Mr. C. David Brown, P.G.
Regional Manager - Cleanup and Brownfields
Pennsylvania Department of Environmental Protection
2 East Main Street
Norristown, PA 19401

Arcadis U.S., Inc.
2100 Georgetown Drive
Suite 402
Sewickley, PA 15143
United States
Phone: 724 742 9180
www.arcadis.com

Date: May 21, 2025
Our Ref: 3108678
Subject: Response to Public Comments Received on Remedial Investigation Report and Cleanup Plan
Alliance 51st Street
eFACTS PF No. 855927
eFACTS Activity No. 60376
1646 South 51st Street
City and County of Philadelphia

Dear Mr. Brown,

On behalf of Alliance 51st Street, LLC (Alliance), Arcadis U.S., Inc. (Arcadis) is in receipt of the same multiple emails from the public related to the amended "Act 2 Remedial Investigation Report and Cleanup Plan" (the Report), submitted to the Pennsylvania Department of Environmental Protection (PADEP) on May 20, 2025 for the above referenced Site. After careful review of the comments, we have concluded that no revisions are required to the Report As a result, we are submitting this letter response in lieu of an amended RIR/CP.

As an initial matter we wish to point out the origin of the e-mails. Other than the e-mail from Bartram's Garden, all the other e-mails were based upon a form letter prepared by someone else. Only one of those form e-mails was revised by the sender. The other 49 were almost exactly alike. We determined that the Clean Air Council (Philadelphia) prepared the form e-mail which was available in a link on its website. https://cleanaircouncil.salsalabs.org/bartramscleanup. The Clean Air Council webpage is attached as Exhibit A. You will note the comment e-mails track the comments in Exhibit A. It is also worth pointing out that only the sender of the modified form letter states that she uses Bartram's Garden Trail. All the other senders of the form e-mail make absolutely no reference to living near the Alliance site or using Bartram's Garden Trail. In fact, some of the senders live a considerable distance from the site. Included in Exhibit B are the two types of form e-mails that were received, and Exhibit C presents a list of the email senders and a map with the location of each sender based upon the address provided.

In addition to the form e-mails, as referenced above Bartram's Garden submitted an e-mail with comments and an attached report, also included in Exhibit B. The e-mail and report were submitted after the deadline for comments. Nevertheless, a response is provided to that e-mail and report attached thereto.

The form letter may be broken down into four main comments associated with each paragraph of each e-mail. which are provided below followed by Arcadis' response in bold/italic font. The one additional e-mail is also refenced below and a comment provided.

Comment 1: Alliance is proposing to redistribute soil at the Site in order to make it level and then cap the Site as a part of the construction of a proposed warehouse. However, Alliance's cleanup plan states that, "Redevelopment plans are currently paused until a prospective buyer is identified." Alliance's proposed cap on the Site is unacceptable because there are currently no plans to redevelop, or cap, the Site until a potential buyer for the Site is found.

Response to Comment 1: Alliance has an approved Site plan and is ready to commence development of the property. The Site is secured by fencing and there are no current receptors to onsite soils. While redevelopment is paused due to market conditions, the Site is being monitored as approved by the PADEP through existing National Pollution Discharge Elimination System (NPDES) and Philadelphia Water Authority (PWA) stormwater permits. Erosion and sediment controls including berms are in place to mitigate stormwater runoff, and inspections are conducted on at least a weekly frequency, and after rain events exceeding 0.25 inches in accordance with the PADEP-approved permits to confirm no run-off is present. Following prolonged periods of rain, additional inspections are conducted by Shearon Environmental Design, Inc. on behalf of Alliance.

Alliance's improvements to the Site to date have vastly improved the condition of the property, which was contaminated many decades prior to their occupying the Site. Current constituents of concern (COCs) in soil, as well as stormwater are controlled as determined by the many inspections conducted by Shearon Environmental Design, Inc., and these controls will continue to be maintained.

Comment 2: The "proposed remedy" section of Alliance's cleanup plan mentions that soil will be taken from the Southwestern portion of the Site and moved to a central area of the parcel, but Alliance neglects to mention that it also plans to take soil from the Eastern portion of the Site and place it in the middle of the Site. The Eastern portion of the Site contains soil that is contaminated with hexavalent chromium beyond DEP's statewide health standards. In Alliance's graphic showing areas where soil will be excavated (Figure 14), Alliance also fails to include that soil boring SB-703 showed hexavalent chromium contamination beyond statewide health standards. Figure 14 should be updated to show chromium contamination at SB-703. When digging into the Eastern portion of the Site, where hexavalent chromium contamination is known to exist, and where the Site is closest to the Bartram Mile trail, Alliance could easily disturb hexavalent chromium contamination in soil and groundwater, potentially causing this contamination to leave the Site, as it did last summer.

Response to Comment 2: On Figure 14, soil boring SB-703 is already highlighted as having an exceedance. However, the only soil that will be cut from the eastern portion of the Site and redistributed, is the above-grade soil pile that is present adjacent to the SB-703 location. The soil pile does not contain chromium compounds with concentrations greater than the statewide health standards for nonresidential use. During redevelopment, the SB-703 location will be covered with approximately eight feet of soil.

Any contaminated soil relocated at the Site will be controlled by the Soil Erosion and Sediment Control Plan requirements and perimeter monitoring. There will be no contaminated soil leaving the Site. Any contaminated soil that is moved within the Site during development will be placed beneath the building or will be paved over and will not be exposed. Controls are currently in place as discussed in response to Comment 1 and site media is not being disturbed or going offsite.

Comment 3: Alliance has not placed any groundwater monitoring wells in the location on the Eastern side of the Site where it proposes to cut into existing soil. Alliance should identify groundwater levels in the Eastern area of the Site where Alliance is proposing to remove soil. This lack of information about groundwater levels increases the risk that contaminants will be disturbed when moving soil at the Site. Alliance should also add at least two groundwater

monitoring wells in the section on the Eastern portion of this Site where it is currently proposing to excavate and relocate soil.

***Response to Comment 3*: Groundwater will not be impacted by redevelopment and soil below grade on the eastern portion of the Site will not be relocated. As noted above, the above grade, unimpacted soil pile will be redistributed across the central and eastern portion of the Site. Monitoring wells MW-1, MW-2, MW-3 and MW-4 are located along the eastern property boundary to characterize groundwater. The movement of soil will not impact the groundwater level. Once the Site is regraded, the soil in the area of the proposed below grade stormwater retention basins will be excavated. However, the soil below the current grade on the eastern portion of the Site will not be disturbed. Overall, the Site will be raised in elevation to increase the distance between ground surface and groundwater. Based on the final grades of the Site, a retention wall will be installed along 51st Street.**

Comment 4: Unfortunately, Alliance maps groundwater levels in terms of height above sea level, rather than feet below ground surface (BGS). The distance between ground surface and groundwater at the Site must be mapped in Alliance's proposed cleanup plan. Alliance should also map potential groundwater elevations that will exist after Alliance's proposed soil reorganization, specifically in the area on the Eastern portion of the Site where Alliance is proposing to remove soil. If the Site is capped where groundwater levels are known to be high, this could cause contaminated groundwater to surface during significant rain events.

