COMMITMENT & INTEGRITY
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40 Shattuck Road
Suite 110
Andover, Massachusetts 01810
www.woodardcurran.com

T 866.702.6371
T 978.557.8150
F 978.557.7948

December 29, 2014

Ms. Kimberly Tisa, PCB Coordinator
U.S. Environmental Protection Agency Region 1
5 Post Office Square – Suite 100
Boston, Massachusetts 02109-3912

Re: Long-Term Monitoring and Maintenance Implementation – 2014 Monitoring Results
University of Massachusetts, Amherst, Massachusetts

Dear Ms. Tisa:

On behalf of the University of Massachusetts, this report has been prepared and is being submitted to document the results from the 2014 long term monitoring activities conducted at the following buildings on the University of Massachusetts Amherst Campus:

- Tobin Hall Deck – The Monitoring and Maintenance Implementation Plan (MMIP) was submitted on March 13, 2012 in accordance with Condition 8 of the United States Environmental Protection Agency's (EPA) PCB Risk-Based Decontamination and Disposal Approval under 40 CFR 761.61 (c) and 761.79 (h) dated February 28, 2012; monitoring activities were also conducted at those areas described in the September 2012 PCB Remediation Plan Addendum;
- Dubois Library Elevator Lobbies – The MMIP was submitted on March 29, 2013 in accordance with Condition 12 of the EPA's Dubois Library PCB Cleanup and Disposal Approval under 40 CFR 761.61(c), 761.62, and 761.79(h) dated April 8, 2010;
- Southwest Concourse – The MMIP was submitted on December 29, 2010 in accordance with Condition 13 of the EPA's Southwest Residential Area Concourse PCB Cleanup and Disposal Approval under 40 CFR 761.61 (a) and (c) and 761.79 (h) dated August 30, 2010; monitoring activities were also conducted at those areas described in the PCB Remediation Plan Amendment dated May 9, 2011;
- Orchard Hill Residential:
    - Webster House – The MMIP was submitted on January 5, 2012 in accordance with Condition 16 of the EPA's PCB Decontamination and Disposal Approval under 40 CFR 761.61 (c) and 761.79 (h) dated July 4, 2011;
    - Field and Grayson Houses – The MMIP was submitted on January 13, 2014 in accordance with Condition 17 of the EPA's April 30, 2012 PCB Decontamination and Disposal Approval issued under 40 CFR 761.61(c) and 761.79(h) for the window/door replacement project; monitoring activities were also conducted in accordance with the MMIP for the work complete on the exterior joints submitted on April 24, 2012 as part of the PCB Remediation Plan/Close Out Document for Field and Grayson House by ATC Associates, Inc.; and
- Sylvan Residential – The MMIP was submitted on February 20, 2014 as part of the remediation completion reporting for the exterior and interior renovations conducted at each of the three buildings within the Sylvan Complex (Brown, Cashin, and McNamara). An EPA Approval letter was not issued for this work.

As previously discussed, the activities conducted in support of the monitoring and maintenance activities for these projects are being submitted under a single cover to streamline reporting and review of these activities. The locations of these areas are depicted on Figure 1.

An overall summary of the 2014 activities is provided below with details of the specific projects included in individual project reports provided as attachments to this letter.

MONITORING AND MAINTENANCE IMPLEMENTATION PLAN

For each of the projects included in this report, certain building materials formerly in direct contact with or adjacent to former PCB caulking were encapsulated using liquid coatings and/or physical barriers (e.g., sheet metal cladding) as a risk-based management approach under 40 CFR 761.61(c) where it was determined that physical removal was an infeasible remedial approach. This included both porous masonry surfaces in former direct contact with the caulking (i.e., coated) as well as a limited extent of masonry materials beyond the former joints.

Components of each MMIP, including subsequent revisions based on the monitoring results and maintenance activities completed to date, include the following:

- Visual inspections of the encapsulated surfaces will be performed to look for signs of encapsulant deterioration, breakages, wear, and/or signs of weathering or disturbance of the replacement caulking or other secondary physical barriers.
- Surface wipe samples of the encapsulated surfaces will be collected using a hexane-soaked wipe following the standard wipe test procedures described in 40 CFR 761.123.
- Indoor air monitoring will be conducted at the Dubois Library elevator lobbies in accordance with US EPA Compendium Method TO-10A "Determination of Pesticides and Polychlorinated Biphenyls in Ambient Air Using Low Volume Polyurethane Foam (PUF) Sampling Followed by Gas Chromatographic/Multi-Detector Detections (GC/MD)".
- Monitoring results will be compared to the evaluation criteria to determine the need and type of corrective actions.
- A monitoring report will be prepared and submitted to EPA to document the results of the visual inspections and sampling activities, as well as to provide any recommendations for corrective measures based on the results of the visual inspections or laboratory analytical results. The report will also include a statement on the continued effectiveness of the encapsulants and/or secondary physical barriers; and will include any proposed modifications to the MMIP.

MONITORING ACTIVITIES –2014

Woodard & Curran performed the following monitoring activities during 2014:

- Tobin Hall Deck – A visual inspection of the encapsulated concrete pillar surface was performed and two verification wipe samples collected;
- Dubois Library – A visual inspection of encapsulated interior concrete building walls, ceiling, and CMU block in-fills in the elevator lobbies was conducted and seven verification wipe samples were collected from the lobby areas. In addition, five indoor air samples were collected during three rounds of indoor air sampling conducted in the lobbies (February, July, and October);
- Southwest Concourse – A visual inspection of encapsulated exterior concrete building walls, retaining walls, and concrete within the pedestrian tunnel was conducted and 19 verification wipe samples collected from representative locations throughout the project area;
- Orchard Hill Residential – At the Webster House, a visual inspection of the encapsulated interior elevator lobby walls and the metal cladding/window frames on the northwest building

elevation was performed and three verification wipe samples collected from the interior lobby walls. At the Field and Grayson Houses, a visual inspection was completed in the 6th floor elevator lobbies, the stairwells, and of the exterior concrete spandrels. Two wipe samples were collected from the exterior spandrels and one was collected from the elevator lobby walls. Additionally, a visual inspection of encapsulated concrete parapet wall materials at the roofline of the buildings was performed; and

- Sylvan Residential – For all three buildings, visual inspections of encapsulated brick and replacement caulking associated with the exterior control joints, interior encapsulated walls, and interior encapsulated ceilings were conducted. In addition, a total of 32 wipe samples were collected from the encapsulated interior and exterior surfaces as part of the long term monitoring.

RESULTS

A summary of the results of the 2014 monitoring activities for each building is included in Attachments 1 through 5 to this letter. Complete analytical laboratory reports, along with a data validation summary, are provided in Attachment 6.

The 2014 inspection and sampling results indicate that the liquid coatings and secondary barriers continue to be effective containment barriers to residual concentrations of PCBs in the masonry.

As described in Attachments 1 and 3, relatively minor flaking and peeling were observed in the clear acrylic coatings applied to select concrete surfaces at the Tobin Hall Deck and in the Southwest Concourse Area. Wipe samples collected from areas of observed flaking and peeling indicate that PCBs were not detected above the target level of 1.0 μg/100 cm^2.

The next monitoring events will be performed throughout 2015 in accordance with the individual project MMIPs.

If you have any comments, questions, or require further information, please do not hesitate to e-mail or call me at the number listed above.

Sincerely,

WOODARD & CURRAN INC.

Jeffrey A. Hamel, LSP, LEP
Senior Vice President

cc: Terri Wolejko, UMass EH&S

Enclosures: Figure 1 – Site Location Map
Attachment 1 – Tobin Hall Deck
Attachment 2 – Dubois Library Elevator Lobbies
Attachment 3 – Southwest Concourse
Attachment 4 – Orchard Hill Residential Complex
Attachment 5 – Sylvan Residential Complex
Attachment 6 – Data Validation Summary and Analytical Laboratory Reports

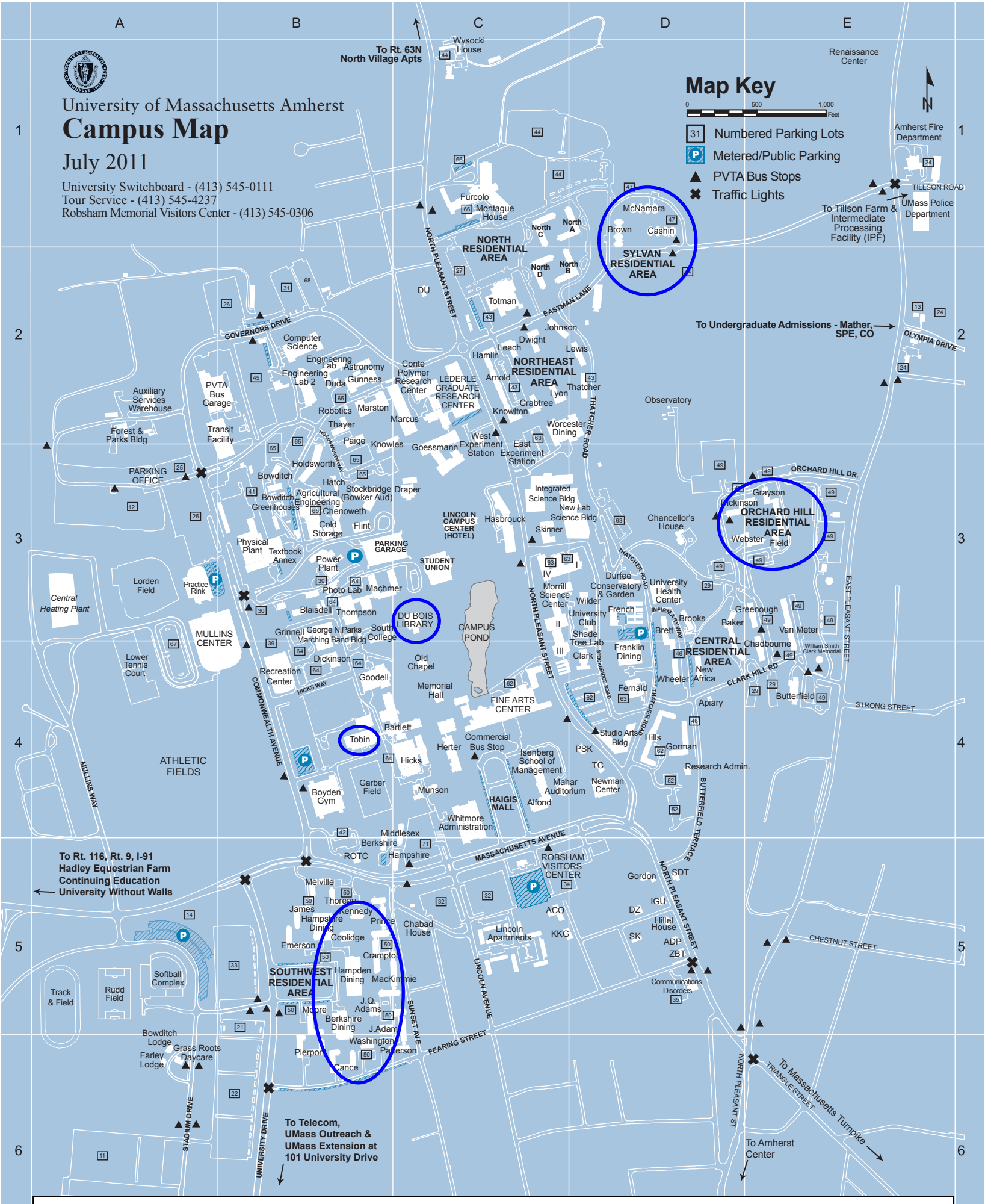

Figure 1 Site Location Map

Attachment 1 – Tobin Hall Deck

Attachment 1 – Tobin Hall
Long-Term Maintenance and Monitoring Program
In-Place Management of PCB Impacted Materials
UMass Amherst

