) in 2001 and this area has been excluded from the VAP property. The entire VAP property is a combination of 5.222 acres regulated under the RMP and the 6.195 acres not regulated by the RMP. Legal descriptions for both areas including the VAP areas shown on a parcel map are included in Appendix A.

As required by OAC 3745-300-15(1), the stated purpose of this RMP is to describe the potential health risks that could result from contact with the chemicals of concern (COCs) in groundwater during possible excavation activities by construction or utility workers via the incidental ingestion, direct dermal contact, or inhalation routes of exposure, and to present ways by which these potential health risks can be mitigated. The COCs in site groundwater and soil are discussed below in Section 2. The potential health risks associated with the COCs are discussed below in Section 3.

In accordance with OAC 3745-300-15(5) through (7), this RMP specifies that the risk mitigation procedures described below in Section 4 must be implemented whenever excavation activities are performed in areas of potential environmental concern (refer to Section 2). Further, the information contained in this RMP should be included in the Chemical Hazards portion of any subsequent Health and Safety Plan (HASP) developed for excavation activities at the Property.

Implementation of this RMP is the responsibility of the Owner. In accordance with OAC 3745-300-15(G)(8) and (9), the Owner shall ensure that notification of the RMP is given to contractors and subcontractors, their employees, and other persons involved in excavation activities. The health and safety officer of the excavation shall ensure that the precautions are explained, and that each contractor must require and communicate the precautions to their employees and subcontractors. In accordance with OAC 3745-300-15(G)(10), the Owner will notify the Ohio Environmental Protection Agency (Ohio EPA) in the annual report if excavation activities are conducted at the

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Risk Mitigation Plan

Lane Avenue Shopping Center
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site which require implementation of this RMP if a Covenant Not to Sue is issued for the site under the VAP. The annual report shall include, at a minimum: notifications to Ohio EPA and contractors; the date each activity began and ended; a map showing the location(s) of any newly-discovered area(s) in which COCs are found; a cover letter summarizing all activities performed; and an affidavit from the Certified Professional attesting that all information for the given reporting period has been submitted and is truthful, accurate, and complete.

Based on prior investigations, the potential health risks that could result from contact with groundwater during subsurface excavation activities is the most probable source of risk to the construction worker. Subsurface soil, defined as soil from a depth of greater than 2 feet or soil directly beneath current barriers such as building foundations or pavement, is included in this risk mitigation plan for completeness, although all impacted soils above direct contact standards have been removed (ARCADIS, 2005).

2. Background

A Phase I Property Assessment (Phase I) was conducted at the site in accordance with OAC 3745-300-06 between November 2003 and October 2005. The Phase I established that a release of hazardous substances (chlorinated volatile organic compounds [VOCs]) occurred at two locations; each location is referred to as an Identified Area (IA). Subsurface investigations involving groundwater and soil sampling and analysis for the COCs were performed in these areas during the subsequent completion of a VAP Phase II Property Assessment. The locations of the IAs are shown in Figure 2. The two locations at which releases occurred are designated IA-1 and IA-2 and are defined as follows:

- IA-1 – The former 1655 West Lane Avenue address in the west-central portion of the main shopping center building, and a portion of the parking lot south of this address. A dry cleaner occupied IA-1 from 1957 to 1985. Soil and groundwater within and south (hydraulically downgradient) of IA-1 as far as the residential property at 1674 Berkshire Road were impacted with chlorinated VOCs from a release(s) of dry cleaning fluids; and,
- IA-2 – The location of the former 1689 West Lane Avenue address (a.k.a. 2394 Wellesley Lane) that is currently located beneath the parking lot east of the main shopping center building. A dry cleaner occupied IA-2 from 1957 to 1975. Soil and groundwater within IA-2 were impacted with chlorinated VOCs from a release(s) of dry cleaning fluids.

This RMP was prepared because of the potential for future construction and utility workers to be exposed to VOCs in groundwater during excavation activities at the site. Exposure to subsurface soil is included although direct contact with soil is not considered to pose a potential risk at the site.

3. Potential Health Risks

In accordance with OAC 3745-300-15(G)(2), this section describes the potential health risks associated with VOCs which have been detected in site groundwater and soil at concentrations above the VAP generic direct contact standards.

3.1 Volatile Organic Compounds

Tetrachloroethene (PCE) is the main solvent used in dry cleaning and was the main COC at the site prior to source area excavation activities of the subsurface soil and remediation of the groundwater through in-situ reactive zone (IRZ) enhanced bioremediation. The IRZ technology involves repeated introductions of an organic carbon source (molasses). Groundwater remediation is accomplished through the process of enhanced reductive dechlorination (ERD), during which there is a stepwise reduction from parent compound (PCE), to daughter products such as trichloroethene (TCE), 1,1-dichloroethene (1,1-DCE), cis-1,2-dichloroethene (cis-DCE), trans-1,2-dichloroethene (trans-DCE) and vinyl chloride to innocuous, non-toxic end products such as ethene and ethane.

The health effects of VOCs can vary from highly toxic to innocuous, depending on the compound, the type of exposure, and the length of exposure. According to the 10th Report on Carcinogens, PCE, TCE and vinyl chloride are "reasonably anticipated to be carcinogens." People at the highest risk of long-term exposure to these VOCs are industrial workers who have prolonged exposure to these compounds in the workplace, as well as cigarette smokers and people who have prolonged exposure to emissions from motor vehicle traffic. Long-term exposure to VOCs can damage the liver, kidneys, and central nervous system. Short-term exposure to VOCs can irritate the eyes and respiratory tract, and cause headaches, dizziness, visual disorders, fatigue, loss of coordination, allergic skin reactions, nausea, and memory impairment.

4. Risk Mitigation Procedures and Exposure Response Actions

In accordance with OAC 3745-300-15(G)(3), this section describes the specific precautions to be taken to prevent worker exposure to VOCs during on-site excavation activities at the site.