***Response to Comment 4*: The data presented in the report follows the requirements of PADEP and is typical for presenting groundwater data and evaluating groundwater flow. The requirement is to survey the groundwater monitoring wells to a common datum and measure and report the level of the groundwater using the common datum. With regard to depth to groundwater, as noted above, on the eastern portion of the Site, only the above grade soil pile will be cut and redistributed. With the exception of the southwestern portion of the Site, the entire Site overall will be raised in elevation and the distance from the ground surface to the water table will increase. The depth to water below grade will increase by several feet in the central, northern and eastern portions of the Site upon filling and grading the Site.**

Bartram's Garden Comments

In addition to the comments above, the Bartram's Garden's representative provided comments to the PADEP via e-mail on May 3, 2025 (and forwarded to Alliance on May 9, 2025), along with a technical review by Urban Engineers of the fate and transport modeling that was presented in the report.

Based on the comments and the Urban Engineers report, it appears Urban Engineers did not review the exposure pathway evaluations in the Report. The Quick Domenico (QD) model is a quasi-2D model and, as acknowledged by Urban Engineers, has inherent limitations. Interpreted plume centerlines were presented on Figure 12 of the Report to focus on maximum downgradient reach of the COCs and to provide a visual interpretation of the model outputs. The purpose of the model was to evaluate potential transport of COCs in groundwater, and potential migration to the river where receptors could potentially be exposed to groundwater. Arcadis agrees that plumes can disperse under certain hydraulic conditions and as such included some dispersion in the model to account for potential dispersion and diffusion; however, the model was not developed or calibrated to accurately assess lateral dispersion, due to its inherent limitations. Further, as indicated in the Response to Bartram Garden's Comment 3, the likely source of the chromium in groundwater is from historical fill which has been fully delineated on the Site but not offsite, which is not the responsibility of Alliance. Thus, the lateral extent of chromium in groundwater from

offsite sources may also be unknown. While Arcadis does not discount the potential for dispersion or more complex flow, it does not change the conclusion of the exposure pathway evaluations related to Site groundwater.

The following three comments were included in the e-mail from Bartram's Garden. Arcadis' responses are below.

Bartram's Garden Comment 1: As per the attached assessment, we have questions about the flow of contaminated groundwater to adjacent public areas given that the Arcadis report only interprets the eastward movement. How will DEP ensure that the north-south lateral spread be assessed and how can the public trail and Bartram's Garden be protected in future from the spread of contaminated groundwater? Related, what is the process for monitoring future groundwater movement and for how long will the monitoring continue?

Response to Bartram's Garden Comment 1: The figures in the report related to fate and transport modeling are general schematics to simplify the interpretation of the model results. Groundwater beneath the Site and Bartram's Garden historically discharged eastward to the river, including when historic fill was placed in the area. People walking on the trails or visiting Bartram's Garden are not expected to contact groundwater as it is several feet below the ground surface. Groundwater is not used for potable purposes in the area and all residents and businesses are connected to public water supply. Future groundwater movement is not expected to require monitoring upon PADEP's acceptance of the Report and the modeling presented in the report, as well as the Final Report for the Site. See also Response to Bartram Garden's Comment 2.

Bartram's Garden Comment 2: The Arcadis report says that chromium 6 may be coming from the railroad line. However, the pattern of the chromium 6 findings on the Alliance Site suggests that it is emanating from the center of the Site. How will DEP establish the source of the contamination? If the railroad line is the source, what will DEP do to investigate and ensure that the railroad company is notified and required to clean up the contamination?

Response to Bartram's Garden Comment 2**: The center or more accurately, the western half of the Site is was the focus of Alliance's environmental sampling and investigations and hexavalent chromium concentrations were detected. That does not indicate that this area is the source of the offsite contamination. Rather, historical fill of the area along the river is believed to be the source of chromium 6 at and near the Site. The historic fill is likely present on railroad property and on Bartram Garden's property to the south. Historic fill was commonly used to level or raise the elevation of land to support development, particularly near water ways. Metals including chromium were commonly present in more commercial/industrialized settings where historic fill was placed prior to 1980s [1]. As an example, several of the offsite sample points with hexavalent chromium detections are at groundwater elevations that are much higher than the Site (i.e., upgradient) and thus could not have been impacted by the Site groundwater. Chromium and other constituents can leach from the soils and dissolve into groundwater. In the case of hexavalent chromium, it generally transports a short distance downgradient before it attenuates, depending on the groundwater flow velocities and chemistry. The Site data and the modeling indicated that hexavalent chromium would attenuate within approximately 430 feet downgradient, which is within the Site downgradient property line. Since the extent of the historical fill in the offsite area is unknown, the lateral extent of chromium in groundwater is also unknown.

[1] New Jersey Department of Environmental Protection. 2013. Site Remediation Program, Historic Fill Material Technical Guidance, Version 2.0. April 29.

Mr. C. David Brown, P.G.
PADEP
May 21, 2025

Bartram's Garden Comment 3: We have heard that Alliance may be selling the property. If a new owner is involved, then what is the role DEP will play to ensure that the Site remediation is done correctly. Who will be responsible for ensuring the groundwater monitoring?

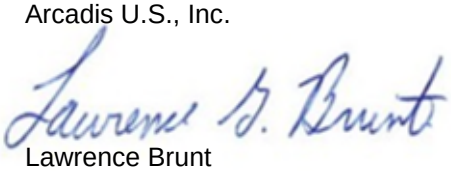
Response to Bartram's Garden Comment 3: Alliance is the current owner and the current developer of the Site. There are no current plans to sell the property. The current plan is to seek a tenant/user. When the Act 2 case is closed, a deed restriction will have been recorded in the county recording office and any ongoing obligations would run with the land and be an obligation of any future owner and remote future owner of the Site.

It is worth nothing that:

- ***Alliance has not caused or contributed to any of the contamination found at the Site.***
- ***The chromium contamination has been present for close to if not longer than 100 years and colored runoff was identified by others leaving the site before Alliance purchased the site.***
- ***When market conditions allow, Alliance will commence development immediately.***

We realize these responses are subject to PADEP. Arcadis will provide a brief summary of the above responses during the public meeting on May 22, 2025. Arcadis does not expect that this will require a resubmittal of the Report but will support specific revisions as needed and as requested by PADEP.

Sincerely,
Arcadis U.S., Inc.