Location: Tobin Hall

Summary of Remedial Areas

In-Place Management: Residual PCBs on a building wall are being managed in-place following removal of concrete decking on the west side of Tobin Hall in 2011 and concrete stairs/landing in 2012. Concrete materials that contain PCBs at concentrations > 1 ppm remain beneath a liquid encapsulating coating (residual PCB concentration in masonry reported at a concentration of 2.37 ppm). The encapsulation extends to a distance of six inches above and six inches below the former caulked joint along approximately 80 linear feet (l.f.) of the Tobin Hall building wall and along approximately seven l.f. of the concrete façade/pillar at the north and south ends of the stairway landing. Materials were encapsulated with two coats of clear Sikagard 670W acrylic coating or two coats of Sikagard 62 liquid epoxy coating (south end of the stairwell landing only). The locations of the encapsulated surfaces are depicted on Figure 1-1. The photo below depicts a portion of the concrete wall encapsulated with the Sikagard 670W acrylic coating and which is no longer accessible as described in the following sections.

Concrete Wall to North of Main Stairway

Baseline Verification Data Summary: Two initial baseline wipe samples were collected in August 2011 from the building wall façade encapsulated with Sikagard 670W clear acrylic coating as part of the decking removal project. Analytical results reported PCBs as non-detect (< 0.20 µg/100 cm^2) in both samples. One baseline wipe sample was collected from the epoxy coated concrete surfaces as part of the stair landing removal project in 2012. Analytical results reported PCBs as non-detect (< 0.20 µg/100 cm^2).

Monitoring and Maintenance Implementation Plan

The Monitoring and Maintenance Implementation Plan (MMIP) was submitted to EPA in March 2012 and included visual inspections and verification wipe sampling. As described in the May 2013 letter report, concrete surfaces encapsulated as part of the stair landing removal project were incorporated into the existing MMIP.

Verification wipe sampling of the encapsulated surfaces includes the collection of two verification wipe samples from the encapsulated surfaces (one from the northern portion of the wall and one from the southern portion of the wall). The locations will be randomly selected using a number representing the length of the individual joints in feet. Wipe samples will be collected using a hexane-soaked wipe following the standard wipe test procedures described in 40 CFR 761.123 over a 100 square centimeter surface area.

Attachment 1 – Tobin Hall
Long-Term Maintenance and Monitoring Program
In-Place Management of PCB Impacted Materials
UMass Amherst

Monitoring Activities – August 2012

On August 9, 2012, coated concrete materials remaining above grade were inspected for signs of deterioration or damage to the Sikagard 670W clear coat. The southern portion of the coated areas was not accessible due to the installation of an asphalt pedestrian walkway to a level above the extent of the coating. Along the northern wall, the coating was observed to be in good condition with one small, isolated area of limited deterioration directly adjacent to a hose connection possibly due to physical impacts to the coating during connection and disconnection of the hoses during construction activities in the area. Analytical results from one verification wipe sample collected from the northern side of the encapsulated area indicated that PCBs were non-detect (< 0.20 µg/100cm^2).

Monitoring Activities – October 2013

As described in the 2012 Long Term Maintenance and Monitoring Report, repairs to the area observed to be damaged by the hose connection were to be conducted as part of maintenance activities in 2013; however, as part of the final restoration/construction activities associated with the Commonwealth Honors construction project, four foot high retaining walls were constructed to the north and south of the former stair landing eliminating access to the damaged area observed in 2012 as well as the majority of the encapsulated surfaces identified as containing > 1 ppm PCBs (see photo below and Figure 1-1). Given the current inaccessibility of these materials and the low concentrations of residual PCBs in the concrete, repairs to the existing liquid coatings were not conducted.

In addition, and as described in the PCB Remediation Completion report submitted for the stair landing project, minor flaking and peeling in select areas was observed on the clear coat applied to concrete above the former caulked joints. Monitoring of the area was conducted as part of the 2013 activities as described below; however, additional coatings were not applied in 2013 prior to the completion of the retaining walls.

On October 10, 2013 accessible coatings applied to concrete materials were inspected for signs of deterioration or damage. The majority of the concrete façade identified as containing residual PCBs > 1 ppm to the north and south of the stair landing was not accessible for inspection due to the installation of new retaining walls and planting beds as described above and as shown in the photo below.

The remaining exposed encapsulated concrete façade was limited to a total of approximately 3.5 square feet of concrete at the northern and southern ends of the stair landing (i.e., seven feet of former joint to a distance of six inches above the former joints). The epoxy coating on the southern façade area was observed to be in good condition while there was limited flaking and peeling observed on the clear acrylic coating on the northern façade area. Analytical results from the two wipe samples collected (1 from each area) indicated that PCBs were non-detect (< 0.20 µg/100cm^2).

Attachment 1 – Tobin Hall
Long-Term Maintenance and Monitoring Program
In-Place Management of PCB Impacted Materials
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Northern Side of Stair Landing

Monitoring Activities – July 2014

On July 22, 2014, accessible coatings applied to concrete materials were inspected for signs of deterioration or damage. The remaining exposed concrete areas remained the same as in the 2013 monitoring event and the two sampling areas remained the same. A summary of the results of the visual inspections and wipe sampling is as follows:

- Southern Façade Area - Sikagard 62 liquid epoxy coating was observed to be in good condition with no signs of damage or wear. Results of the verification wipe sample collected from the epoxy coated surfaces indicated that PCBs were non-detect (LTM-TH-VWC-270 at < 0.20 µg/100cm^2) consistent with previous sampling events; and
- Northern Façade Area - Sikagard 670W clear coat encapsulant was found to be flaking and peeling in select sections of the concrete as observed following the application of the coatings in Fall 2012; a verification wipe sample was collected from the flaking area and analytical results indicated that PCBs were non-detect (LTM-TH-VWC-271 at < 0.20 µg/100cm^2) consistent with previous sampling events.

Corrective Actions

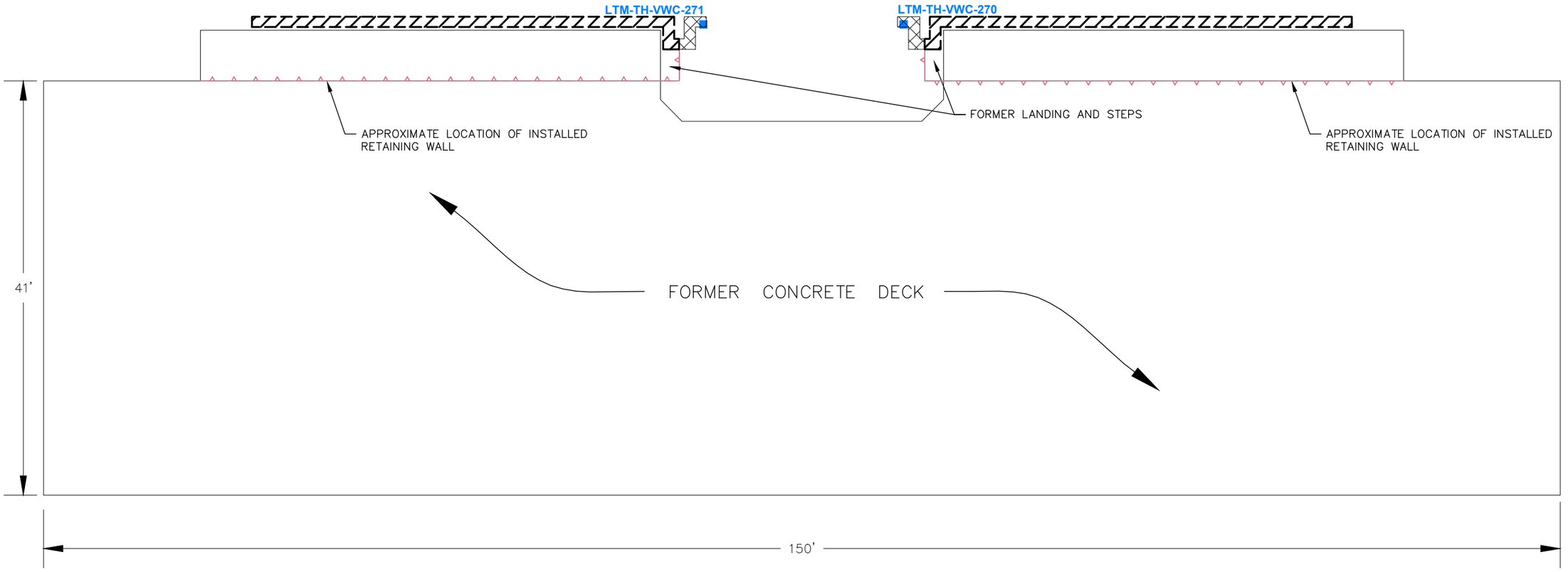
Based on the results of verification wipe sampling which indicate that PCBs were non-detect in the wipe samples collected and the limited area of accessible concrete subject to this MMIP, no corrective actions are proposed to be conducted in this area. Continued monitoring of the accessible concrete surfaces will be conducted as part of 2015 monitoring activities.

Proposed Monitoring Frequency

If verification wipe sampling results remain consistent in 2015, it will be proposed to modify the wipe sampling frequency to every other year with continued visual inspections annually.