4.1 Risk Mitigation Procedures

As stated above in Section 1, the Owner shall ensure that the information contained in this RMP is communicated to all contractors, their employees, and their subcontractors. Specifically, the health and safety officer of the excavation shall ensure that all site workers are apprised of the potential health risk posed by subsurface soil and/or groundwater that may contain VOCs, of the precautions to be taken to mitigate this risk, and of the procedures for handling soil and groundwater that may present a health risk.

4.1.1 Worker Protection

All workers involved in on-site excavation activities shall receive Occupational Safety and Health Administration (OSHA) training for Hazardous Waste Operations (Hazardous Waste Operations). Each worker must also take the following minimum precautions to effectively limit the potential risk of exposure to the COCs via dermal contact, ingestion, or inhalation:

- Wear clothing that limits the skin area available for exposure (long pants and long-sleeved shirts buttoned at the cuff) and gloves whenever performing work in areas where subsurface soil is exposed;
- Use a pump to remove groundwater from the excavation and containerize the water for testing and proper disposal later;
- Wear waterproof or rubber boots and rubber, nitrile, or equivalent gloves when working in groundwater;
- Do not eat, drink, smoke, or apply cosmetics, creams, ointments or topical solutions in any area where excavation work is being performed;
- Wash hands thoroughly before eating, drinking, smoking, or using the restroom;

- Avoid direct contact, to the greatest extent practicable, with subsurface soil; and
- Implement dust-suppression measures whenever soil is being excavated or transported across the site.

Additionally, the following procedures should be conducted prior to, or during, excavation activities:

- Review a site map to determine whether planned activities will be occurring in IA's;
- Perform a utility clearance for each excavation area;
- Prevent unauthorized persons from entering the work areas; and
- Perform air monitoring for the COCs in the excavation work areas.

4.1.2 Maintenance of Floor Slabs, Building Foundations, and Pavement

Direct contact with groundwater, ingestion of groundwater, and inhalation of vapors emanating from groundwater were considered to be complete exposure pathways for site workers. These exposures are precluded during normal commercial use of the property, however, because there are exposure barriers at the site. The exposure barriers include the concrete and floor slabs of the site buildings, and the pavement in the exterior portions of the site. Because these exposure barriers are present, the site is currently considered protective of populations associated with commercial land use. The site will continue to be protective of these populations provided these exposure barriers are maintained in good condition. Such maintenance should involve regular periodic inspection and repair. The maintenance and/or replacement of exposure barriers with equivalent barriers will be documented in the annual report. If an exposure barrier is removed, the Owner shall replace it with another barrier that limits exposure as effectively as the removed barrier.

4.1.3 Soil Mixing During Excavation or Construction Activities

Although no excavation or construction work is currently planned, it is possible that such activities will be performed in the future. If the excavation occurs in an IA where COCs are known to occur, all excavation activities should be performed in a manner that minimizes the mixing of soil containing COCs with soil that does not contain COCs. Excavation contractors must develop and implement procedures to segregate

soils. Such procedures should include, at a minimum, contracting a qualified environmental professional to be present during excavation activities, and assigning the environmental professional responsibility for examining all soil removed from the ground and from the walls and floor of the excavation, and for determining whether excavated soil can be used on-site as backfill or fill material.

4.2 Exposure Response Actions

If a significant exposure is known or suspected to have occurred, the following steps must be taken:

- Immediately remove and decontaminate all site personnel;
- Provide medical surveillance monitoring as needed;
- Restrict access to the area where the exposure occurred; and
- Perform sampling and analysis to determine the level of personal protective equipment required if/when work is resumed, as well as personnel and equipment decontamination requirements, training requirements, medical surveillance requirements, and waste management requirements.

5. Groundwater and Soil Handling

This section describes the manner by which soil and water derived from future excavation or construction activities should be handled.

5.1 Groundwater Handling

Depth to groundwater ranges from approximately eight to 14 feet below land surface (bls) in IA-1. At IA-2 the depth to groundwater can be as shallow as six to seven feet bls. If excavations are performed within the groundwater zone and that groundwater may or is known to contain COCs the excavation contractors must develop and implement procedures to minimize the volume of water that could accumulate in an excavation, and to properly manage and dispose of water that does accumulate. To minimize the volume of water that accumulates in an excavation, such procedures should include, at a minimum, covering the excavation or lining the excavation and making arrangements to dewater the excavation and contain the water. To properly manage and dispose of the water that does accumulate, such procedures should include, at a minimum, contracting a qualified environmental professional to visit the site, collect a sample of the water, submit the sample for laboratory analysis, determine appropriate disposal options based on an evaluation of the resulting analytical data, and ensure that the water is disposed in accordance with applicable regulations. All federal and state laws and regulations concerning the treatment, storage and disposal requirements of hazardous materials as discussed in OAC 3745-300-15(C) will be followed.

5.2 Soil Handling

Because soil containing the COCs at concentrations that are a potential exposure risk will not necessarily be stained or odorous, all subsurface soil derived from excavations performed within the IA's identified at the site should be considered to be a potential exposure risk. Section 4.1.1 of this RMP describes procedures that should be implemented during excavation work to protect workers from exposure to site soil. In accordance with OAC 3745-300-15(G)(4), the following minimum procedures should be implemented to properly handle soil derived from future excavation work:

- Contain the soil in 55-gallon steel drums or in roll-off containers depending on the volume of soil that is generated;

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Risk Mitigation Plan

Lane Avenue Shopping Center
1557-1735 West Lane Avenue
Upper Arlington, Ohio

- Collect representative samples of the soil and submit the samples for waste characterization analyses; and
- Dispose the soil off-site as hazardous or non-hazardous waste depending on the results of the waste characterization analyses, or re-use the soil on-site if it does not contain the COCs at concentrations of concern, and if this practice is allowed by applicable regulations.

If more than 2,200 pounds of soil are removed from the site during a calendar year, the Owner shall prepare an Annual Hazardous Waste Report for submittal to the Ohio EPA. The report shall indicate the volume of material removed from the site and shall identify all waste transporting and receiving facilities.