Lawrence Brunt
Project Manager

Email: Larry.Brunt@arcadis.com
Direct Line: 908-391-4371
CC. Matthew Sabetta, PADEP
Mr. Reitano, Esq. (Herold Law)
Mr. Eric Carlson, Alliance
Mr. Max Ryan, Alliance

Enclosures:

Exhibit A - Clean Air Council Website
Exhibit B – E-mails and Comments Received
Exhibit C – List of Form E-mail Senders and Maps of Addresses

Exhibit A

CLEAN AIR COUNCIL

Dear Friend,

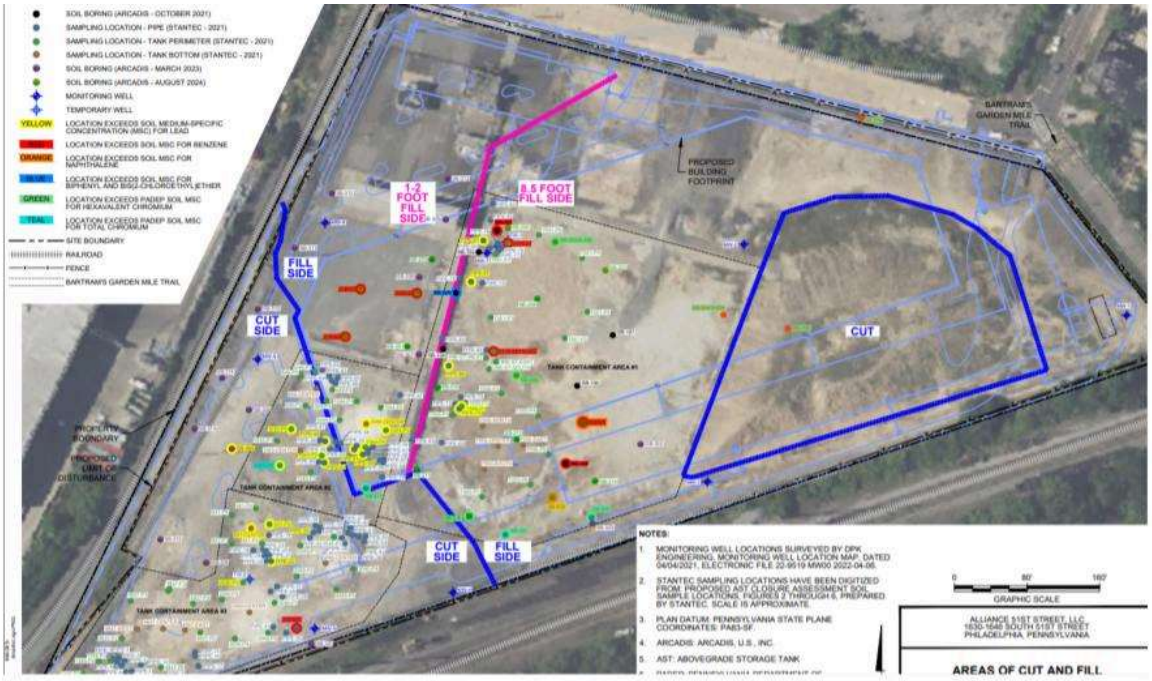
Alliance 51st St. LLC has proposed a cleanup plan for its contaminated land at 1646 S 51st St., immediately adjacent to Bartram's Garden. Last summer, a substance containing hexavalent chromium, a known carcinogen, left the site and was seen on the Bartram's Mile trail. Lead and benzene, also a known carcinogen, are also known to be present in the soil and groundwater at the site at levels above statewide health standards. Alliance 51st St. is now proposing a cleanup plan to the Pennsylvania Department of Environmental Protection (DEP) under Act 2, and Clean Air Council has serious concerns about several aspects of this proposal.

Most importantly, Alliance 51st St. is proposing to redistribute soil at the site and then cap the site with concrete and asphalt as a part of the construction of a proposed warehouse, but all redevelopment plans are currently paused. Alliance's own cleanup plan states that, "Redevelopment plans are currently paused until a prospective buyer is identified." DEP should not approve the proposed plan to cap the site until Alliance is able to locate a prospective buyer and solidify next-steps.

Additionally, the "proposed remedy" section of Alliance's cleanup plan mentions that soil will be taken from the Southwestern portion of the site and moved to a central area of the parcel, but Alliance neglects to mention that it also plans to take soil from the Eastern portion of the site and place it in the middle of the site. The Eastern portion of the site contains soil that is contaminated with hexavalent chromium beyond DEP's statewide health standards. In Alliance's graphic showing areas where soil will be excavated (shown below), Alliance also fails to include that soil boring 703 showed hexavalent chromium contamination beyond statewide health standards. When digging into the Eastern portion of the site, where hexavalent chromium contamination is known to exist, and where the site is closest to the Bartram Mile trail, Alliance could easily disturb hexavalent chromium contamination in soil and groundwater, potentially causing this contamination to leave the site, as it did last summer.

Please click here to submit an official comment.

Comments on the proposed cleanup plan are due Sunday, May 4th.



Sincerely,

Russell Zerbo, rzerbo@cleanair.org

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Follow Us

PHILADELPHIA OFFICE
1617 JFK BOULEVARD
SUITE 1130
PHILADELPHIA, PA, 19103

PITTSBURGH OFFICE
200 FIRST AVE
SUITE 101
PITTSBURGH, PA 15222

WILMINGTON OFFICE
100 W. 10TH STREET
SUITE 1004
WILMINGTON, DE, 19801

Exhibit B

Foster, Crystal

From: Reuben Wade <reubenpaulwade@gmail.com>
Sent: Friday, May 2, 2025 8:17 AM
To: Brunt, Larry
Subject: 1646 S 51st St. Cleanup Plan

Dear Larry Brunt,

Alliance 51st St. LLC's (Alliance) proposed cleanup plan for its property at 1646 S 51st St. is not adequate to reduce the risk that contaminants, like carcinogenic hexavalent chromium, will migrate onto the adjacent Bartram's Mile Trail.

Alliance is proposing to redistribute soil at the site in order to make it level and then cap the site with as a part of the construction of a proposed warehouse. However, Alliance's cleanup plan states that, "Redevelopment plans are currently paused until a prospective buyer is identified." Alliance's proposed cap on the site is unacceptable because there are currently no plans to redevelop, or cap, the site until a potential buyer for the site is found.

Additionally, the "proposed remedy" section of Alliance's cleanup plan mentions that soil will be taken from the Southwestern portion of the site and moved to a central area of the parcel, but Alliance neglects to mention that it also plans to take soil from the Eastern portion of the site and place it in the middle of the site. The Eastern portion of the site contains soil that is contaminated with hexavalent chromium beyond DEP's statewide health standards. In Alliance's graphic showing areas where soil will be excavated (figure 14), Alliance also fails to include that soil boring (SB) 703 showed hexavalent chromium contamination beyond statewide health standards. Figure 14 should be updated to show chromium contamination at SB 703. When digging into the Eastern portion of the site, where hexavalent chromium contamination is known to exist, and where the site is closest to the Bartram Mile trail, Alliance could easily disturb hexavalent chromium contamination in soil and groundwater, potentially causing this contamination to leave the site, as it did last summer.