N

TOBIN HALL



LEGEND

- AREA OF TOBIN HALL CONCRETE ENCAPSULATION CURRENTLY INACCESSIBLE DUE TO INSTALLATION OF RETAINING WALL AND PLANTING BED (ENCAPSULATION APPLIED TO A DISTANCE OF 6" ABOVE AND BELOW THE FORMER CAULKED JOINT).
- AREA OF TOBIN HALL CONCRETE ENCAPSULATION TO A DISTANCE OF 6" ABOVE AND 6" BELOW CAULKED JOINT CURRENTLY ACCESSIBLE AT LOCATIONS ABOVE THE FORMER JOINT.
- LTM-TH-VWC-270 ■ VERIFICATION WIPE SAMPLE LOCATION AND IDENTIFIER

16' 12' 8' 4' 0 12' 24'

BAR SCALE
3/32" = 1'-0"
CHECK GRAPHIC SCALE BEFORE USING

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ENCAPSULATED BUILDING SURFACES AND VERIFICATION WIPE SAMPLE LOCATION

DESIGNED BY: GJF
DRAWN BY: PF
CHECKED BY: JAH
225996-LTM-TOBIN-FIGURE 1.DWG

UNIVERSITY OF MASSACHUSETTS
AMHERST, MASSACHUSETTS

2014 TOBIN HALL PCB MMIP REPORT

JOB NO: 225695
DATE: SEPTEMBER 2014
SCALE: AS NOTED

FIGURE 1

Attachment 2 – Dubois Library Elevator Lobbies

Attachment 2 – Dubois Library
Long-Term Maintenance and Monitoring Program
In-Place Management of PCB Impacted Materials
UMass Amherst

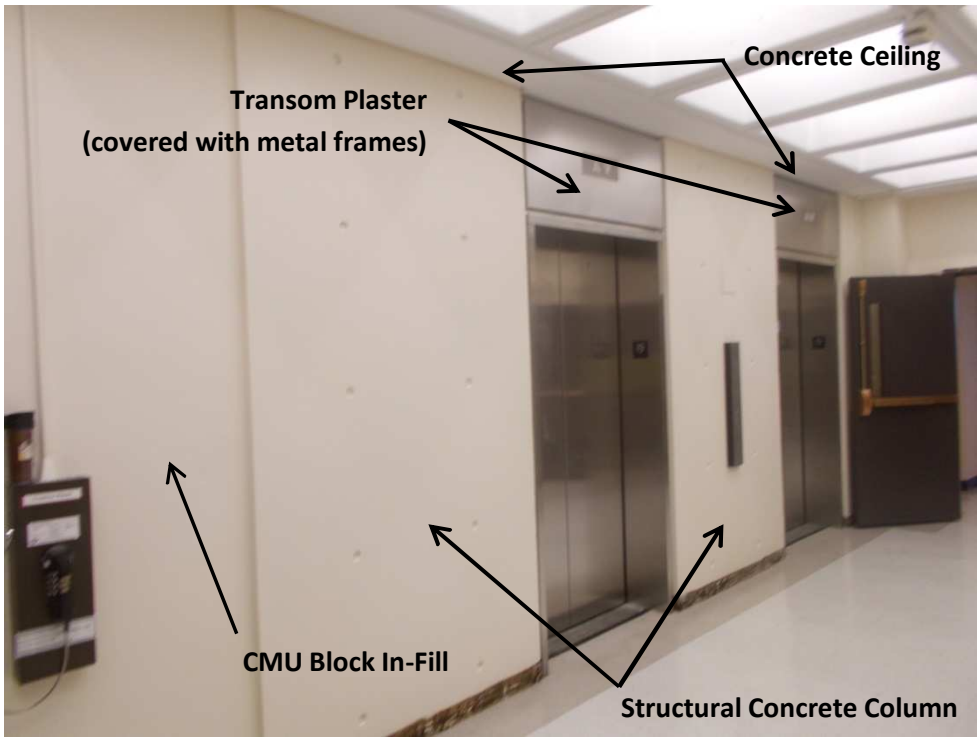
Location: W.E.B Dubois Library

Summary of Remedial Areas

In-Place Management: Residual PCBs are being managed in place at concentrations > 1 ppm following abatement activities at the following locations located within the elevator lobbies:

- CMU Block In-Fill Materials – All CMU block in-fill materials were encapsulated with Sika 550W acrylic coating followed by a final coat of interior latex paint.
- Transom Plaster – Plaster materials throughout the elevator lobbies were encapsulated with Sika 550W acrylic coating followed by a final coat of interior latex paint. Metal cladding was installed over the encapsulated transom plaster materials in accordance with project requirements.
- Concrete Ceiling – Concrete materials formerly in direct contact with the caulking and out to the corner of the concrete ceiling (or within 12 inches of the caulked joint) were encapsulated with Sika 550W acrylic coating followed by a final coat of interior latex paint. All remaining elevator lobby ceiling materials beyond the corner were covered with latex paint.
- Structural Concrete Columns – Concrete materials formerly in direct contact with the caulking and out to the first 90-degree angle (or within approximately 2 inches of the caulked joint) were encapsulated with Sika 550W acrylic coating followed by a final coat of interior latex paint. Portions of the elevator door recesses were also covered with metal frames associated with the new elevator doors. All materials on the face of the structural concrete column beyond the corner were encapsulated with latex paint.

The encapsulated surfaces associated with the elevator lobby abatement activities are shown in the photo below.



Attachment 2 – Dubois Library
Long-Term Maintenance and Monitoring Program
In-Place Management of PCB Impacted Materials
UMass Amherst

Baseline Verification Wipe Data Summary: Initial baseline wipes were collected August 28, 2012. A summary of analytical results from the baseline sampling is as follows:

- CMU Block In-Fill materials: Three verification wipes samples were collected from CMU block in-fill surfaces following the application of the Sika 550W acrylic coating followed by a latex coating. Analytical results reported PCBs as non-detect (< 0.20 µg/100 cm^2) in the three wipes samples.
- Transom Plaster: One verification wipe sample was collected from transom plaster surfaces following the application of the Sika 550W acrylic coating followed by a latex coating. Analytical results indicated that PCBs were present below the encapsulation criteria of 1 µg/100 cm^2 with a reported concentration of 0.72 µg/100 cm^2.
- Concrete Ceiling: One verification wipe sample was collected from concrete ceiling surfaces following the application of the Sika 550W acrylic coating followed by a latex coating. Analytical results reported PCBs as non-detect (< 0.20 µg/100 cm^2).
- Structural Concrete Columns – Three wipe samples were collected from encapsulated structural concrete materials following the application of the Sika 550W acrylic coating followed by a latex coating. Two wipe samples were collected from the parallel face of the structural concrete (facing the lobby) at a distance of 10 inches from the former caulked joint. Analytical results from these two samples indicated that PCBs were non-detected (< 0.20 µg/100cm^2). One sample was collected at a distance of two inches from the former caulked joint along the perpendicular face of the structural concrete (i.e., within the elevator recess). Analytical results indicated that PCBs were present at a concentration of 4.6 µg/100cm^2 in this sample (sample DL-4E0-VWC-100 collected from the fourth floor).

Indoor Air Sampling Data Summary: Indoor air samples were collected on August 28, 2012 as part of the initial post-remediation sampling. Analytical results indicated that PCBs were present at concentrations of 0.690, 0.977, and 1.146 µg/m^3 in the three samples collected. As described in the MMIP, these results were above EPA's published guidance for indoor air levels for schools and below the risk-based project specific action level of 1.180 µg/m^3.

As part of the development of the MMIP and to gain an understanding of indoor air levels in the different floors of the library as well as over the different seasons to assess variations over time, an expanded indoor air sampling program, which including the collection of samples from nine lobby areas, was developed and implemented on October 16, 2012. Results from the expanded round of sampling indicated that PCBs were present at concentrations up to 0.542 µg/m^3.

Monitoring and Maintenance Implementation Plan

The Monitoring and Maintenance Implementation Plan (MMIP) was submitted to EPA in March 2013 and included visual inspections of encapsulated surfaces, verification wipe sampling, and indoor air sampling. A summary of the inspection and monitoring requirements is as follows:

Verification Wipe Sampling: Verification wipe samples of the encapsulated surfaces will be collected using a hexane-soaked wipe following the standard wipe test procedures described in 40 CFR 761.123. A total of seven samples will be collected from randomly selected locations as follows:

- CMU Block In-Fill Materials – Three verification wipe samples will be collected from encapsulated masonry block in-fills on three randomly selected floors. The location of the wipe sample on the in-fill will be randomly selected using a random number generator based on the total height and width of the in-fill;
- Structural Concrete/Lobby Walls – Three verification wipe samples will be collected from structural concrete/lobby wall materials on three randomly selected floors. The location of each wipe sample will be selected as follows:
    - The associated elevator shaft will be randomly selected;

  - The location of the wipe along the former joints will be randomly selected using a random number generator with the "zero" point being located on the lower left hand corner and proceeding clockwise along the former joints; and
  - One wipe sample will be collected at a distance of 1.5 inches from the former caulked joint (i.e., within the return of the elevator door recess, prior to the first 90-degree angle). Two wipe samples will be collected at a distance of 10 inches from the former joint (the higher number of samples is based on the higher likelihood of direct contact with the lobby walls compared to the relatively small [1.5 inch wide] elevator door recess).

- Ceiling – One verification sample will be collected from ceiling materials on a randomly selected floor. The location of the wipe will be selected as follows:
  - The elevator shaft will be randomly selected;
  - The location of the wipe along the former joint will be randomly selected using a random number generator with the "zero" point being located on the left end of the former joint; and
- Transom Plaster – The final construction included the installation of sheet metal cladding over the existing transom plaster. No verification wipe samples will be collected due to the lack of direct contact exposure pathway to the transom plaster.

Indoor Air Sampling: Based on the existing data set, which indicated that PCBs were present in indoor air samples at concentrations above the EPA's published guidance for indoor air levels for schools of 0.450 µg/m^3 but below the project specific risk-based action level developed for the elevator lobbies (1.18 µg/m^3), two additional rounds of indoor air monitoring were proposed for the first year of long term monitoring of indoor air conditions. The sampling plan was designed to gain an understanding of indoor air levels across the different floors of the library and over the different seasonal variations in ambient temperature and ventilation configuration.

One sampling event was to be conducted in Winter / early Spring to monitor indoor air conditions during periods of colder ambient temperatures and when the ventilation system dampers are in a more closed position (less outside make-up air). The second sampling event was to be conducted in the Fall to monitor indoor air conditions during a period of moderate ambient air temperatures when the ventilation system dampers are more open (more outside make-up air). During each event, indoor air samples would be collected from the nine locations previously sampled in October 2012 for comparison purposes to previous results over time. These locations include the 4th, 5th, 8th, 13th, 15th, 18th, 19th, 23rd, and 26th floors. In addition to the above samples, one background air sample, collected from outside the library, and one duplicate sample would be collected during each event as part of the QA/QC procedures associated with the sample collection procedures.

Indoor air samples were collected in accordance with the US EPA Compendium Method TO-10A "Determination of Pesticides and Polychlorinated Biphenyls in Ambient Air Using Low Volume Polyurethane Foam (PUF) Sampling Followed by Gas Chromatographic/Multi-Detector Detection (GC/MD)". Samples were submitted to a certified analytical laboratory for PCB Homolog Analysis via US EPA Method 680A with a laboratory reporting limit of < 0.10 µg/m^3.

Following receipt and review of the indoor air data collected during these two events, as well as the previous indoor air sampling events, recommendations for the continued indoor air monitoring program would be proposed.