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Risk Mitigation Plan

Lane Avenue Shopping Center
1557-1735 West Lane Avenue
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6. References

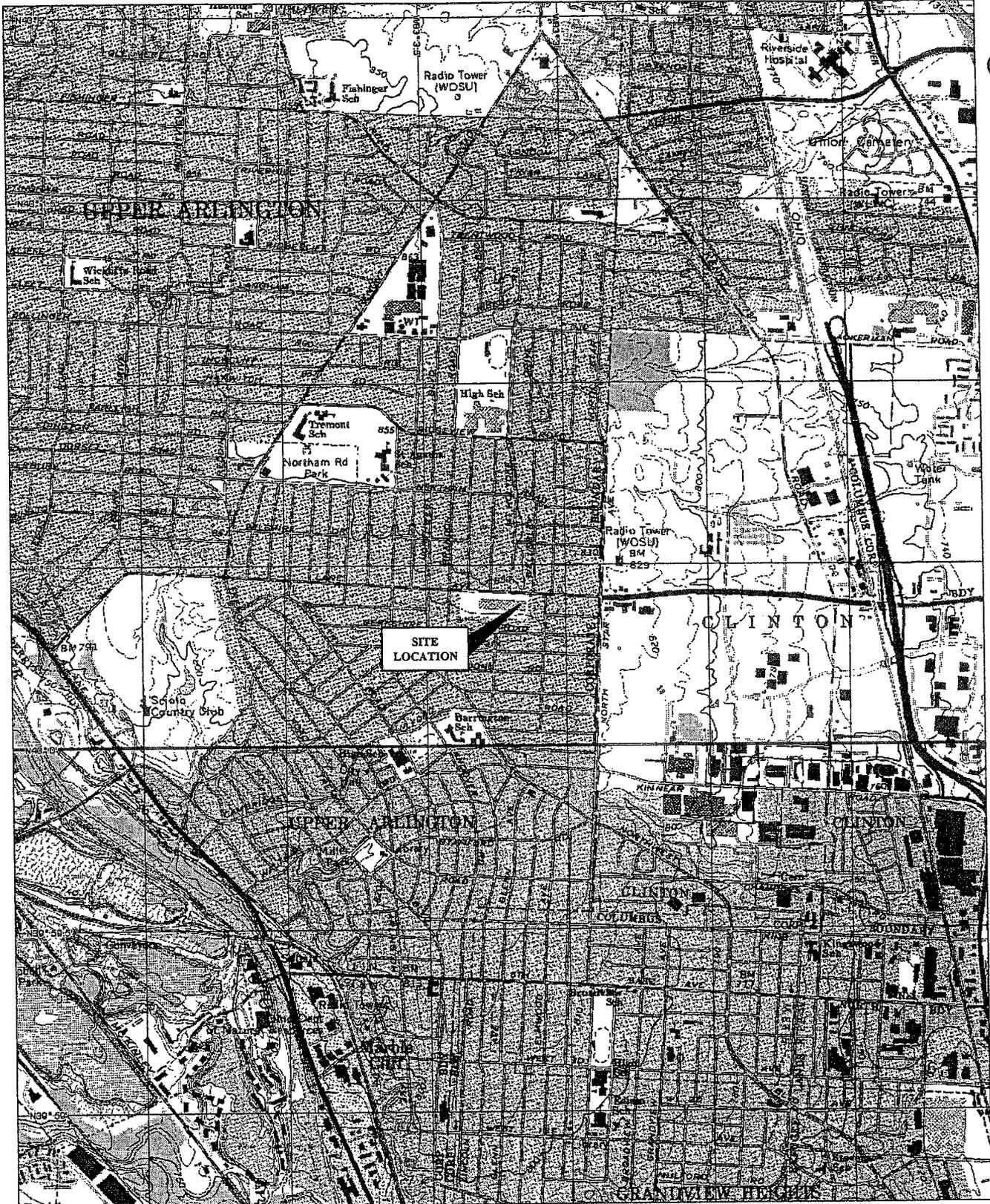
Agency for Toxic Substances and Disease Registry (ATSDR). 1997. *Toxicological Profiles*. U.S. Department of Health and Human Services, Public Health Service. U.S. Public Health Service, Atlanta, GA.

ARCADIS, 2005. Source Area Excavation Report, Former Swan Cleansers Site, Lane Avenue Shopping Center, 1655 West Lane Avenue, Upper Arlington, Ohio.

Integrated Risk Information System (IRIS), 2001. U.S. Environmental Protection Agency, Office of Health and Environmental Assessment, Cincinnati, OH.
URL: <http://www.USEPA.gov/iris>.

International Agency for Research on Cancer (IARC), 1983. IARC monograph on the evaluation of carcinogenic risk of chemicals to man. Vol 32 IARC, Lyon, France.

Risk Assessment Information System (RAIS), 2001. Toxicity Profiles. URL:
<http://www.risk.lsd.ornl.gov/tox/profiles>.