Alliance has not placed any groundwater monitoring wells in the location on the Eastern side of the site where it proposes to cut into existing soil. Alliance should identify groundwater levels in the Eastern area of the site where Alliance is proposing to remove soil. This lack of information about groundwater levels increases the risk that contaminants will be disturbed when moving soil at the site. Alliance should also add at least two groundwater monitoring wells in the section on the Eastern portion of this site where it is currently proposing to excavate and relocate soil.

Unfortunately, Alliance maps groundwater levels in terms of height above sea level, rather than feet below ground surface (BGS). The distance between ground surface and groundwater at the site must be mapped in Alliance's proposed cleanup plan. Alliance should also map potential groundwater elevations that will exist after Alliance's proposed soil reorganization, specifically in the area on the Eastern portion

of the site where Alliance is proposing to remove soil. If the site is capped where groundwater levels are known to be high, this could cause contaminated groundwater to surface during significant rain events.

Sincerely,
Reuben Wade
715 S 7th St
Philadelphia, PA 19147
267-670-5217

Foster, Crystal

From: Linda Blythe <linblythe@msn.com>
Sent: Thursday, May 1, 2025 8:53 PM
To: Brunt, Larry
Subject: 1646 S 51st St. Cleanup Plan

Dear Larry Brunt,

Alliance 51st St. LLC's (Alliance) proposed cleanup plan for its property at 1646 S 51st St. is not adequate to reduce the risk that contaminants, like carcinogenic hexavalent chromium, will migrate onto the adjacent Bartram's Mile Trail.

Alliance is proposing to redistribute soil at the site in order to make it level and then cap the site with as a part of the construction of a proposed warehouse. However, Alliance's cleanup plan states that, "Redevelopment plans are currently paused until a prospective buyer is identified." Alliance's proposed cap on the site is unacceptable because there are currently no plans to redevelop, or cap, the site until a potential buyer for the site is found.

Before the contamination was found I was a regular walker on the Bartram's Mile Trail. I and many others are anxious to use the trail again. Fixing this problem is urgent because soon the Bartram's trail will be connected to the Schuylkill River Trail and many more people will want to explore this new section of trail. There are still some sections of the trail to the north of the contamination that have not yet been completed. But once they are done, all eyes will be on the contaminated site if it still is a hindrance to continuing on the trail. It is in everyone's interest that Alliance 51st St. LLC complete a thorough capping or cleanup of the site to once again allow safe travel on the Bartram's Mile Trail as soon as possible.

Sincerely,
Linda Blythe
4433 Osage Ave
Philadelphia, PA 19104
215-387-3370

Outlook

FW: [External] Questions regarding the Alliance 51st Street site Chromium contamination

From Brown, C David <cdbrown@pa.gov>
Date Fri 5/9/2025 1:12 PM
To Foster, Crystal <Crystal.Foster@arcadis.com>; Brunt, Larry <Larry.Brunt@arcadis.com>
Cc Eric Carlson <ecarlson@alliancehp.com>; Anthony J. Reitano <areitano@heroldlaw.com>; Sabetta, Matthew <msabetta@pa.gov>; Devan, Russ <rdevan@pa.gov>; Costello, Andrea <acostello@pa.gov>

1 attachment (1 MB)
2025-05-02_Arcadis GW Modeiling Summary and Plume Analsyis_UEI.pdf;

Crystal and Larry,

DEP received these questions from Bartram's Garden regarding the remedial investigation report and cleanup plan. Please address them in your comment/response addendum to the report.

C. David Brown P.G. | Environmental Program Manager
Environmental Cleanup & Brownfields Program
Department of Environmental Protection | Southeast Regional Office
2 East Main Street | Norristown, PA 19401
Phone: 484.250.5792 | Fax: 484.250.5961
www.dep.pa.gov

From: Maitreyi Roy <mroy@bartramsgarden.org>
Sent: Saturday, May 3, 2025 1:50 PM
To: Brown, C David <cdbrown@pa.gov>; Strobridge, Lisa <lstrobridg@pa.gov>
Cc: Angelo J Waters <ajwaters@urbanengineers.com>; Leigh-Anne Rainford <leighanne.rainford@phila.gov>; Mariya Khandros <mariya.khandros@phila.gov>; Palak.Raval-Nelson <Palak.Raval-Nelson@phila.gov>; Angelo J Waters <ajwaters@urbanengineers.com>; Wilde, Candee <cwilde@mccarter.com>
Subject: [External] Questions regarding the Alliance 51st Street site Chromium contamination

Hello David,
I am attaching the assessment conducted by Urban Engineers on behalf of Bartram's Garden regarding the remediation plan submitted by Arcadis for the Alliance site on 51st Street. Please see the attached report for the details. In summary our questions for the community meeting include the following:

1. As per the attached assessment, we have questions about the flow of contaminated groundwater to adjacent public areas given that the Arcadis report only interprets the eastward movement. How will DEP ensure that the north-south lateral spread be assessed and how can the public trail and Bartram's Garden be protected in future from the spread of contaminated groundwater? Related, what is the process for monitoring future groundwater movement and for how long will the monitoring continue?
2. The Arcadis report says that the Chromium6 may be coming from the railroad line. However the pattern of the Chromium6 findings on the Alliance site suggests that it is emanating from the center of the site. How will DEP establish the source of the contamination? If the railroad line is the source, what will DEP do to investigate and ensure that the railroad company is notified and required to clean up the contamination?
3. We have heard that Alliance may be selling the property. If a new owner is involved, then what is the role DEP will play to ensure that the site remediation is done correctly. Who will be responsible for the ensuring the groundwater monitoring?

Thank you for your consideration of the attached assessment and the questions outlined above. We hope to hear the answers and direction forward at the upcoming public meeting.

Best regards, Maitreyi

Maitreyi Roy (she/her)
Executive Director
Bartram's Garden

5400 Lindbergh Boulevard
Philadelphia PA 19143

M: 609.516.4198
P: 215.729.5281 x101
www.bartramsgarden.org

URBAN ENGINEERS
530 Walnut Street
Philadelphia, PA 19106
215.922.8080

May 2, 2025

Maitreyi Roy
Executive Director
Bartram's Garden
5400 Lindbergh Boulevard
Philadelphia, PA 19143

Subject: **Summary Analysis of Groundwater Modeling**
(Arcadis – Remedial Investigation – 1630-1640 51st Street)

Dear Ms. Roy:

Urban Engineers has reviewed the Remedial Investigation Report prepared by Arcadis, including the fate and transport analysis utilizing the PADEP Quick Domenico (QD) modeling tool. Based on our review, Urban finds that while the Arcadis fate and transport model incorporates three-dimensional dispersion, including north-south (lateral) spread, the results are only reported and interpreted in terms of downgradient (eastward) movement. In our opinion, this limited directional focus understates the true extent of the plume and may lead to underassessment of potential exposure risks to adjacent areas such as Bartram's Garden.