Monitoring Activities – Surface Wipe – October 2013

Visual inspections and verification wipe sampling of the encapsulated materials was conducted on October 11, 2013 in accordance with the MMIP as described above. Results of the monitoring activities are summarized on Table 2-1 and as follows:

- CMU Block In-Fill materials – Liquid coatings applied to the CMU block in-fills within the elevator lobbies were observed to be in good condition with no signs of wear or damage. Three verification wipe samples

were collected from the coated CMU block in-fill materials on the 10th, 19th, and 23rd floors. Analytical results indicated that PCBs were not present above the encapsulation goal of 1 µg/100 cm^2. Two samples were non-detect for PCBs (< 0.20 µg/100 cm^2) and one verification wipe sample contained PCBs at a concentration of 0.49 µg/100 cm^2.

- Structural Concrete Columns – Visual inspection found no evidence of deterioration of the coatings applied to the structural concrete columns; however, some physical wearing of the top coat of the latex paint (potentially due to rubbing of the wall surface by trash cans or other objects) was observed. Three verification wipe samples were collected for PCB analyses. Two verification wipe samples collected at a distance of 10 inches from the joint on the 16th and 21st floors were reported as non-detect for PCBs (< 0.20 µg/100 cm^2). One verification wipe sample collected at a distance of 1.5 inches from the joint on the 4th floor contained PCBs with a reported concentration of 0.49 µg/100 cm^2. This sample was collected from the same area as the baseline verification sample which detected 4.6 µg/100 cm^2.
- Concrete Ceiling – Visual inspection found no evidence of deterioration of the coatings applied to the concrete ceiling. One verification wipe sample was collected from the 20th floor at a distance of six inches from the joint. Analytical results indicated that PCBs were non-detect (< 0.20 µg/100 cm^2).

Monitoring Activities – Indoor Air – April and October 2013

Results from the two rounds of indoor air sampling are summarized as follows:

- April 5, 2013 – Analytical results indicated that total PCBs were present at concentrations ranging from 0.154 to 0.406 µg/m^3 with an average PCB concentration of 0.253 µg/m^3;
- October 11, 2013 – Analytical results indicated that total PCBs were present at concentrations ranging from 0.191 to 0.959 µg/m^3 with an average PCB concentration of 0.525 µg/m^3; and
- Analytical results from the ambient air samples collected outside of the library indicated that PCBs were non-detect (< 0.005 µg/m^3) during both sampling events.

Results from the indoor air sampling events are proposed to be compared to the project specific risk-based action level and EPA's published guidance as follows:

- Total PCBs < 0.450 µg/m^3 – continued monitoring to determine if results are consistent throughout the year; potentially cease indoor air monitoring if results are sustained over multiple events;
- Total PCBs > 0.450 µg/m^3 and < 1.18 µg/m^3 – evaluate data for any trends that may be evident, continue semi-annual monitoring of indoor air concentrations; and
- Total PCBs > 1.18 µg/m^3 – evaluate results and present proposed actions to EPA.

The maximum and average concentrations continue to be in the 0.450 to 1.18 µg/m^3 continued monitoring range.

Monitoring Activities – Surface Wipes – July 2014

Visual inspections and verification wipe sampling of the encapsulated materials was conducted on July 22, 2014 in accordance with the MMIP as described above. Results of the monitoring activities are summarized on Table 2-1 and as follows:

- CMU Block In-Fill materials – Liquid coatings applied to the CMU block in-fills within the elevator lobbies were observed to be in good condition with no signs of wear or damage. Three verification wipe samples were collected from the coated CMU block in-fill materials on the 5th, 10th, and 13rd floors. Analytical results indicated that PCBs were non-detect (< 0.20 µg/100 cm^2) at all sample locations.

- Structural Concrete Columns – Visual inspection found no evidence of deterioration of the coatings applied to the structural concrete columns. Three verification wipe samples were collected for PCB analyses. Two verification wipe samples collected at a distance of 10 inches from the joint on the 7th and 13th floors were reported as non-detect for PCBs (< 0.20 µg/100 cm^2). One verification wipe sample collected at a distance of 1.5 inches from the joint on the 22nd floor contained PCBs with a reported concentration of 0.31 µg/100 cm^2.
- Concrete Ceiling – Visual inspection found no evidence of deterioration of the coatings applied to the concrete ceiling. One verification wipe sample was collected from the 17th floor at a distance of six inches from the joint. The verification wipe sample collected at this location contained PCBs with a reported concentration of 0.97 µg/100 cm^2.

Monitoring Activities – Indoor Air – February, July, and October 2014

Given the consistency in the sample results between ventilation zones and floors, the number of samples was modified from 10 samples (9 floors, 1 ambient) to 5 (4 floors, 1 ambient), consisting of 2 floors per ventilation zone. Sample locations were biased to floors with higher concentrations during previous sampling events and collected from floors 4 and 13 (zone 1) and floors 19 and 23 (zone 2). Based on 2012 and 2013 indoor air results, three rounds of sampling were conducted to capture indoor air conditions under each of the three temperature/ventilation conditions. These 3 conditions are as follows:

1. Colder temperatures with the ventilation system dampers generally in a more closed configuration to provide less outside make-up air (Winter/early Spring);
2. Warmer temperatures with the ventilation system dampers generally in a more closed configuration to provide less outside make-up air (Summer); and
3. Moderate temperatures with the ventilation system dampers generally fluctuating between open and closed due to temperatures (Spring and Fall).

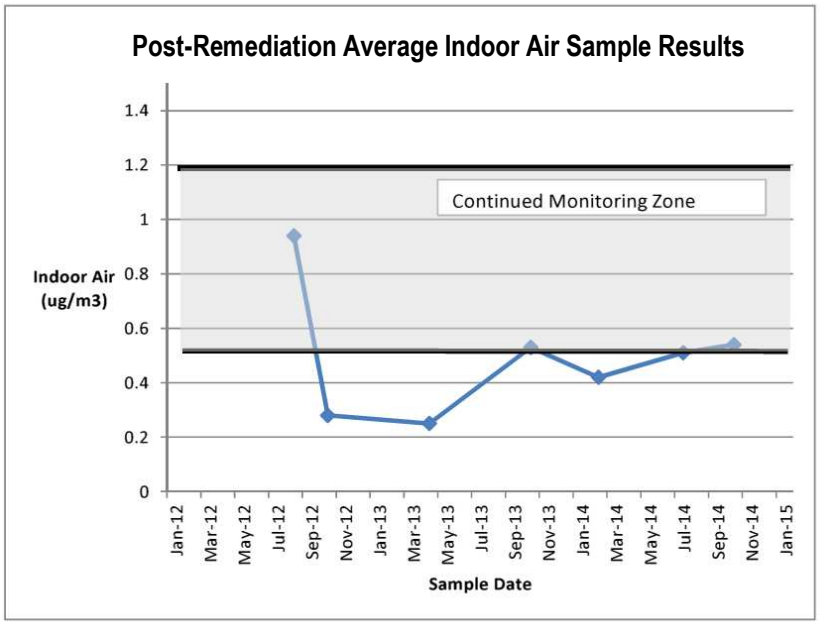
Results from the three rounds of indoor air sampling are summarized on Table 2-2, along with all previous indoor air sample results, and were as follows:

- February 24, 2014 – Analytical results indicated that total PCBs were present at concentrations ranging from 0.309 to 0.526 µg/m^3 with an average PCB concentration of 0.418 µg/m^3.
- July 22, 2014 – Analytical results indicated that total PCBs were present at concentrations ranging from 0.391 to 0.575 µg/m^3 with an average PCB concentration of 0.506 µg/m^3.
- October 10, 2014 – Analytical results indicated that the total PCBs were present at concentrations ranging from 0.436 to 0.636 µg/m^3 with an average PCB concentration of 0.539 µg/m3.
- Analytical results from the ambient air samples collected outside of the library indicated that PCBs were non-detect (< 0.005 µg/m^3) during the three sampling events.

During all three of the 2014 sampling events, the variability between the minimum, maximum, and average concentrations was relatively consistent and smaller than during previous monitoring events. In addition, the maximum and average concentrations continue to be in or slightly below the 0.450 to 1.18 µg/m^3 continued monitoring range.

Attachment 2 – Dubois Library
Long-Term Maintenance and Monitoring Program
In-Place Management of PCB Impacted Materials
UMass Amherst

A graph of the average indoor air concentrations detected during the post-remediation sampling events is depicted on the graph below. As shown below, the highest readings were observed immediately after the remediation activities and since that time, levels have stabilized to near the lower of the target levels.



Corrective Actions

Based on the 2014 monitoring activities, no corrective actions are proposed at this time and monitoring activities will continue in 2015. The 2015 activities will consist of visual inspections, surface wipe samples (same program as 2014), and indoor air sampling. Based on the 2014 indoor air results, which indicated that the concentrations of PCBs in indoor air were relatively consistent across the three sampling events, three rounds of sampling will be conducted again in 2015 to assess indoor air conditions under each of the three temperature/ventilation conditions and to confirm the 2014 data. Samples will be collected in February (cooler temperatures), July (warmer temperatures) and October (moderate temperatures). Given the consistency in the sample results between ventilation zones and floors, the number of samples is proposed to remain as conducted in 2014 with samples collected from both ventilation zones during each event including floors 4 and 13 (Zone 1) and floors 19 and 23 (Zone 2).

Proposed Monitoring Frequency

If indoor air results are similar following the 2015 monitoring events and based on the surface wipe data collected to date, it will be proposed to modify the sampling frequency to every other year and to maintain visual inspections of encapsulated surfaces on an annual basis.

Table 2-1
Summary of Long Term Monitoring Wipe Sampling Results - Dubois Library
UMass Amherst

Coating/Area	Surface	2013 Verification Wipes			2014 Verification Wipes			
		Sample Date	Sample ID	Total PCBs (ug/100 cm^2)	Sample Date	Sample ID	Total PCBs (ug/100 cm^2)	Comments
Sikagard 55W and Acrylic Latex Paint	CMU Block In-Fill	10/11/2013	DL-23E0-VWC-146	< 0.20	--	--	--	
		10/11/2013	DL-19E0-VWC-149	< 0.20	--	--	--	
		10/11/2013	DL-10E0-VWC-151	0.49	--	--	--	
		--	--	--	7/22/2014	LTM-DL-VWC-237	<0.20	
		--	--	--	7/22/2014	LTM-DL-VWC-238	<0.20	
		--	--	--	7/22/2014	LTM-DL-VWC-239	<0.20	
	Structural Concrete Lobby Walls	10/11/2013	DL-4E0-VWC-152	0.49	--	--	--	1.5 inches from joint
		10/11/2013	DL-16E5-VWC-150	< 0.20	--	--	--	10 inches from joint
		10/11/2013	DL-21E3-VWC-147	< 0.20	--	--	--	10 inches from joint
		--	--	--	7/22/2014	LTM-DL-VWC-234	0.31	1.5 inches from joint
		--	--	--	7/22/2014	LTM-DL-VWC-235	<0.20	10 inches from joint
		--	--	--	7/22/2014	LTM-DL-VWC-236	<0.20	10 inches from joint
	Ceiling	10/11/2013	DL-20E3-VWC-148	< 0.20	--	--	--	
					7/22/2014	LTM-DL-VWC-240	0.97	

Notes:
Samples submitted for PCB analysis via USEPA method 8082 with Soxhlet Extraction (3540C).
Wipe samples collected in accordance with the standard wipe test method of 40 CFR 761.123.
Total PCBs reported as Aroclor 1254 and/or Aroclor 1260. No other Aroclors reported at concentrations above the minimum laboratory reporting limit.