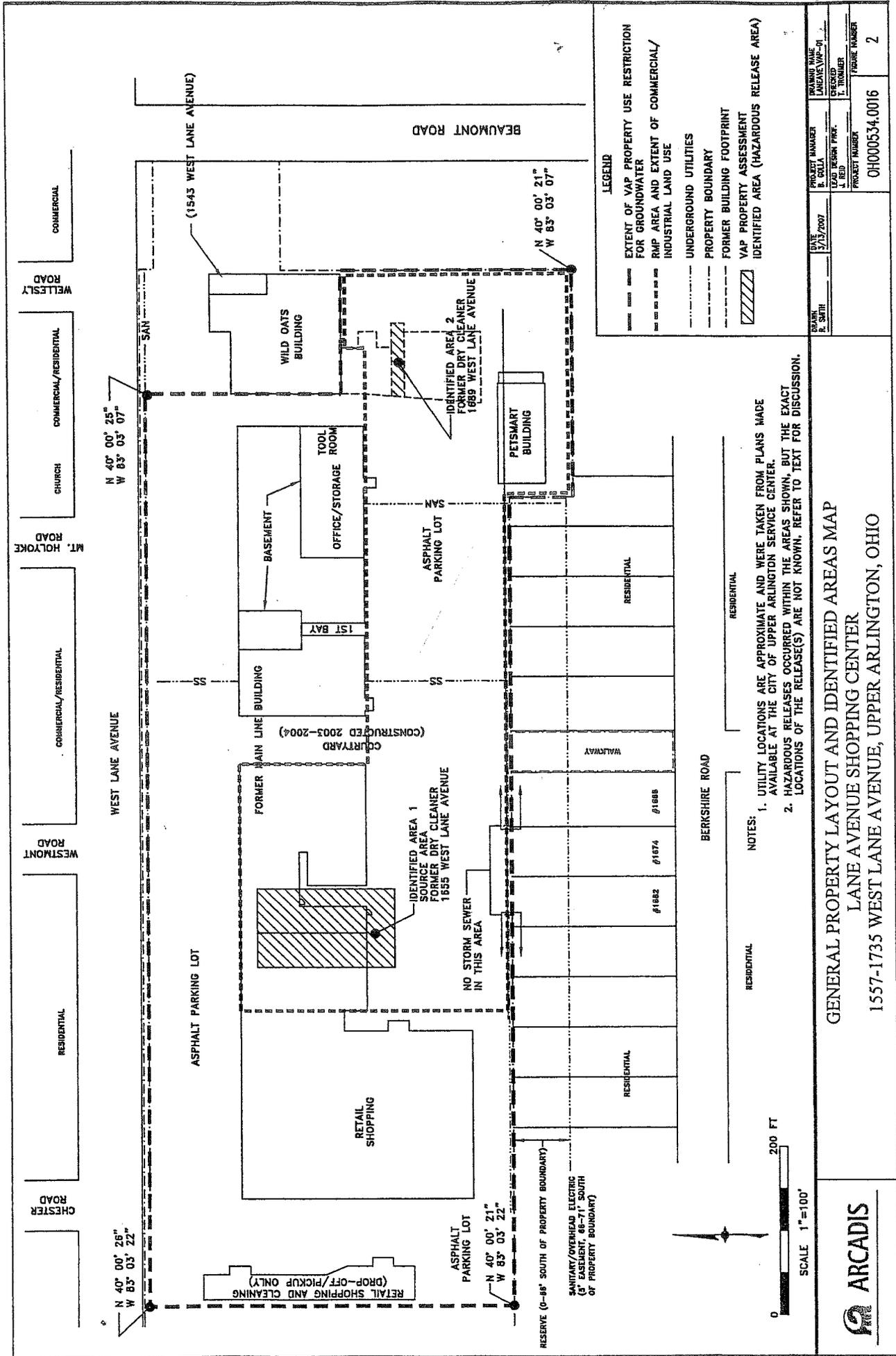


3-D TopoQuads Copyright © 1999 DeLorme Yarmouth, ME 04096 Source Data: USGS 750 ft Scale: 1: 25,000 Detail: E-0 Datum: WGS84



PROPERTY LOCATION MAP
 LANE AVENUE SHOPPING CENTER
 1557-1735 WEST LANE AVENUE
 UPPER ARLINGTON, OHIO

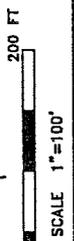
Date 25JUL00	Project Manager A. HAGEN	Drawing Name LANEAVEQUADS
Drawn By R. SMITH	Lead Design Prof. J. REID	Checked T. TROMMER
Project Number OH000534.0012		Figure Number 1



- LEGEND**
- EXTENT OF VAP PROPERTY USE RESTRICTION FOR GROUNDWATER
 - RMP AREA AND EXTENT OF COMMERCIAL/ INDUSTRIAL LAND USE
 - UNDERGROUND UTILITIES
 - PROPERTY BOUNDARY
 - FORMER BUILDING FOOTPRINT
 - ▨ VAP PROPERTY ASSESSMENT IDENTIFIED AREA (HAZARDOUS RELEASE AREA)

- NOTES:**
1. UTILITY LOCATIONS ARE APPROXIMATE AND WERE TAKEN FROM PLANS MADE AVAILABLE AT THE CITY OF UPPER ARLINGTON SERVICE CENTER.
 2. HAZARDOUS RELEASES OCCURRED WITHIN THE AREAS SHOWN, BUT THE EXACT LOCATIONS OF THE RELEASE(S) ARE NOT KNOWN. REFER TO TEXT FOR DISCUSSION.

GENERAL PROPERTY LAYOUT AND IDENTIFIED AREAS MAP
LANE AVENUE SHOPPING CENTER
 1557-1735 WEST LANE AVENUE, UPPER ARLINGTON, OHIO



DATE	5/13/2007	PROJECT MANAGER	B. DOLLA	DRAWING NAME	LANE/VAP-01
DRAWN	R. SMITH	LEAD DESIGN PRF.	J. EDD	CHECKED	L. NUMBER
		PROJECT NUMBER	CH0000534.0016	FIGURE NUMBER	2

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Appendix A

Property Legal Descriptions

**DESCRIPTION OF
11.417 ACRES
CITY OF UPPER ARLINGTON, OHIO**

Situated in the State of Ohio, Franklin County, City of Upper Arlington, lying in Section 4, Township 1, Range 19, United States Military Lands and being 11.417 acres out of a 12.481 acre tract as conveyed to UAP-COLUMBUS JV 326152 by deed of record in Volume 3700, Page 338 (all records herein are from the Recorder's Office, Franklin County, Ohio) and being more particularly described as follows.