Arcadis Groundwater Analysis

As part of the Remedial Investigation Report, Arcadis used a PADEP-approved tool called the Quick Domenico (QD) model to estimate how far certain chemicals found in the groundwater might travel underground from known source areas on the site. This modeling helps predict the potential size of a contamination plume and where it could eventually weaken to acceptable levels.

This tool is commonly used for cleanup planning and was applied here to simulate the worst-case spread of the site's contaminants over time. The model is limited in its ability to simulate contamination as described further below.

How the Modeling Works

Arcadis used the QD model to:

- Simulate how chemicals move with groundwater.
- Estimate how they dilute, break down, or slow down due to soil interaction.
- Use real monitoring well data as inputs, and rely on published estimates when site-specific values weren't available.
- Assume the contamination source stays constant, which tends to overestimate how far it might go, adding a layer of conservativeness to the results.

Chemicals Analyzed

Arcadis modeled the fate and movement of:

- Hexavalent Chromium
- Lead
- Benzene
- Naphthalene

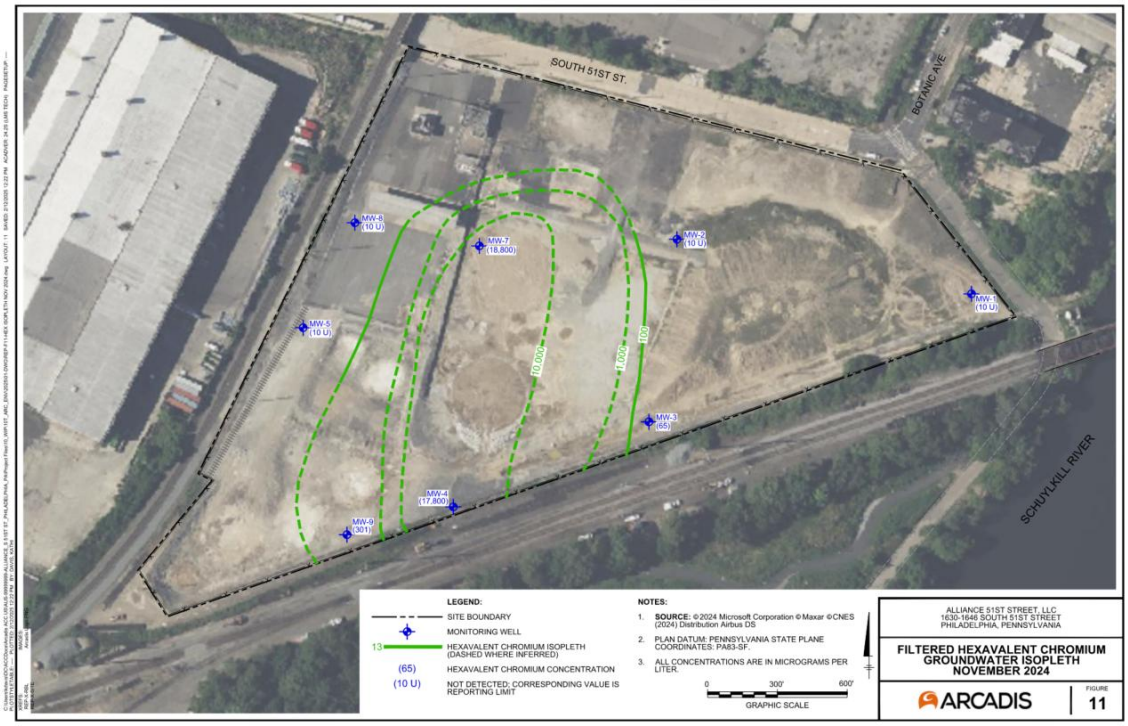
They did not model total chromium because nearly all of it is already in its hexavalent form, which is the more mobile and toxic type.

How Far Could the Hexavalent Chromium Go?

Based on Arcadis' modeling from specific wells, the predicted maximum distances before reaching safe levels are:

- Hexavalent Chromium: Up to 430 feet from the source
- Lead: 105 feet
- Naphthalene: 22 feet
- Benzene: 265 feet

These distances represent eastward flow, based on the way groundwater moves beneath the site.



Important Limitation – Direction Only Modeled Eastward

While Arcadis predicts how far the chemicals can travel east, it does not account for movement to the north or south.

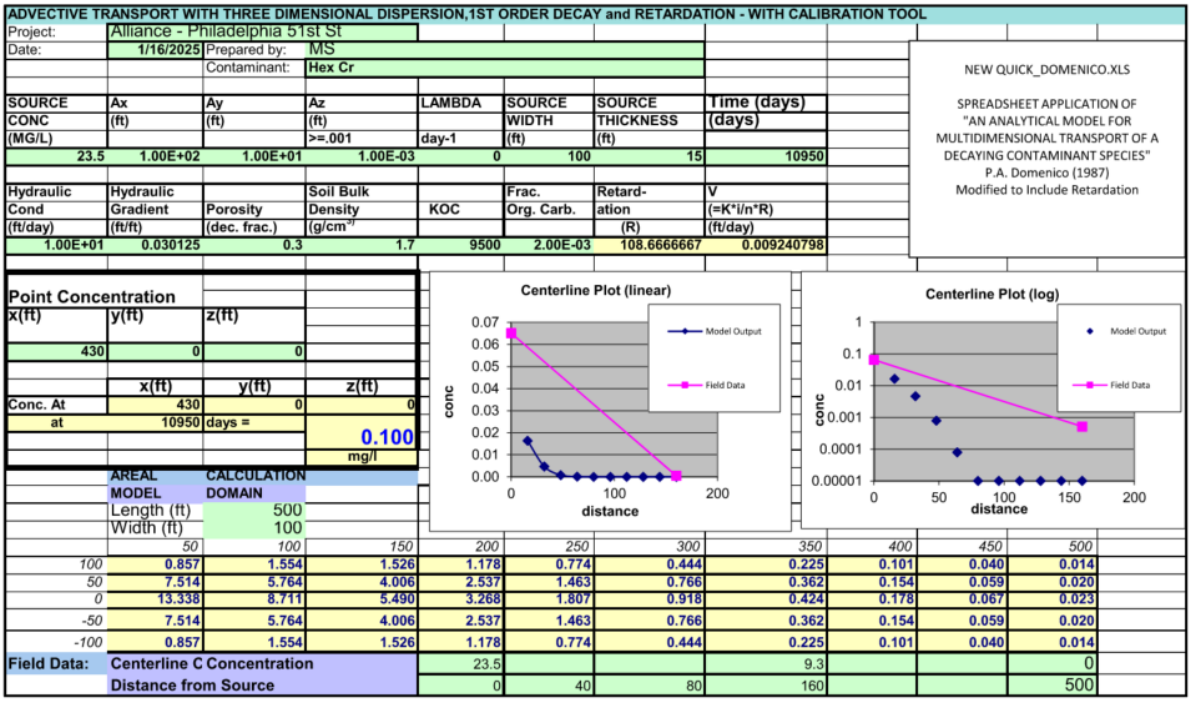
That's important because field data and QD model predictions show the contamination also spreads north and south, especially for hexavalent chromium, in addition to its eastward movement.