Table 2-2
Summary of Indoor Air Sample Results - Dubois Library
UMass Amherst

Floor	Air Sample	PCB Concentration (µg/cartridge)	Flow Rate (L/Minute)	Duration (minutes)	PCB Concentration (µg/m^3)
Project Specific Risk-Based Action Level: 1.18 µg/m^3					
Lobby Floor	**Pre PCB Remediation Indoor Air Samples January 15, 2010**				
4	DL-4E-IAS-088	0.198	2.58	121	0.629
15	DL-15E-IAS-085	0.146	2.6	127	0.442
18	DL-18E-IAS-082	0.193	2.57	128	0.580
Blank	N/A	N/A	N/A	N/A	N/A
QA/QC Sample - Field Duplicate					
18	N/A	N/A	N/A	NA/	N/A
Post PCB Remediation Indoor Air Samples August 28, 2012					
4	DL-4E-IAS-108	0.41	2.6	240	0.690
15	DL-15E-IAS-109	0.68	2.6	240	1.146
18	DL-18E-IAS-110	0.58	2.6	240	0.977
Blank	DL-OUT-IAS-112	< 0.005	2.6	250	< 0.005
QA/QC Sample - Field Duplicate					
18	DL-18ED-IAS-111	0.56	2.6	240	0.928
Post PCB Remediation Indoor Air Samples October 16, 2012					
4	DL-4E-IAS-113	0.34	2.6406	241	0.542
5	DL-5E-IAS-114	0.21	2.6517	242	0.332
8	DL-8E-IAS-115	0.25	2.6589	242	0.394
13	DL-13E-IAS-116	0.052	2.6451	244	0.082
15	DL-15E-IAS-117	0.053	2.637	244	0.084
18	DL-18E-IAS-118	0.31	2.6225	246	0.488
19	DL-19E-IAS-119	0.1	2.6826	246	0.154
23	DL-23E-IAS-120	0.26	2.6605	248	0.4
26	DL-26E-IAS-121	0.0091	2.6456	250	0.014
Blank	DL-OUT-IAS-122	0.0	2.6591	240	-
QA/QC Sample - Field Duplicate					
13	DL-13ED-IAS-123	0.37	2.6404	244	0.583
Post PCB Remediation Indoor Air Samples April 5, 2013					
4	DL-4E-IAS-124	0.21	2.62	245	0.327
5	DL-5E-IAS-125	0.11	2.62	245	0.171
8	DL-8E-IAS-126	0.13	2.62	241	0.206
13	DL-13E-IAS-127	0.23	2.62	242	0.362
15	DL-15E-IAS-128	0.13	2.62	243	0.204
18	DL-18E-IAS-129	0.14	2.62	243	0.220
19	DL-19E-IAS-130	0.26	2.62	244	0.406
23	DL-23E-IAS-131	0.15	2.62	246	0.232
26	DL-26E-IAS-132	0.1	2.62	248	0.154
Blank	DL-OUT-IAS-134	0	2.62	243	0
QA/QC Sample - Field Duplicate					
4	DL-4ED-IAS-133	0.2	2.62	242	0.315

Table 2-2
Summary of Indoor Air Sample Results - Dubois Library
UMass Amherst

Floor	Air Sample	PCB Concentration (µg/cartridge)	Flow Rate (L/Minute)	Duration (minutes)	PCB Concentration (µg/m^3)
Post PCB Remediation Indoor Air Samples October 11, 2013					
4	DL-4E-IAS-135	0.33	2.63	240	0.529
5	DL-5E-IAS-136	0.12	2.63	241	0.191
8	DL-8E-IAS-137	0.22	2.64	240	0.351
13	DL-13E-1AS-138	0.50	2.62	240	0.803
15	DL-15E-IAS-139	0.30	2.63	241	0.478
18	DL-18E-IAS-145	0.31	2.63	240	0.496
19	DL-19E-IAS-140	0.60	2.64	240	0.959
23	DL-23E-IAS-141	0.35	2.62	242	0.559
26	DL-26E-IAS-142	0.23	2.65	242	0.362
Blank	DL-OUT-IAS-144	0.00	2.60	240	<0.0081
QA/QC Sample - Field Duplicate					
4	DL-4ED-IAS-143	0.21	2.63	241	0.335
Post PCB Remediation Indoor Air Samples February 24, 2014					
4	DL-4E-IAS-147	0.2	2.57	242	0.325
13	DL-13E-1AS-148	0.32	2.60	243	0.513
19	DL-19E-IAS-149	0.32	2.56	240	0.526
23	DL-23E-IAS-150	0.19	2.59	240	0.309
QA/QC Sample - Field Duplicate					
23	DL-4ED-IAS-151	0.36	2.55	240	0.36
Post PCB Remediation Indoor Air Samples July 22, 2014					
4	DL-4E-IAS-201	0.24	2.62	240	0.391
13	DL-13E-IAS-203	0.32	2.67	243	0.506
19	DL-19E-IAS-204	0.37	2.71	244	0.575
23	DL-23E-IAS-205	0.36	2.76	243	0.552
QA/QC Sample - Field Duplicate					
4	DL-4ED-IAS-202	0.26	2.74	242	0.40
Post PCB Remediation Indoor Air Samples October 10, 2014					
4	DL-4E-IAS-201	0.3	2.56	240	0.496
13	DL-13E-IAS-203	0.37	2.69	240	0.586
19	DL-19E-IAS-204	0.39	2.61	240	0.636
23	DL-23E-IAS-205	0.27	2.62	240	0.436
QA/QC Sample - Field Duplicate					
4	DL-4ED-IAS-202	0.38	2.64	240	0.614

Notes:
Project Specific Risk-based Action Level as specified in the *Risk-Based Disposal and Cleanup PCB Remediation Plan* for the Dubois Library dated March 2010.
Air samples collected in accordance with USEPA Compendium Method TO-10A "Determination of Pesticides and Polychlorinated Biphenyls In Ambient Air Using Low Volume Polyurethane Foam (PUF) Sampling Followed by Gas Chromatographic/Multi-Detector Detection (GC/MD)" and submitted for laboratory analysis of PCBs homologs.
µg/m^3 = micrograms per cubic meter
J/UJ = Analytical results qualified as estimated based on external data validation of individual homolog groups.

Attachment 3 – Southwest Concourse

Attachment 3 – Southwest Concourse Area
Long-Term Maintenance and Monitoring Program
In-Place Management of PCB Impacted Materials
UMass Amherst

Location: Southwest Concourse Area

Areas: Hampshire Plaza, Berkshire Plaza, Washington Plaza, MacKimme House/Stonewall Center

Summary of Remedial Areas

In-Place Management: Residual PCBs on building walls and retaining walls are being managed in place at concentrations > 1 ppm following removal of caulking, soils, and concrete decking along retaining walls and ground level structures throughout the Southwest Concourse Area as follows:

- Retaining Walls and Ground Level Structures (maximum residual PCB concentrations in masonry was 292 parts per million [ppm]):
    - Planned Sub-grade areas – Concrete materials formerly in direct contact with the caulked joint, to a minimum distance of 12 inches below the caulked joint, and to a distance equivalent to the planned final finished grade above the caulked joint (if the final grade was above the former caulked joint) were encapsulated with two coats of tan Sikagard 62 colored epoxy.
    - Planned Above-grade areas – Concrete materials to a minimum distance of 12 inches above the caulked joint or planned finished grade were encapsulated with two coats of clear Sikagard 670W acrylic coating.

- Concrete Ceiling of Pedestrian Tunnel (maximum residual PCB concentration in masonry was 309 ppm) – Concrete materials formerly in direct contact with the caulking and to a lateral distance of 12 inches from the caulked joint were encapsulated with two coats of tan Sikagard 62 epoxy coating. Following application of the epoxy, a new bead of caulking was installed within the joint and a final top coat of a white elastomeric acrylic coating was applied to the entire tunnel ceiling.

The locations of the encapsulated surfaces are depicted on Figure 3-1 and typical applications are shown in the photos below.

Typical Retaining Wall Application

Typical Stair Application
(shadow from railing visible as dark area)

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Long-Term Maintenance and Monitoring Program
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Baseline Verification Data Summary: Initial baseline wipe samples were collected in July and August 2010 (majority of the Southwest Concourse Area) and in July and August 2011 (areas included in the PCB Remediation Plan Amendment). A summary of analytical results from the baseline sampling is as follows:

- Sikagard 62 Epoxy Encapsulated Surfaces – 67 of 69 samples reported as non-detect (the two samples of former direct contact materials in the pedestrian tunnel reported PCBs at concentrations of 7.16 and 24 µg/100 cm^2; however, these areas were subsequently covered with a new bead of caulking and a final acrylic coat).
- Sikagard 670W Acrylic Coating Encapsulated Surfaces – 64 of 64 samples collected from above grade locations were reported as non-detect (< 1.0 µg/100 cm^2).
- Encapsulated Concrete Building Foundations (July and August 2011) – 6 of 7 samples collected at grade (both epoxy and clear coated surfaces) reported as non-detect and one sample reported at a concentration of 4 µg/100 cm^2; however, materials in this area were recoated and results from the follow-up wipe samples indicated PCBs were non-detect (< 1.0 µg/100 cm^2).

Monitoring and Maintenance Implementation Plan

The Monitoring and Maintenance Implementation Plan (MMIP) was submitted to EPA in December 2010 with a final response to comments on the plan submitted in January 2011. The MMIP includes visual inspection and wipe sampling of encapsulated surfaces to be conducted during each event. A summary of the inspection and monitoring requirements is as follows:

Verification wipe sampling for each of the encapsulated surfaces will be conducted using a hexane-soaked wipe following the standard wipe test procedures described in 40 CFR 761.123. Samples will be collected as follows:

- Concrete Structures (retaining walls and ground surface structures):
    - Sub-grade areas (Sikagard 62 epoxy) – Given the inaccessibility to these areas and that all 67 baseline wipe samples were non-detect for PCBs, no long term monitoring samples were proposed from these areas. However, due to modifications to the final site grade during construction, areas encapsulated with the Sikagard 62 liquid epoxy coating remain visible above grade over select portions of the Southwest Concourse. As such, both visual inspections of the epoxy coating and collection of verification wipe samples have been added to the program similar to the planned above grade areas; and
    - Above-grade areas (Sikagard 670W acrylic) – Nine wipe samples from randomly selected locations throughout the concourse area are to be collected. One sample will be collected from each type of concrete structure (retaining walls, building walls, walls along stairs) within each of the three major subdivisions of the concourse area (Hampshire Plaza, Berkshire Plaza, and Washington Plaza).
- Concrete Ceiling of the Pedestrian Tunnel – Two wipe samples will be collected from materials within the tunnel as follows:
    - One sample from the new caulking; and
    - One sample from the adjacent coated concrete.