BEGINNING at a iron pin found at the southwest corner of said 12.481 acre tract, being at the northwesterly corner of Reserve D of the "THE UNIVERSITY ADDITION" a subdivision of record in Plat Book 16, Page 39;

Thence North 02° 46' 07" East, a distance of 392.25 feet along the westerly line of said 12.481 acre tract to a point;

Thence the following three (3) courses and distances over and across said 12.481 acres tract;

1. Thence South 86° 25' 53" East, a distance of 1148.81 feet, across said 12.481 acre tract to a point;
2. South 03° 34' 00" West a distance of 218.43 feet a point;
3. South 86° 25' 53" East, a distance of 147.08 feet to a point on the westerly line of Reserve F of said "THE UNIVERSITY ADDITION";

Thence South 01° 58' 04" West, a distance of 240.13 feet, along said westerly line of Reserve F, to a point;

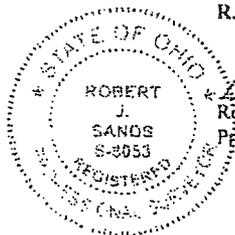
Thence North 86° 25' 53" West, a distance of 329.96 feet along the southerly line of the "THE UNIVERSITY ADDITION" to a point, being on the northerly line of Lot Number 14 of said subdivision;

Thence North 02° 11' 07" East, a distance of 66.26 feet along the easterly line of said Lot Number 14 of said subdivision to a point;

Thence North 86° 25' 53" West, a distance of 965.56 feet along the northerly line of Reserve D of the "THE UNIVERSITY ADDITION", to the **POINT OF BEGINNING**, containing 11.417 acres, more or less, and being subject to all easements, restrictions and rights-of-way of record.

Bearings on the above description are based on the grid bearing of South 89° 18' 1/2" East for the centerline of Lane Avenue as delineated on said subdivision of record.

R.D. ZANDE & ASSOCIATES



Robert J. Sands
Robert J. Sands, P.S. Date

Professional Surveyor No-S-8053

**DESCRIPTION OF
5.222 ACRES
CITY OF UPPER ARLINGTON
FRANKLIN COUNTY, OHIO**

Situate in the State of Ohio, Franklin County, City of Upper Arlington, lying in Section 4, Township 1, Range 19, United States Military Lands and being 5.222 acres out of a 12.481 acre tract as conveyed to UAP-COLUMBUS JV 326132 by deed of record in Deed Volume 3700, Page 338 (all records herein are from the Recorder's Office, Franklin County, Ohio) and being more particularly described as follows:

Begin, for reference at an iron pin found at the northwesterly corner of Reserve D of the "THE UNIVERSITY ADDITION" a subdivision of record in Plat Book 16, Page 39;

Thence South $86^{\circ} 25' 53''$ East, a distance of 344.13 feet, along the northerly line of said Reserve D to the **TRUE POINT OF BEGINNING**;

Thence the following six (6) courses over and across said 12.481 acre tract;

1. North $03^{\circ} 50' 43''$ East a distance of 327.70 feet a point;
2. South $86^{\circ} 09' 17''$ East, a distance of 290.91 feet to a point;
3. South $03^{\circ} 30' 07''$ West, a distance of 157.40 feet to a point;
4. South $85^{\circ} 53' 12''$ East, a distance of 515.55 feet to a point;
5. North $03^{\circ} 34' 07''$ East, a distance of 9.80 feet to a point;
6. South $86^{\circ} 25' 53''$ East, a distance of 138.23 feet to a point on the westerly line of Reserve "F" of the "THE UNIVERSITY ADDITION";

Thence South $01^{\circ} 58' 04''$ West, a distance of 240.13 feet along the westerly line of said Reserve "F" of the "THE UNIVERSITY ADDITION" to a point;

Thence North $86^{\circ} 25' 53''$ West, a distance of 329.96 feet along the southerly line of the "THE UNIVERSITY ADDITION" to a point, being on the northeasterly line of Lot Number 14 of said subdivision;

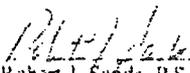
Thence North $02^{\circ} 11' 07''$ East, a distance of 66.26 feet along the easterly line of said Lot Number 14 of said subdivision to a point;

Thence North $86^{\circ} 25' 53''$ West, a distance of 621.43 feet along the northerly line of Reserve D of the "THE UNIVERSITY ADDITION", to the **POINT OF BEGINNING**, containing 5.222 acres, more or less, and being subject to all easements, restrictions and rights-of-way of record.

Bearings on the above description are based on the grid bearing of South $89^{\circ} 18' 1.2''$ East for the centerline of Lane Avenue as delineated on said subdivision of record.

All iron pins set are $\frac{1}{4}$ inch iron pipes, 30 inches in length, with a yellow cap bearing the name "R.D. ZANDE".

R.D. ZANDE & ASSOCIATES


Robert J. Sands, P.S. Date
Professional Surveyor No-S-8053

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Appendix B

Letters from the Ohio EPA/UIC Group
Authorizing Introduction of Carbon
Solution and On-Site Groundwater
Extraction/Treatment



State of Ohio Environmental Protection Agency

STREET ADDRESS:

Lazarus Government Center
122 S. Front Street
Columbus, OH 43215-1099

TELE: (614) 644-3020 FAX: (614) 644-2329

MAILING ADDRESS:

P.O. Box 1049
Columbus, OH 43216-1049

June 19, 2002

Mr. William M. Golla
Arcadis Geraghty & Miller, Inc.
Suite 150
6397 Emerald Parkway
Dublin, Ohio 43016

RECEIVED
JUN 20 2002
ARCADIS GERAGHTY & MILLER
150 S. FRONT STREET
COLUMBUS, OH 43215

Dear Mr. Golla:

This letter is to inform you that the Ohio EPA, Division of Drinking and Ground Waters, Underground Injection Control (UIC) Unit has reviewed your proposed use of Class V injection well(s) in the remediation plan for Swan Cleaners located at 1655 Lane Avenue in Upper Arlington, Ohio.

The installation and operation of this (these) Class V injection well(s), through which you propose to inject feed grade molasses and potable water, is authorized under Ohio's UIC regulations set forth in Ohio Administrative Code Chapter 3745-34. Class V injection wells that are not used to dispose of wastes may be authorized by rule, as long as no Underground Source of Drinking Water is endangered by such operation. To demonstrate continuous compliance with the UIC regulations, we request that you submit monthly operating reports which should include:

- A description of the injected fluids;
- The injection rate and volume;
- A description of any injection well maintenance and rehabilitation procedures; and,
- Any monitoring results.