Arcadis' assumption of one-directional flow along the groundwater path is helpful for showing general reach but may underestimate the true width of the contamination plume.

Although the model used by Arcadis includes the ability to show how contamination spreads in all directions, the report only explains how it moves to the east, in the same direction groundwater flows. This means it doesn't fully explain that the contamination also spreads to the north and south, even though both the model and actual testing data show that it does. Focusing only on eastward movement leaves out important information about how wide the plume really is. To fully understand the situation and protect nearby areas like Bartram's Garden, both the model results and the actual sampling data need to be looked at together when making cleanup decisions.

Plume Mapping

A plume map was generated using Arcadis' fate and transport data.



ADVECTIVE TRANSPORT WITH THREE DIMENSIONAL DISPERSION,1ST ORDER DECAY and RETARDATION - WITH CALIBRATION TOOL

Project:	Alliance - Philadelphia 51st St						
Date:	1/16/2025	Prepared by:	MS				
		Contaminant:	Hex Cr				

NEW QUICK_DOMENICO.XLS

SPREADSHEET APPLICATION OF "AN ANALYTICAL MODEL FOR MULTIDIMENSIONAL TRANSPORT OF A DECAYING CONTAMINANT SPECIES" P.A. Domenico (1987) Modified to Include Retardation

SOURCE CONC (MG/L)	Ax (ft)	Ay (ft)	Az (ft) >=.001	LAMBDA day-1	SOURCE WIDTH (ft)	SOURCE THICKNESS (ft)	Time (days) (days)
23.5	1.00E+02	1.00E+01	1.00E-03	0	100	15	10950

Hydraulic Cond (ft/day)	Hydraulic Gradient (ft/ft)	Porosity (dec. frac.)	Soil Bulk Density (g/cm³)	KOC	Frac. Org. Carb.	Retard-ation (R)	V (=K*i/n*R) (ft/day)
1.00E+01	0.030125	0.3	1.7	9500	2.00E-03	108.6666667	0.009240798

Point Concentration

x(ft)	y(ft)	z(ft)
430	0	0

	x(ft)	y(ft)	z(ft)
Conc. At	430	0	0
at	10950	days =	
			0.100
			mg/l

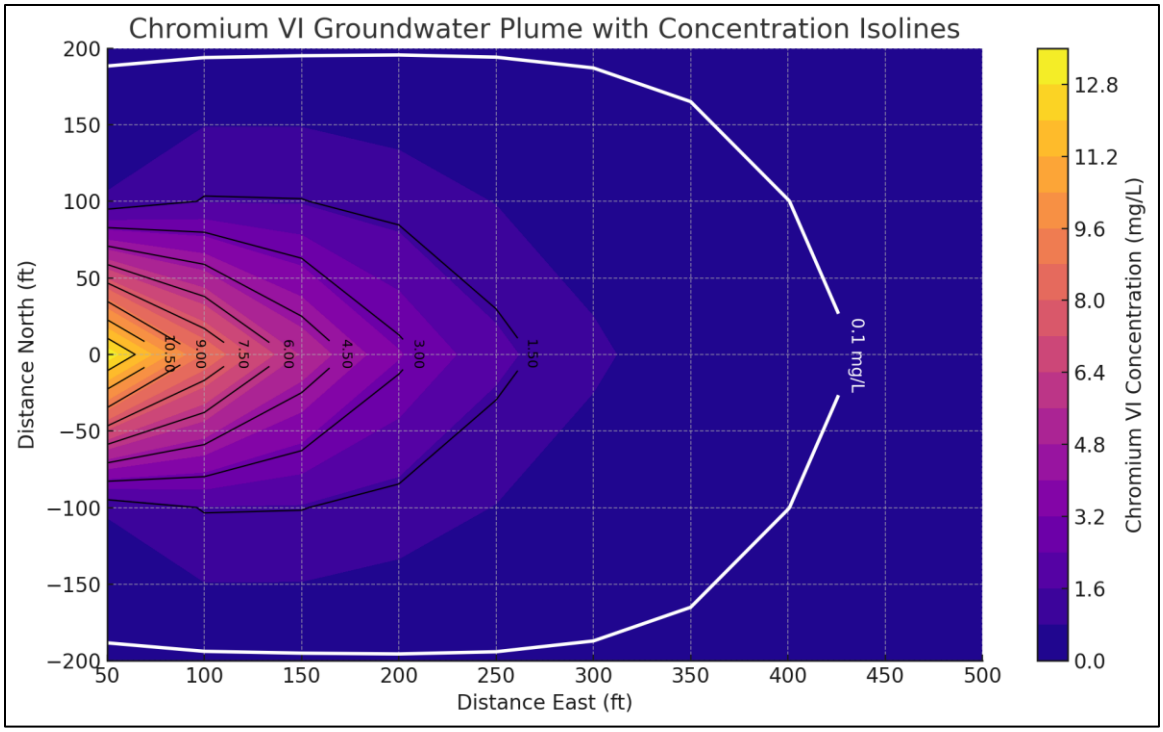
	AREAL MODEL	CALCULATION DOMAIN
	Length (ft)	500
	Width (ft)	100

	50	100	150	200	250	300	350	400	450	500
100	0.857	1.554	1.526	1.178	0.774	0.444	0.225	0.101	0.040	0.014
50	7.514	5.764	4.006	2.537	1.463	0.766	0.362	0.154	0.059	0.020
0	13.338	8.711	5.490	3.268	1.807	0.918	0.424	0.178	0.067	0.023
-50	7.514	5.764	4.006	2.537	1.463	0.766	0.362	0.154	0.059	0.020
-100	0.857	1.554	1.526	1.178	0.774	0.444	0.225	0.101	0.040	0.014
Field Data:	Centerline C Concentration			23.5			9.3			0
	Distance from Source			0	40	80	160			500

The data shows a source concentration of 23.5 mg/L at MW-4, and a predicted centered concentration of 13.3 mg/L 50 feet east of MW-4. From this point, the plume spreads:

- About 200 feet to the north
- About 200 feet to the south
- Roughly 430 feet to the east

The shape of the plume is oval and symmetrical, not just flowing east—it fans out both north and south as well.



The above plume graphic with labeled isolines (contour lines) showing the predicted Chromium VI concentrations in mg/L. The white line marks the 0.1 mg/L PADEP threshold, while the black isolines provide a clear view of predicted concentration gradients across the site.