Monitoring Activities – August 2012

Visual inspection and verification wipe sampling of encapsulated surfaces was conducted in accordance with the MMIP as described above between August 15, 2012 and August 20, 2012 and on January 4, 2013. Results of the monitoring activities are summarized below:

Visual Inspection: Results of the visual inspections are as follows:

- Sikagard 62 Liquid Epoxy: The visual inspection conducted found no evidence of significant peeling, breakage, or brittleness of the coating. However, some damage was observed at a few isolated exterior locations. Areas of observed deterioration appear to be related to physical impacts to the coating (e.g., impacts from a metal grate at the Kennedy House). Locations of these areas are depicted on Figure 3-1.
- Sikagard 670W: Visual inspection of the clear acrylic coating indicated that the coating remains in good condition over the majority of the encapsulated surfaces. Where present, areas of flaking and peeling were limited to isolated areas typically 4 to 6 inches in size (some areas were observed up to 1 foot in size). More widespread flaking and peeling was observed at two locations: the concrete retaining wall north of the Cance House, and the concrete building wall on the northeast face of the southwest end of the MacKimme House. In addition, areas of flaking and peeling of the Sikagard 670W on the concrete building wall on the southeast corner of the Crampton House appeared to be co-located with areas of visible concrete efflorescence (note, concrete efflorescence was also observed on this building wall outside the limits of the clear coat application).

  The locations in which flaking and peeling were observed are depicted on Figure 3-1 (Note: the areas depicted are intended to indicate concrete surfaces on which limited areas of flaking and peeling described above were observed).
- Concrete Ceiling of Pedestrian Tunnel: Visual inspection indicated that the coatings and caulking installed within the joint were in good condition. No deterioration was observed.

Verification Wipe Samples: Verification wipe samples were collected from concrete surfaces coated with the Sikagard 62 liquid epoxy coating and the Sikagard 670W clear acrylic coating in the Southwest Concourse area and from concrete coated with the Sikagard 62 liquid epoxy coating, caulking, and a final elastomeric acrylic coating in the pedestrian tunnel. Wipe samples were collected from coated surfaces without observed flaking and peeling. Analytical results are presented in Table 3-1. A summary of the samples collected is as follows:

- Sikagard 62 Liquid Epoxy: Wipe samples were collected from representative locations within each of the three main plazas in the Southwest Concourse area. A total of eight wipe samples were collected from concrete retaining walls (2 samples), building walls (3 samples), and concrete along stairs (3 samples). Analytical results were as follows:
  - PCBs were either non-detect (six samples at < 0.20 µg/100 cm^2) or at a concentration < 1 µg/100 cm^2 (total PCBs reported as 0.24 µg/100 cm^2) in seven of the eight samples collected; and
  - PCBs were reported at a concentration > 1 µg/100 cm^2 in sample LTM-SWC-VWC-020 collected from concrete along a stairway in the Washington Plaza with a reported concentration of 1.4 µg/100 cm^2.
- Sikagard 670W: One wipe sample was collected from each of the three main divisions of concrete surfaces in each of the three plazas within the Southwest Concourse area (total of nine samples). Analytical results indicated that PCBs were non-detect (< 0.20 µg/100 cm^2) in all nine samples collected.
- Concrete Ceiling of Pedestrian Tunnel: One wipe sample was collected from the caulked joint and one wipe sample was collected from coated concrete adjacent to the joint. Analytical results indicated that PCBs were non-detect (< 0.20 µg/100 cm^2) in the sample collected from the adjacent concrete and 1.6 µg/100 cm^2 in the sample from the new caulking.

Monitoring Activities – October 2013

Visual inspection and verification wipe sampling of encapsulated surfaces was conducted in accordance with the MMIP as described above on October 10, 2013. Results of the monitoring activities are summarized below:

Visual Inspection: Results of the visual inspections are as follows:

- Sikagard 62 Liquid Epoxy: The visual inspection conducted found no evidence of significant peeling, breakage, or brittleness of the coating. Some damage in isolated was observed which was consistent with August 2012 observations.
- Sikagard 670W: Visual inspection of the clear acrylic coating indicated that the coating condition remains consistent with the August 2012 observations.
- Concrete Ceiling of Pedestrian Tunnel: Visual inspection indicated that the coatings and caulking installed within the joint were in good condition. No deterioration was observed.

Verification Wipe Samples: Verification wipe samples were collected from concrete surfaces coated with the Sikagard 62 liquid epoxy coating and the Sikagard 670W clear acrylic coating in the Southwest Concourse area and from concrete coated with the Sikagard 62 liquid epoxy coating, caulking, and a final elastomeric acrylic coating in the pedestrian tunnel. Analytical results are presented on Table 3-1. A summary of the samples collected is as follows:

- Sikagard 62 Liquid Epoxy: Wipe samples were collected from representative locations within each of the three main plazas in the Southwest Concourse area. A total of eight wipe samples were collected from concrete retaining walls (2 samples [no epoxy on retaining walls is exposed in the Washington Plaza), building walls (3 samples), and concrete along stairs (3 samples). Analytical results were as follows:
    - PCBs were either non-detect (six samples at < 0.20 µg/100cm^2) or at a concentration < 1 µg/100cm^2 (total PCBs reported as 0.46 µg/100 cm^2) in seven of the eight samples collected; and
    - PCBs were reported at a concentration > 1 µg/100 cm^2 in sample LTM-SWC-VWC-027 collected from concrete along a stairway in the Washington Plaza with a reported concentration of 2.4 µg/100 cm^2. This result is consistent with the results from wipe sampling of the same area in 2012 where PCBs were reported at a concentration of 1.4 µg/100cm^2.
- Sikagard 670W: One wipe sample was collected from each of the three main divisions of concrete surfaces in each of the three plazas within the Southwest Concourse area (total of nine samples). Of these, three were collected from areas of observed flaking/peeling of the coating. Analytical results from the six samples collected from areas with intact clear coating indicated that PCBs were non-detect (< 0.20 µg/100cm^2). Analytical results from the three samples collected from areas of observed flaking/peeling indicated that PCBs were non-detect (2 samples at < 0.20 µg/100cm^2) and present at a concentration of 0.34 µg/100cm^2. The sample with the reported concentration of 0.34 µg/100cm^2 was collected at a location with observed efflorescence from the concrete building wall.
- Concrete Ceiling of Pedestrian Tunnel: One wipe sample was collected from the caulked joint and one wipe sample was collected from coated concrete adjacent to the joint. Analytical results were consistent with those reported in 2012 and indicated that PCBs were non-detect (< 0.20 µg/100 cm^2) in the sample collected from the adjacent concrete and 2.7 µg/100 cm^2 in the sample from the new caulking.

Monitoring Activities – July 2014

Visual inspection and verification wipe sampling of encapsulated surfaces was conducted in accordance with the MMIP as described above on July 22, 2014. Results of the monitoring activities are summarized below:

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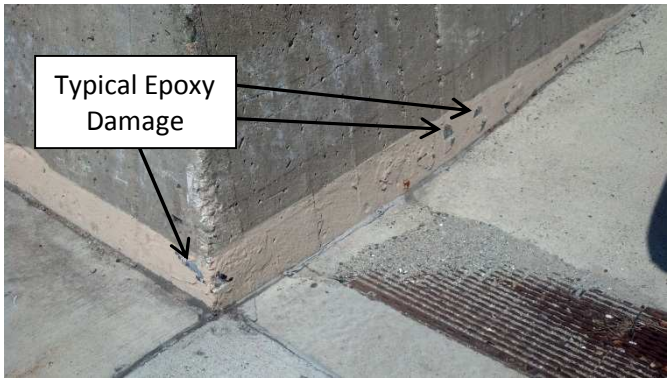
Visual Inspection: Results of the visual inspections are as follows:

- Sikagard 62 Liquid Epoxy: The visual inspection conducted found no evidence of significant peeling, breakage, or brittleness of the coating. However, some damage was observed at a few isolated exterior locations including areas not previously observed during the 2012 or 2013 monitoring. Locations of these areas are depicted on Figure 3-1 and an example of one of the damaged areas is shown in the adjacent photo.



- Sikagard 670W: Visual inspection of the clear acrylic coating indicated that the coating condition remains in good condition over the majority of the encapsulated surfaces. Overall, areas of flaking and pealing remain generally consistent with 2012 and 2013 observations. The locations in which isolated flaking and peeling were observed are depicted on Figure 3-1.
- Concrete Ceiling of Pedestrian Tunnel: Visual inspection indicated that the coatings and caulking installed within the joint were in good condition. No deterioration was observed.

Verification Wipe Samples: Verification wipe samples were collected from concrete surfaces coated with the Sikagard 62 liquid epoxy coating and the Sikagard 670W clear acrylic coating in the Southwest Concourse area and from concrete coated with the Sikagard 62 liquid epoxy coating, caulking, and a final elastomeric acrylic coating in the pedestrian tunnel. The locations of the verification wipe samples are presented on Figure 3-1. Analytical results are presented in Table 3-1. A summary of the samples collected is as follows:

- Sikagard 62 Liquid Epoxy: Wipe samples were collected from representative locations within each of the three main plazas in the Southwest Concourse area. A total of eight wipe samples were collected from concrete retaining walls (2 samples [no epoxy on retaining walls is exposed in the Washington Plaza), building walls (3 samples), and concrete along stairs (3 samples). Analytical results were as follows:
    - PCBs were either non-detect (seven samples at < 0.20 µg/100cm^2) or at a concentration < 1 µg/100cm^2 (total PCBs reported as 0.24 µg/100 cm^2) in the eight verification wipe samples collected.
- Sikagard 670W: One wipe sample was collected from each of the three main divisions of concrete surfaces in each of the three plazas within the Southwest Concourse area (total of nine samples). Of these, three were collected from areas of observed flaking/peeling of the coating. Analytical results indicated that PCBs were non-detect (< 0.20 µg/100cm^2) in the nine samples collected.
- Concrete Ceiling of Pedestrian Tunnel: One wipe sample was collected from the caulked joint and one wipe sample was collected from coated concrete adjacent to the joint. Analytical results were consistent with those reported in 2012 and 2013 and indicated that PCBs were non-detect (< 0.20 µg/100 cm^2) in the sample collected from the adjacent concrete and 1.9 µg/100 cm^2 in the sample from the replacement caulking.

Based on these results, the liquid coatings applied to concrete surfaces in the Southwest Concourse and the pedestrian tunnel continue to be effective in encapsulating residual PCBs in masonry. The sample which detected PCBs > 1 µg/100 cm^2 (1.9 µg/100 cm^2) will continue to be monitored. This area has a lower probability of access given its location (Pedestrian Tunnel ceiling).