Additionally, with the first monthly operating report submitted, please include the latitude and longitude measurements for each Class V well at this site.

The authorization to install and operate this(these) Class V UIC well(s) in no way relieves the owner/operator of any Class V injection well from the obligations imposed by any state or local statutes, administrative rules, court order, or order of any administrative agency. No permit of any kind is granted or implied by this correspondence.

If you have any questions, please feel free to contact me at (614) 644-2752.

Sincerely,

Valerie J. Orr
Class V Coordinator
UIC Section
Division of Drinking and Ground Waters

cc: Bruce Colman, Chief, CDO
Lindsay Taliaferro III, Manager, DDAGW
Linnea Saukko, CDO-DDAGW

Bob Taft, Governor
Maureen O'Connor, Lieutenant Governor
Christopher Jones, Director



State of Ohio Environmental Protection Agency

STREET ADDRESS:

Lazarus Government Center
122 S. Front Street
Columbus, Ohio 43215

TELE: (614) 644-3020 FAX: (614) 644-3184

MAILING ADDRESS:

P.O. Box 1049
Columbus, OH 43216-1049

June 16, 2004

Mr. William M. Golla
Arcadis G&M, Inc.
284 Cramer Creek Court
Dublin, Ohio 43017

RECEIVED
JUN 21 2004
ARCADIS Geraghty & Miller

Dear Mr. Golla:

This letter is to inform you that the Ohio EPA, Division of Drinking and Ground Waters, Underground Injection Control (UIC) Unit has reviewed your proposed use of Class V injection well(s) in the remediation plan for Swan Cleaners located at 1655 Lane Avenue in Upper Arlington, Ohio.

The installation and operation of this (these) Class V injection well(s), through which you propose to reinject treated ground water and molasses is approved with the understanding that extracted ground water will be treated to meet primary drinking water standards, Maximum Contaminant Levels (MCLs) or Health Advisory Limits (HAs) pursuant to Ohio Administrative Code (OAC) 3745-34-07. Injection is authorized under Ohio's UIC regulations set forth in Ohio Administrative Code Chapter 3745-34. Class V injection wells that are not used to dispose of wastes may be authorized by rule, as long as no Underground Source of Drinking Water is endangered by such operation. To demonstrate continuous compliance with the UIC regulations, we request that you submit monthly operating reports which should include:

- An analysis of the injected fluids;
- The injection rate and volume;
- A description of any injection well maintenance and rehabilitation procedures; and,
- Any monitoring results.

Additionally, with the first monthly operating report submitted, please include the latitude and longitude measurements for each Class V well at this site.

The authorization to install and operate this(these) Class V UIC well(s) in no way relieves the owner/operator of any Class V injection well from the obligations imposed by any state or local statutes, administrative rules, court order, or order of any administrative agency. No permit of any kind is granted or implied by this correspondence.

Bob Taft, Governor
Jennette Bradley, Lieutenant Governor
Christopher Jones, Director

June 16, 2004

Page 2

If analysis of injected fluids indicate the above referenced water quality standards are exceeded, Swan Cleaners may be required to apply for and obtain a Class V Permit to Operate at a cost of \$2,000.00 pursuant to OAC Rule 3745-34-07(c).

If you have any questions, please feel free to contact me at (614) 644-2752.

Sincerely,



Valerie J. Orr
Class V Coordinator
UIC Section
Division of Drinking and Ground Waters

5x26fm

cc: Craig Butler, Acting Chief, CDO
Lindsay Taliaferro III, Manager, DDAGW
Linnea Saukko, CDO-DDAGW

ARCADIS

Appendix C

**Carbon Solution Introduction Log and
Introduction Equipment Inspection
Form**

CARBON SOLUTION INTRODUCTION EQUIPMENT INSPECTION LOG

Inspection Date: _____

Inspection Time: _____

Equipment Item	Inspection Location	Condition(s) to Inspect	Repair(s) Required?	Description of Required Repair(s)
Carbon Tank T-1	Solution Mixing Area	Leaking, bulging		
Carbon Pump P-1	Solution Mixing Area	Leaking, motor obstructions, power feed line		
Potable Water Supply	Solution Mixing Area	Availability of supply, restrictions to flow		
Building	Solution Mixing Area	Presence of clutter, standing water, solution residue		
Introduction Tank T-3	Introduction Trailer	Leaking, bulging		
Introduction Pumps P-3 and P-4	Introduction Trailer	Leaking, obstructions in pump motor, oil level		
Trailer	Introduction Trailer	Lights, cracking in frame or hitch, tire pressure, brakes		
Support Truck	N/A	Fluid levels, belts, brakes, cracking in hitch		
Hoses and Cantlock Filings	Solution Mixing Area, Introduction Trailer, Test Area	Leaking, cracking, presence and condition of gaskets		
Piping	Solution Mixing Area, Introduction Trailer	Leaking, cracking		
Flow Meters	Solution Mixing Area, Introduction Trailer	Functioning efficiency during pumping		
Valves	Solution Mixing Area, Introduction Trailer	Leaking, ability to rotate to 'closed' position		
Pressure Gauges	Solution Mixing Area, Introduction Trailer	Needle unstuck, intact, and zeroed, leaking, functioning during pumping		
Introduction Points	Test Area	Locks, caps, presence of fluid in vault		
Roadways	Test Area	Settlement, cracking, rutting, puddling		
Subfloor Ventilation System	Inside Building	Operational, Proper pressure and air flow.		