What This Means

- The Arcadis model is capable of showing how contamination spreads in all directions, including north and south.
- However, the reporting and interpretation focus only on the eastward direction, following the path of groundwater flow.
- As a result, the full width of the contamination plum, particularly its spread to the north and south, is not fully discussed, even though both the model and sampling data show it.
- This matters because areas like Bartram's Garden Mile Trail lie south of the site, and understanding lateral spread is critical to evaluating potential risks and guiding protective measures.

Conclusion

The Arcadis modeling shows that contaminants aren't expected to leave the site or reach the river, assuming groundwater conditions remain steady.

But because the model only predicts eastward movement, it misses the real north-south spread of the contamination seen in field data. The plume model shows a much wider area of impact, particularly for hexavalent chromium, spanning nearly 400 feet north to south.

In summary, the model helps us understand how the contamination might move underground, but it doesn't tell the whole story. Actual testing shows the contamination spreads more widely than the report discusses, especially to the north and south. To make sure the cleanup is done right and nearby places like Bartram's Garden stay safe, it's important to look at both the model results and the real sampling data together.

Additional analysis by Arcadis/landowner is recommended to properly estimate the extent of groundwater contamination at and around the site. This could include updating the model results to reflect contamination in all directions, installing additional monitoring wells near property boundaries, and conducting more detailed soil and groundwater sampling in areas that may not have been fully covered.

Thank you for the opportunity to assist Bartram's in the review of the remedial investigation report. Should you have any questions, please feel free to contact me at 215-284-3161.

Very truly yours,

URBAN ENGINEERS, INC.

Angelo J. Waters, PE
Vice President, Environmental Services

Exhibit C

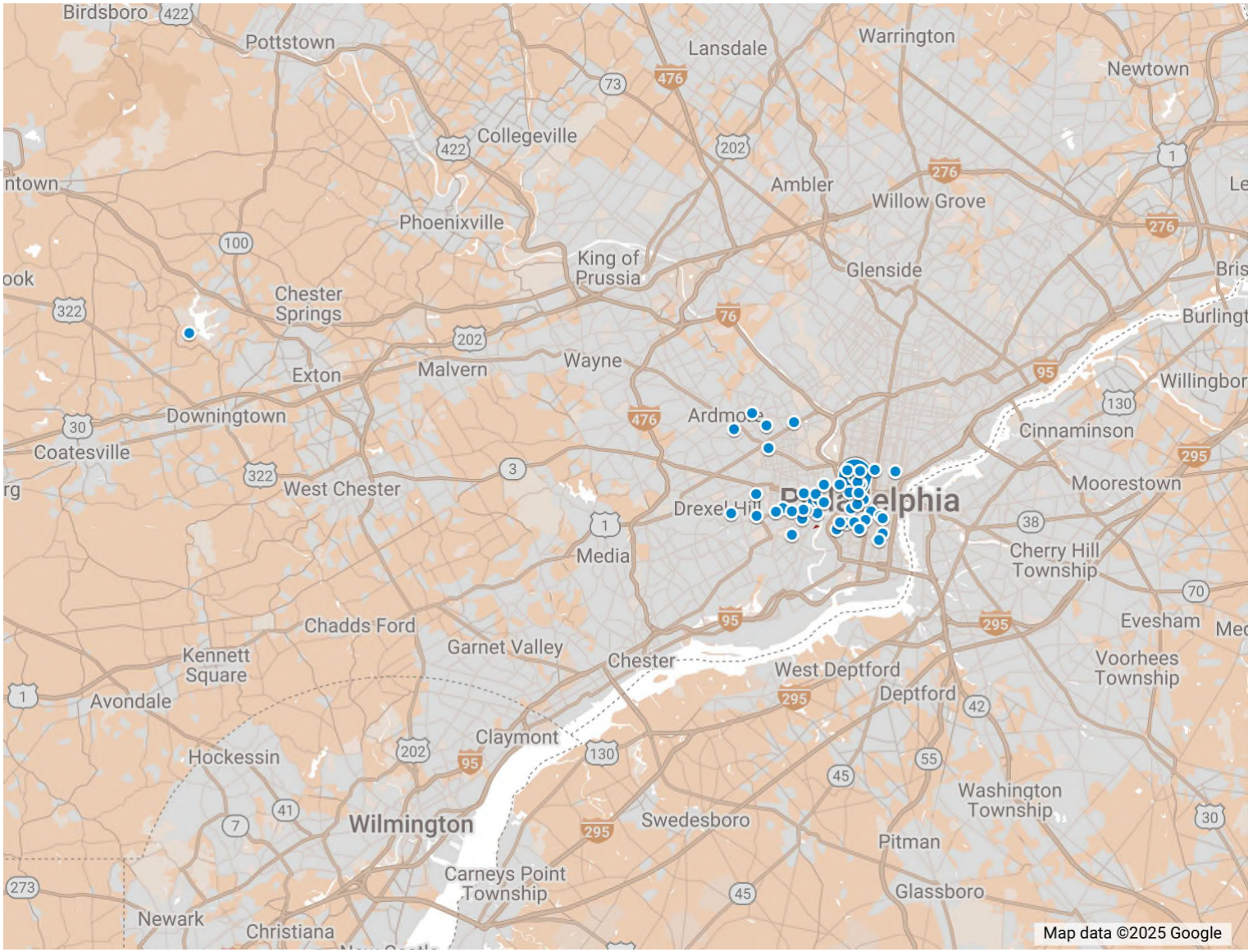
Locations and Addresses of Form E-Mail Senders - Zoomed Out

Parcel Outline

Client Property

05-07-25 list of residents to enter into map.xlsx

- Marlene Adkins 6044 Greenway Avenue Philadelphia, PA 19142
- Kimberly Allen 2114 Pine Street Apt 1R Philadelphia, PA 19103
- Susan Babbit 1010 Pine Street Apt. 2R Philadelphia, PA 19107
- Linda Blythe 4433 Osage Avenue Philadelphia, PA 19104
- Deirdre DeVine 805B Addison Street Philadelphia, PA 19147
- Chris DiGiulio 782 N. Reeds Road Downingtown, PA 19335
- Robert DuPlessis 413 S. 24th Street Philadelphia, PA 19146