Corrective Actions

As described in the 2012 and 2013 long term monitoring and maintenance report, the development of a pilot test was being considered to evaluate alternatives for additional coatings based on the observed flaking and peeling of the clear coat in some areas. Given the minimal additional flaking and peeling observed between 2012 and 2014, it is believed that these areas observed to date are due to conditions at the time of application and not weathering of the coating over time. As such, and based on the limited flaking and peeling in select areas that has been observed along with the results of the wipe testing described above (all results non-detect or < 1 µg/100cm^2), these areas will continue to be included for monitoring during 2015.

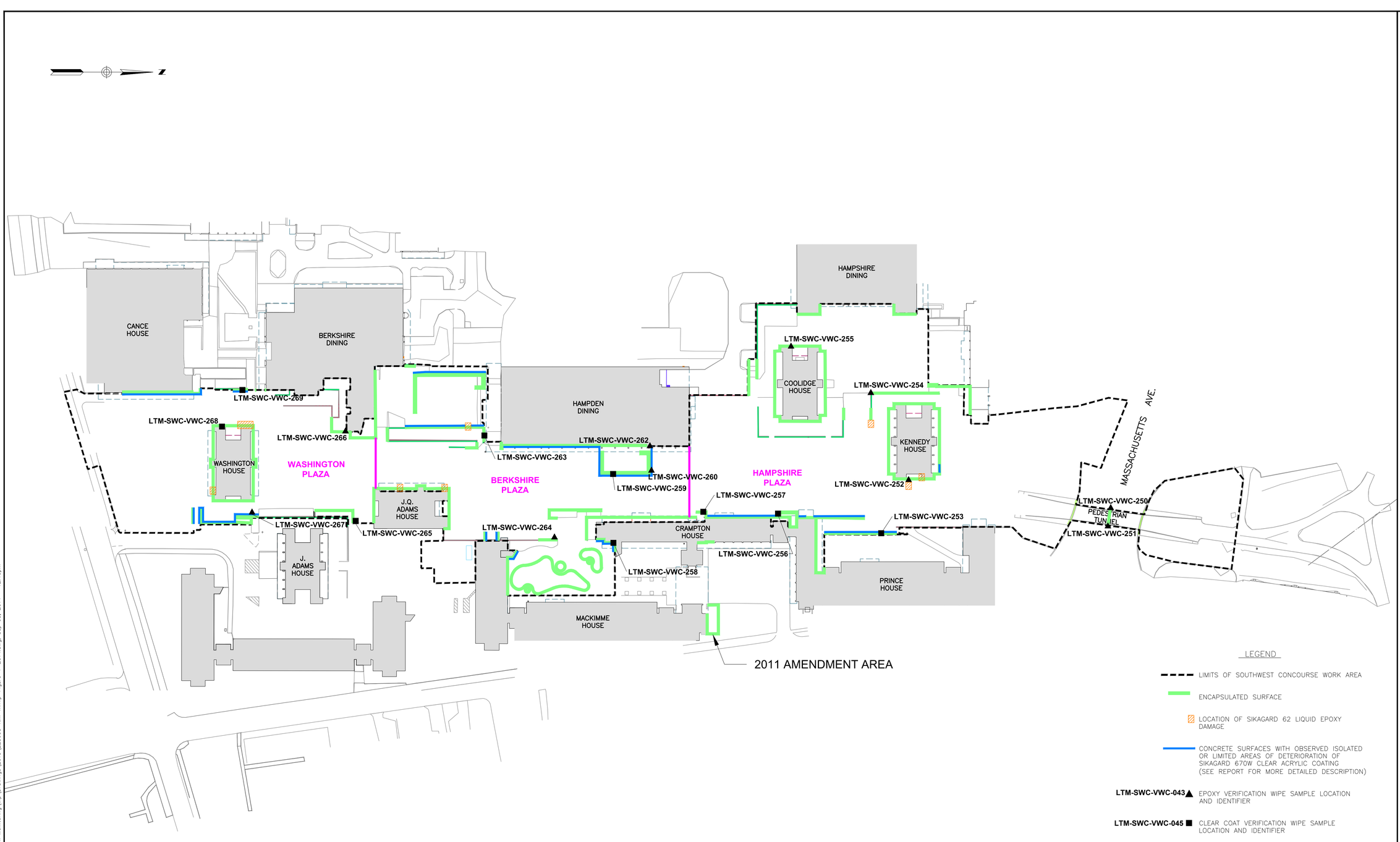
Proposed Monitoring Frequency

If surface wipe sampling results are consistent in 2015, it will be proposed to modify the sampling frequency to every other year while maintaining visual inspections on an annual basis.

Table 3-1
Summary of Long Term Monitoring Wipe Samping Results - Southwest Concourse
UMass Amherst

Coating/Area	Surface	2012 Verification Wipes			2013 Verification Wipes			2014 Verification Wipes			Comment
		Sample Date	Sample ID	Total PCBs (ug/100cm^2)	Sample Date	Sample ID	Total PCBs (ug/100cm^2)	Sample Date	Sample ID	Total PCBs (ug/100cm^2)	
Southwest Concourse - Epoxy Coatings											
Washington Plaza	Building Wall	8/20/2012	LTM-SWC-VWC-017	0.24	--	--	--	--	--	--	
		--	--	--	10/10/2013	LTM-SWC-VWC-028	< 0.20	--	--	--	
		--	--	--	--	--	--	7/22/2014	LTM-SWC-VWC-266	<0.20	
	Retaining Wall	--	--	--	--	--	--	--	--	--	No epoxy observed on retaining walls above grade within Washington Plaza therefore sample location not warranted.
	Stairs	8/15/2012	LTM-SWC-VWC-020	1.4	10/10/2013	LTM-SWC-VWC-027	2.4	7/22/2014	LTM-SWC-VWC-267	0.24	2014 sample location coincides with 2012 and 2013 sample.
Berkshire Plaza	Building Wall	8/15/2012	LTM-SWC-VWC-015	< 0.20	--	--	--	--	--		
		--	--	--	10/10/2013	LTM-SWC-VWC-033	< 0.20	--	--		
		--	--	--	--	--	--	7/22/2014	LTM-SWC-VWC-262	<0.20	
	Retaining Wall	8/15/2012	LTM-SWC-VWC-012	< 0.20	--	--	--	--	--		
		--	--	--	10/30/2013	LTM-SWC-VWC-046	< 0.20	--	--		
		--	--	--	--	--	--	7/22/2014	LTM-SWC-VWC-260	<0.20	
	Stairs	8/15/2012	LTM-SWC-VWC-013	< 0.20	--	--	--	--	--	--	
		--	--	--	10/10/2013	LTM-SWC-VWC-035	< 0.20	--	--	--	
		--	--	--	--	--	--	7/22/2014	LTM-SWC-VWC-264	<0.20	
Hampshire Plaza	Building Wall	8/15/2012	LTM-SWC-VWC-005	< 0.20	--	--	--	--	--	--	
		--	--	--	10/10/2013	LTM-SWC-VWC-040	< 0.20	--	--	--	
		--	--	--	--	--	--	7/22/2014	LTM-SWC-VWC-255	<0.20	
	Retaining Wall	8/15/2012	LTM-SWC-VWC-007	< 0.20	--	--	--	--	--	--	
		--	--	--	10/10/2013	LTM-SWC-VWC-041	0.46	--	--	--	
		--	--	--	--	--	--	7/22/2014	LTM-SWC-VWC-254	<0.20	
	Stairs	8/15/2012	LTM-SWC-VWC-009	<0.20	--	--	--	--	--	--	
		--	--	--	10/10/2013	LTM-SWC-VWC-038	< 0.20	--	--	--	
		--	--	--	--	--	--	7/22/2014	LTM-SWC-VWC-252	<0.20	
Southwest Concourse - Acrylic Coatings											
Washington Plaza	Building Wall	8/15/2012	LTM-SWC-VWC-018	< 0.20	--	--	--	--	--	--	
		--	--	--	10/10/2013	LTM-SWC-VWC-031	< 0.20	--	--	--	
		--	--	--	--	--	--	7/22/2014	LTM-SWC-VWC-268	<0.20	
	Retaining Wall	8/15/2012	LTM-SWC-VWC-019	< 0.20	--	--	--	--	--	--	
		--	--	--	10/10/2013	LTM-SWC-VWC-029	< 0.20	--	--	--	2013 sample collected from area of observed flaking/peeling
		--	--	--	--	--	--	7/22/2014	LTM-SWC-VWC-269	<0.20	2014 sample collected from area of observed flaking/peeling
	Stairs	8/15/2012	LTM-SWC-VWC-021	< 0.20	--	--	--	--	--	--	
		--	--	--	10/10/2013	LTM-SWC-VWC-030	< 0.20	--	--	--	
		--	--	--	--	--	--	7/22/2014	LTM-SWC-VWC-265	<0.20	
Berkshire Plaza	Building Wall	8/15/2012	LTM-SWC-VWC-016	< 0.20	--	--	--	--	--	--	
		--	--	--	10/10/2013	LTM-SWC-VWC-036	0.34	--	--	--	2013 sample collected from area of observed flaking/peeling and efflorescence
		--	--	--	--	--	--	7/22/2014	LTM-SWC-VWC-258	<0.20	2014 sample collected from area of observed flaking/peeling and efflorescence
	Retaining Wall	8/15/2012	LTM-SWC-VWC-011	< 0.20	--	--	--	--	--	--	
		--	--	--	10/10/2013	LTM-SWC-VWC-037	< 0.20	--	--	--	
		--	--	--	--	--	--	7/22/2014	LTM-SWC-VWC-259	<0.20	
	Stairs	8/15/2012	LTM-SWC-VWC-014	< 0.20	--	--	--	--	--	--	
		--	--	--	10/10/2013	LTM-SWC-VWC-032	< 0.20	--	--	--	
		--	--	--	--	--	--	7/22/2014	LTM-SWC-VWC-263	<0.20	
Hampshire Plaza	Building Wall	8/15/2012	LTM-SWC-VWC-006	< 0.20	--	--	--	--	--	--	
		--	--	--	10/10/2013	LTM-SWC-VWC-039	< 0.20	--	--	--	
		--	--	--	--	--	--	7/22/2014	LTM-SWC-VWC-256	<0.20	
	Retaining Wall	8/15/2012	LTM-SWC-VWC-008	< 0.20	--	--	--	--	--	--	
		--	--	--	10/10/2013	LTM-SWC-VWC-042	< 0.20	--	--	--	2013 sample collected from area of observed flaking/peeling
		--	--	--	--	--	--	7/22/2014	LTM-SWC-VWC-253	<0.20	2014 sample collected from area of observed flaking/peeling
	Stairs	8/15/2012	LTM-SWC-VWC-010	< 0.20	--	--	--	--	--	--	
		--	--	--	41563	LTM-SWC-VWC-045	< 0.20	--	--	--	
		--	--	--	--	--	--	7/22/2014	LTM-SWC-VWC-257	<0.20	
Southwest Concourse - Pedestrian Tunnel											
Sika 550W White	Expansion Joint Caulking	8/15/2012	LTM-SWC-VWC-022	1.6	10/10/2013	LTM-SWC-VWK-043	2.7	7/22/2014	LTM-SWC-VWK-250	1.9	2014 sample location coincides with 2012 and 2013 sample.
	Adjacent Concrete	8/15/2012	LTM-SWC-VWC-023	< 0.20	--	--	--	--	--	--	
		--	--	--	10/10/2013	LTM-SWC-VWC-044	< 0.20	--	--	--	
		--	--	--	--	--	--	7/22/2014	LTM-SWC-VWC-251	<0.20	

Notes:
Samples submitted for PCB analysis via USEPA method 8082 with Soxhlet Extraction (3540C).
Wipe samples collected in accordance with the standard wipe test method of 40 CFR 761.123.
Total PCBs reported as Aroclor 1254and/or Aroclor 1260. No other Aroclors reported at concentrations above the minimum laboratory reporting limit.