CARBON SOLUTION INTRODUCTION LOG

Introduction Personnel _____

Date: _____

Organic Carbon Source _____

Is Blower On? _____

Blower Vacuum _____ in H₂O

Point ID	Date	Mixture Percent*	Target Volume (gal)	Actual Volume (gal)	Start Time	Complete Time	Pressure (psi)	Flowmeter Reading (gpm) Start / Stop Reading	Average Flow Rate (gpm)
IP-1									
IP-2									
IP-3									
IP-4									
IP-5									
IP-6									
IP-7									
CO-16									
IP-8									
IP-9									
IP-10									
IP-11									
IP-12									
IP-13									
IP-14									
IP-15									
CO-9									
IP-16									
IP-17									
IL-1									
IL-2									
IL-3									

Comments: _____

* Mixture Percent = units of carbon divided by total units of solution times 100.

Mixture Percent	Gallons of Solution	Gallons of Water	Gallons of Carbon
10	200	180	20
10	400	360	40
10	1000	900	100
4	900	864	36
2	900	882	18

CARBON SOLUTION INTRODUCTION EQUIPMENT INSPECTION LOG

Inspection Date: _____
 Inspector Time: _____

Equipment Item	Inspection Location	Condition(s) to Inspect	Repair(s) Required?	Description of Required Repair(s)
Carbon Tank T-1	Solution Mixing Area	Leaking, bulging		
Carbon Pump P-1	Solution Mixing Area	Leaking, motor obstructions, power feed line		
Potable Water Supply	Solution Mixing Area	Availability of supply, restrictions to flow		
Building	Solution Mixing Area	Presence of clutter, standing water, solution residue		
Introduction Tank T-3	Introduction Trailer	Leaking, bulging		
Introduction Pumps P-3 and P-4	Introduction Trailer	Leaking, obstructions in pump motor, oil level		
Trailer	Introduction Trailer	Lights, cracking in frame or hitch, tire pressure, brakes		
Support Truck	N/A	Fluid levels, belts, brakes, cracking in hitch		
Hoses and Camlock Fittings	Solution Mixing Area, Introduction Trailer, Test Area	Leaking, cracking, presence and condition of gaskets		
Piping	Solution Mixing Area, Introduction Trailer	Leaking, cracking		
Flow Meters	Solution Mixing Area, Introduction Trailer	Functioning efficiency during pumping		
Valves	Solution Mixing Area, Introduction Trailer	Leaking, ability to rotate to "closed" position		
Pressure Gauges	Solution Mixing Area, Introduction Trailer	Needle unstuck, intact, and zeroed, leaking, functioning during pumping		
Introduction Points	Test Area	Locks, caps, presence of fluid in vault		
Roadways	Test Area	Settlement, cracking, rutting, puddling		
Subfloor Ventilation System	Inside Building	Operational, Proper pressure and air flow.		

EXHIBIT 3
Financial Assurance

ESCROW AGREEMENT

THIS ESCROW AGREEMENT ("Escrow Agreement") is dated as of the ___ day of _____, 2007 by and between UAP Columbus Joint Venture 326132 (the "Volunteer"), and The Northwestern Mutual Life Insurance Company with mailing address of 720 East Wisconsin Avenue, Milwaukee, WI 53202 as the escrow agent hereunder ("Escrow Agent").

BACKGROUND

A. Pursuant to Ohio Revised Code, Chapter 3746, the Volunteer and the Director of the Ohio Environmental Protection Agency ("Director") have entered into an Operation and Maintenance Agreement (the "Operation and Maintenance Agreement") date of even date herewith.

B. Pursuant to Section 9 of said Operation and Maintenance Agreement, the Volunteer or its successors must maintain financial assurances for the operation and maintenance of the Property (as defined in the Operation and Maintenance Agreement) to ensure that reasonable and adequate funds are available to comply with the Operation and Maintenance Agreement.

C. The Volunteer desires to enter into this Escrow Agreement to provide for an escrow ("Escrow") of One Hundred Seventy Two Thousand, Eight Hundred 00/100 Dollars (\$172,800.00) (the "Escrowed Amount"), which is to become effective upon the issuance of a Covenant not to Sue for the Property.

NOW, THEREFORE, in consideration of the mutual covenants set forth below and other good and valuable consideration, the parties hereto agree as follows:

1. **Effective Date of Agreement.** Notwithstanding the execution of this Escrow Agreement and/or the deposit of monies into this Escrow, this Escrow Agreement shall not be effective as an assurance of funds for compliance with the Operation and Maintenance Agreement unless and until the Director shall have issued to the Volunteer a Covenant Not To Sue in accordance with Ohio Revised Code, Chapter 3746. Upon notification that a Covenant Not To Sue was not issued by the Director, Volunteer may at any time terminate this Escrow Agreement and receive back from the Escrow Agent all funds deposited by Volunteer into the Escrow

2. **Designation and Delivery.** The Volunteer hereby designates The Northwestern Mutual Life Insurance Company as "Escrow Agent" under this Escrow Agreement. The

Volunteer hereby delivers to the Escrow Agent a copy of the Operation and Maintenance Agreement. The Volunteer, in accordance with the Operation and Maintenance Agreement, hereby delivers to the Escrow Agent immediately available funds in the amount of the Escrowed Amount (the "Deposit").

3. Income and Distributions with Respect to the Deposit. The Escrow Agent shall cause all income and distributions earned on or with respect to the Deposit to be added to the Deposit. Such deposited income and distributions shall, together with the Deposit, constitute the "Escrow Fund" to be distributed as provided in Section 6 hereof.

As long as The Northwestern Mutual Life Insurance Company is the escrow Agent, the average daily balance of the funds so held by Escrow Agent during a month (the "Applicable Month") shall be credited with interest on the first day of the following month at a rate equal to the 30-Day United States Treasury Bill Yield. The "30-Day United States Treasury Bill Yield" means the "Ask Yield" on the first business day of the Applicable Month for United States Treasury bills maturing the closest to 30 days from the first day of the Applicable Month as reported in The Wall Street Journal or a similar yield as reasonably determined by Escrow Agent.

4. Escrow Agent Expenses. The Volunteer shall assume and pay one hundred percent (100%) of the reasonable pre-approved costs and expenses of the Escrow Agent incurred in its capacity as the Escrow Agent under this Escrow Agreement.