Bonnie Eisenfeld 2031 Locust Street Apt. 2R Philadelphia, PA 19104

Giugliano, Louise 225 N. Essex Avenue Narberth, PA 19072

Doug Grainge 785 N. 24th Street Philadelphia, PA 19130

Sean Hoffmann 818 South Street Apt. 1 Philadelphia, PA 19147

Ella Israeli 4218 Spruce Street Apt. 1R Philadelphia, PA 19104

Lisa Jacobs 845 S. 57th Street Philadelphia, PA 19143

Elisa McCool 4916 Sansom Street Philadelphia, PA 19139

Thomas Nelson 105 Drexel Avenue Lansdowne, PA 19050

Saberi, Pouné 1504 Montrose Street Philadelphia, PA 19146

Shafia, Anabel 232 Valley Road Merion Station, PA 19066

Rohil Shah 1235 N. Leithgow Street Philadelphia, PA 19122

Straus, Gabriel 4406 Chestnut Street Apt. 2R Philadelphia, PA 19104

Szczepanik, David 1552 S. Dover Street Philadelphia, PA 19146

Turco, Jill 2428 Manton Street Philadelphia, PA 19146

Wade, Reuben 715 S. 7th Street Philadelphia, PA 19147

Zvonarov, Oleg 2729 Oakford Street Philadelphia, PA 19146

Sara L 2929 Arch St Philadelphia, PA 19104

Geneva Butz 2401 Pennsylvania Ave Philadelphia, PA 19130

Juliana Flint 1330 S Melville St Philadelphia, PA 19143

Brandon Robilotti 2034 Ellsworth St Philadelphia, PA 19146

Lisa Hastings 2001 Hamilton St. P108 Philadelphia, PA 19130

Michelle Dugan 222 Maypole Rd Upper Darby, PA 19082

Marilyn Maurer 538 Ballytore Rd Wynnewood, PA 19096

Paul Beach 4812 Windsor Ave Philadelphia, PA 19143

Millie Chen 1427 W Girard Ave Philadelphia, PA 19130

Cynthia Gilman 2201 Pennsylvania Ave Apt 1006 Philadelphia, PA 19130

Daniel Safer 3305 Hamilton St Philadelphia, PA 19104

Dora Beothy 52 Lewis Ave Lansdowne, PA 19050

Mary Ann Leitch 526 Reed St Philadelphia, PA 19147

Susan Gottesman 20 Conshohocken State Road Bala Cynwyd, PA 19004

Andy Switzer 5236 Chester Ave Philadelphia, PA 19143

Elizabeth Binstead 6300 Drexel Rd Philadelphia, PA 19151

Beatrice Zovich 825 N 29th St, Apt 2E Philadelphia, PA 19130

Harrison Mace 1323 S Colorado St Philadelphia, PA 19146

James Stanton 305 S 40th St Apt A202 Philadelphia, PA 19104

Meredith Stone 868 N Beechwood St Philadelphia, PA 19130

Jennifer Armento 5943 Wharton St Philadelphia, PA 19143

Jason Das 823 S Saint Bernard St Philadelphia, PA 19143

Jenny Ryder 5407 Whitby Ave Philadelphia, PA 19143

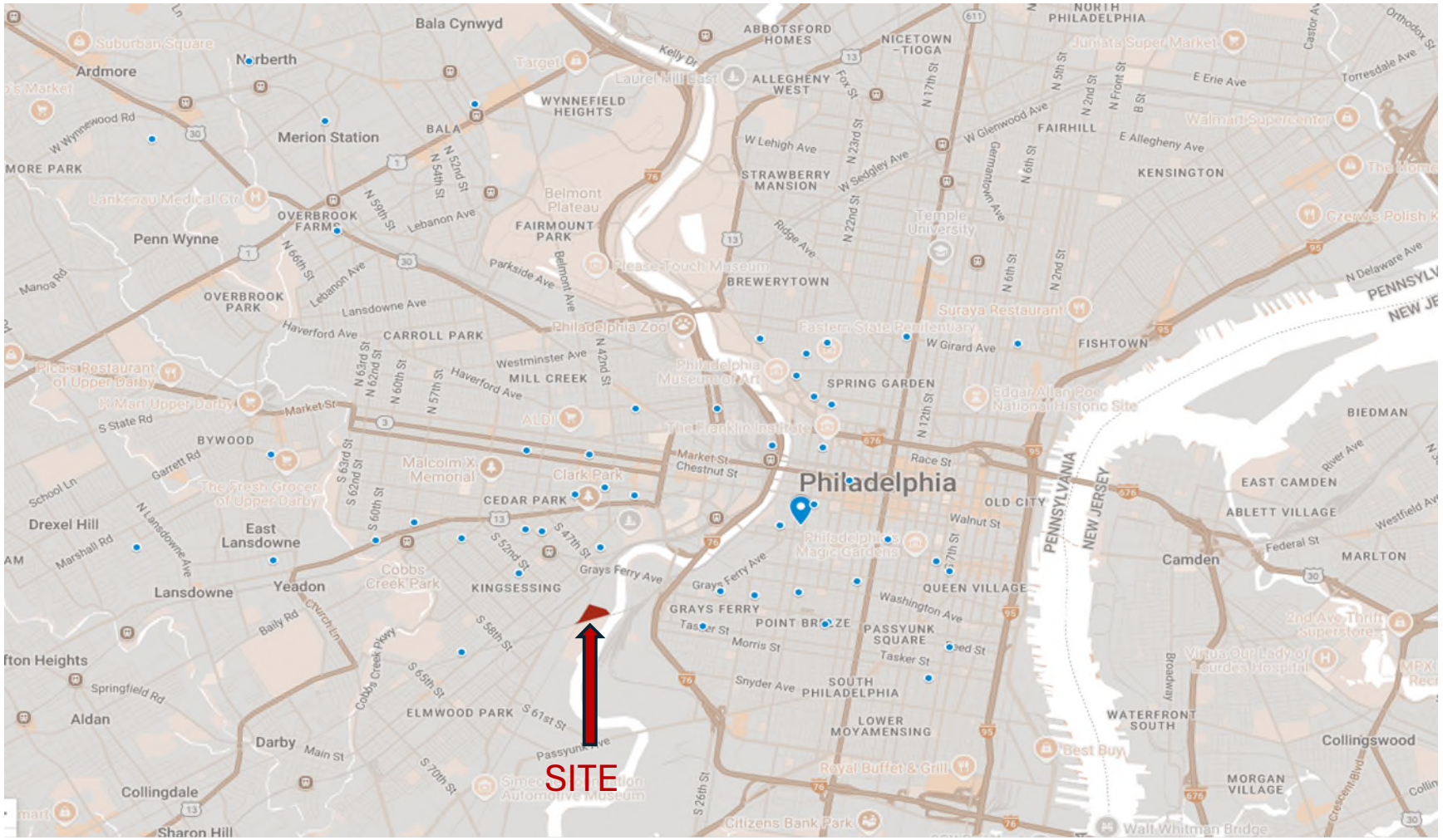
Alexander Milone 1347 S Bouvier St Philadelphia, PA 19146

Rose Paddison 646 Pierce St. Apt 2 Philadelphia, PA 19148

Elizabeth Bonitatibus 122 N Lambert St Philadelphia, PA 19103

Johanna Gelbspan 4021 Green St. Philadelphia, PA 19104

Locations of Form E-Mail Senders – Zoomed In



- Address of Email Sender