5. Resignation; Disagreements.

(a) Escrow Agent (and any successor Escrow Agent) may at any time resign as such by delivering the Escrow Fund to any successor Escrow Agent designated by the Volunteer in writing, or to any court of competent jurisdiction as provided below. The resignation of Escrow Agent will take effect on the acceptance by the successor of the Escrow Funds and the termination of the Escrow Agent's duties hereunder.

(b) In the event of any disagreement between the other parties hereto resulting in adverse claims or demands being made in connection with the Escrow Fund or in the event that Escrow Agent is in doubt as to what action it should take hereunder, the Escrow Agent shall be entitled to retain the Escrow Fund until Escrow Agent shall have received (i) a final non-appealable order of a court of competent jurisdiction directing delivery of the Escrow Fund, or (ii) a written agreement executed by the other party hereto directing delivery of the Escrow Fund, in which event Escrow Agent shall disburse the Escrow Fund in accordance with such order or agreement. Any court order shall be accompanied by a legal opinion by counsel for the presenting party satisfactory to Escrow Agent to the effect that the order is final and non-appealable. The Escrow Agent shall act on such court order and legal opinion without further question.

6. Termination and Distribution of Escrow.

(a) This Escrow Agreement shall terminate upon the earlier to occur of (i) the revocation or termination of the Covenant Not to Sue or (ii) termination of the Operation and Maintenance plan in accordance with paragraph 22 of the Operation and Maintenance Agreement, or (iii) transfer of title to the Property and the provision of replacement Financial Assurance by the Transferee. Upon written notice from the Volunteer to the Escrow Agent of the termination of this Escrow Agreement, Escrow Agent will pay the balance in the Escrow Fund to Volunteer.

(b) Upon Volunteer providing to Escrow Agent demand for reimbursement for expenditures made by Volunteer for required operation and maintenance expenditures made by Volunteer, Escrow Agent shall promptly reimburse Volunteer for all such expenditures set forth therein from the Escrow Fund.

(c) In the event the Escrow Fund is less than the required amount on December 1 of any year, the Escrow Agent will give notice to the Volunteer and Volunteer shall promptly deliver to the Escrow Agent immediately available funds in the amount sufficient to increase the Escrow Funds to an amount not less than the required amount. As provided above the initial required amount shall be One hundred Seventy Two Thousand, Eight Hundred 00/100 Dollars (\$172,800.00). At any time, the required amount in the Escrow Fund can be lowered upon certification by the ARCADIS US, Inc. (or other successor engineer supervising the remediation) that the lowered required amount provides for reasonable and adequate funds to comply with the Operation and Maintenance Agreement.

7. **Notices.** Any notice, demand or communication required or permitted to be given by any provision of this Escrow Agreement will be in writing, and will be made by in-hand delivery with written receipt, or a nationally recognized overnight courier, or by United States Express Mail or certified mail, postage and charge prepaid, to the party designated to receive such notice, directed to the addressee at the address listed in the beginning of this Escrow Agreement. Notice shall be deemed to have been made on the earlier of actual or tender of delivery at the notice address during ordinary business hours. Any party may change its address for notice by giving notice of the new address to the other party. Notwithstanding the foregoing, no notice to the Escrow Agent shall be deemed made until actually received by the Escrow Agent.

8. **Amendment.** No amendment or modification of this Escrow Agreement shall be effective unless in writing and signed by the parties. This Escrow Agreement may not be terminated except in a written document signed by the parties.

9. **Parties in Interest.** This Escrow Agreement shall bind, benefit and be enforceable by and against each party hereto and their successors, assigns, heirs and personal representatives. Following a transfer of ownership, the former owner would no longer be obligated to perform the obligations of the Volunteer under the Escrow Agreement. No party

shall in any manner assign any of its rights or obligations under this Escrow Agreement without the express prior written consent of the other parties.

10. No Waivers. No waiver with respect to this Escrow Agreement shall be enforceable unless in writing and signed by the party against whom enforcement is sought. Except as otherwise expressly provided herein, no failure to exercise, delay in exercising, or single or partial exercise of any right, power or remedy by any party, and no course of dealing between or among any of the parties shall constitute a waiver of, or shall preclude any other or further exercise of the same or any other right, power or remedy.

11. Severability. If any provision of this Escrow Agreement is construed to be invalid, illegal or unenforceable, then the remaining provisions thereof shall not be affected thereby and shall be enforceable without regard thereto.

12. Counterparts. This Escrow Agreement may be executed in any number of counterparts, each of which when so executed and delivered shall constitute an original hereof, and it shall not be necessary in making proof of this Escrow Agreement to produce or account for more than one original counterpart hereof.

13. Controlling Law. This Escrow Agreement is made under, and shall be constructed and enforced in accordance with, the laws of the State of Ohio applicable to agreements made and to be performed solely therein, without giving effect to principles of conflicts of law.

14. Definitions. To the extent not specifically defined herein, all terms used herein shall have the meanings ascribed to them under ORC Chapter 3746 or shall be given their ordinary and customary meaning.

IN WITNESS WHEREOF, the parties have executed, or caused their duly authorized representatives to execute, this Escrow Agreement on the date first written above.

Volunteer: UAP Columbus Joint Venture 326132

By: The Northwestern Mutual Life Insurance Co., a Wisconsin corporation, its managing general partner

By: Northwestern Investment Management Company, LLC, a Delaware limited liability company, its wholly-owned affiliate and authorized representative



By: T.D.Z.
Thomas D. Zale, Managing Director

Attest: Paul J. Hanson
Paul J. Hanson, Assistant Secretary

Escrow Agent: The Northwestern Mutual Life Insurance Company

By: Northwestern Investment Management Company, LLC, a Delaware limited liability company, its wholly-owned affiliate and authorized representative



By: T.D.Z.
Thomas D. Zale, Managing Director

Attest: Paul J. Hanson
Paul J. Hanson, Assistant Secretary