LEGEND

- LIMITS OF SOUTHWEST CONCOURSE WORK AREA
- ENCAPSULATED SURFACE
- LOCATION OF SIKAGARD 62 LIQUID EPOXY DAMAGE
- CONCRETE SURFACES WITH OBSERVED ISOLATED OR LIMITED AREAS OF DETERIORATION OF SIKAGARD 670W CLEAR ACRYLIC COATING (SEE REPORT FOR MORE DETAILED DESCRIPTION)
- LTM-SWC-VWC-043 ▲ EPOXY VERIFICATION WIPE SAMPLE LOCATION AND IDENTIFIER
- LTM-SWC-VWC-045 ■ CLEAR COAT VERIFICATION WIPE SAMPLE LOCATION AND IDENTIFIER

0 60 120
SCALE IN FEET

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REV	DESCRIPTION	DATE
DESIGNED BY:	ALW	CHECKED BY: JAH
DRAWN BY:	EVR	225695-ltm-mmp-Figure1-1-2014.dwg

AREAS OF ENCAPSULATED SURFACES AND OBSERVED DETERIORATION

UNIVERSITY OF MASSACHUSETTS
AMHERST, MASSACHUSETTS

2014 SOUTHWEST CONCOURSE PCB MMP REPORT

JOB NO.: 225695.02
DATE: AUGUST 2014
SCALE: AS NOTED
SHEET: 1 OF 1

Figure 3-1

\\ANDOVER\Projects\225695 UMass Amherst - Long Term Monitoring\vip\Drawings\2013\225695-ltm-mmp-Figure1-1-2014.dwg, Sep 03, 2014 - 12:10pm

Attachment 4 – Orchard Hill Residential Complex

Attachment 4 – Orchard Hill Area
Long-Term Maintenance and Monitoring Program
In-Place Management of PCB Impacted Materials
UMass Amherst

Location: Orchard Hill Residential Area

Building: Webster, Field, and Grayson Houses

Summary of Remedial Areas

In-Place Management: Residual PCBs are being managed in place at concentrations > 1 ppm following abatement activities in the following locations:

Field and Grayson Houses

- Exterior Parapet Masonry Joints (2010): Following replacement of caulking along masonry joints at the upper parapet walls of the Field and Grayson Houses, two coats of Sikagard 62 liquid epoxy coating were applied to concrete materials formerly in direct contact with and to a distance of 6 inches from the joints in either direction (see the photograph to the right).

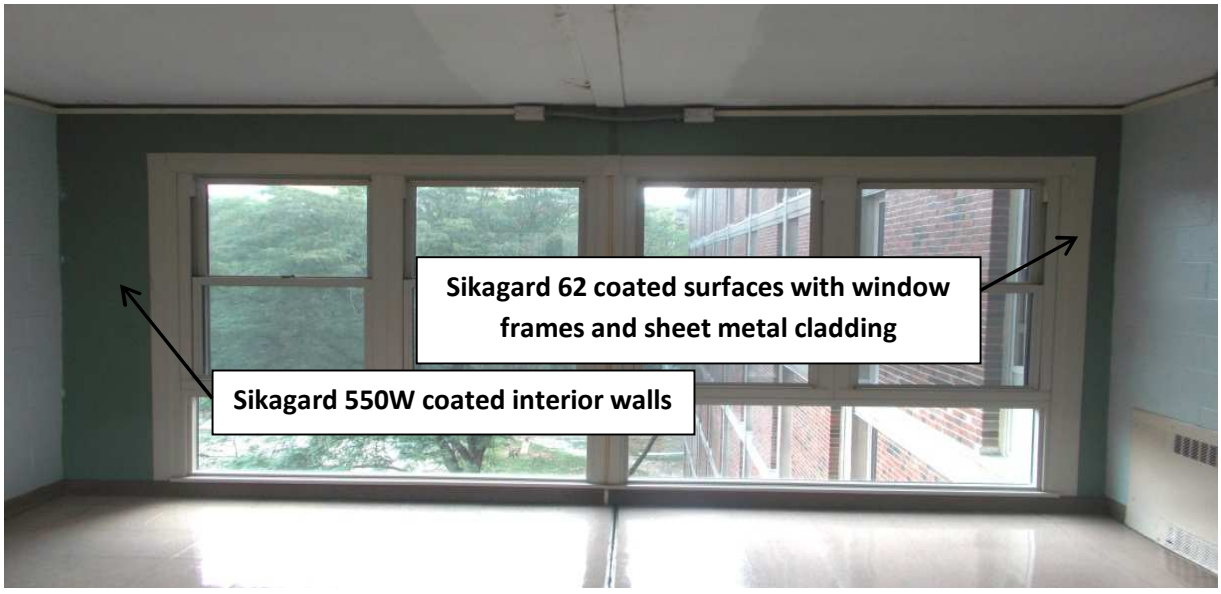
Locations of Typical Masonry Joints

- Elevator Hall CMU Block Walls (2012 and 2013): PCBs are being managed in place at > 1 ppm at the 6th floor elevator lobby of both Field and Grayson Houses following the removal of caulked joints around Type D windows (see Figure 4-1).
    - CMU block materials formerly in direct contact with the caulked joint (i.e., header surfaces) are encapsulated using two coats of Sikagard 62 epoxy coating and the replacement window frames/sheet metal flashing; and
    - CMU block materials above the upper horizontal joints to the first 90-degree angle (i.e., to the ceiling at a distance of approximately 15 inches) are encapsulated using two coats of Sikagard 550W elastomeric acrylic coating. (Note: Sikagard 550W was applied to the CMU block walls of all elevator lobbies as part of the renovation project).
- Concrete Spandrel Beams (2012 and 2013): Exterior concrete spandrel beam materials on the north and south elevations (located in line with the Elevator Hall Windows) formerly in direct contact with the concrete expansion joint caulking and to a distance of three inches in either direction have been encapsulated using two coats of Sikagard 62 epoxy coating (see Figure 4-1).
- Grayson House Exterior Narrow Stairwell Window Jambs (2012): Brick materials on the jambs of the northern stairwell west elevation narrow stairwell windows on the sixth and seventh floors formerly in direct contact with the exterior perimeter window caulking and to the end of the window recess (the first 90-degree angle) have been encapsulated using two coats of Sikagard 62 epoxy coating and the replacement window frames/sheet metal flashing (see Figure 4-1).
- Grayson House Interior Stairwell Concrete Sills (2012): Concrete window sill and header materials at the northern stairwell landings from the second through seventh floors formerly in direct contact with the interior perimeter window caulking and to the first 90-degree angle (approximately two inches) have been encapsulated using two coats of Sikagard 62 epoxy coating and the replacement window frames (see Figure 4-1).

- Field House Interior Stairwell Brick Jambs (2012): Brick window jamb materials at the southern stairwell landings from the second floor through seventh floors formerly in direct contact with the interior perimeter window caulking and to a distance of two inches (i.e., the extent of the replacement window frames) have been encapsulated using two coats of Sikagard 62 epoxy coating and the replacement window frames (see Figure 4-1).

Webster House

- Elevator Lobby Interior Walls (maximum residual PCB concentration in masonry 7.2 ppm) – Concrete materials formerly in direct contact with caulking and to a distance of four inches from the caulked joint were encapsulated with two coats of grey Sikagard 62 epoxy coating and subsequently covered by the newly installed metal window frames and sheet metal cladding. Remaining interior wall materials to the first 90-degree angle were encapsulated with two coats of green Sikagard 550W acrylic coating (see photograph below).
- Northwest Elevation Exterior Concrete Ceiling (maximum residual PCB concentration in masonry 4.3 ppm) – Materials formerly in direct contact with caulking along 100 linear feet (l.f.) of ribbon type windows on the northwest building elevation were encapsulated with two coats of grey Sikagard 62 epoxy coating and subsequently covered by the newly installed metal window frames (see Figure 4-2).



Webster House Elevator Lobby Walls

Baseline Verification Data Summary: A summary of the initial wipe sampling results for the encapsulated areas is presented below.

Attachment 4 – Orchard Hill Area
Long-Term Maintenance and Monitoring Program
In-Place Management of PCB Impacted Materials
UMass Amherst

Field and Grayson Houses

- Exterior Parapet Masonry Joints: Initial wipe samples of the exterior joints were collected in August 2010 following application of the Sikagard 62 epoxy. Analytical results from the 26 wipe samples collected indicated that PCBs were non-detect (24 samples at < 0.20 µg/100cm^2) or < 1 µg/100cm^2 (2 samples with total PCBs reported at concentrations of 0.44 and 0.90 µg/100cm^2).
- Elevator Hall CMU Block Walls:
    - Sikagard 62 Epoxy Coated Materials – In July 2012, prior to installation of the window frames and sheet metal cladding, one verification wipe sample was collected from the encapsulated surfaces. Analytical results reported PCBs as non-detect (< 0.20 µg/100cm^2).
    - Sikagard 550W Elastomeric Coated Materials – In August 2012 following completion of the renovation project, one verification wipe sample was collected from encapsulated materials above the 6th floor elevator hall windows. Analytical results indicated that PCBs were non-detect (< 0.20 µg/100cm^2).
- Concrete Spandrel Beams – Following application of the liquid coatings in August 2012 and July 2013, four verification wipe samples were collected from encapsulated surfaces of the concrete spandrel beams. Analytical results reported PCBs as non-detect (< 0.20 µg/100 cm^2) in the four samples.
- Grayson House Exterior Narrow Stairwell Window Jambs – In July 2013, prior to installation of the window frames, one verification wipe sample was collected from the encapsulated surfaces. Analytical results reported PCBs as non-detect (< 0.20 µg/100cm^2).
- Grayson House Interior Stairwell Concrete Sills - In July 2012, prior to installation of the window frames, one verification wipe sample was collected from the encapsulated surfaces. Analytical results reported PCBs as non-detect (< 0.20 µg/100cm^2).
- Field House Interior Stairwell Brick Jambs - In July 2012, prior to installation of the window frames, one verification wipe sample was collected from the encapsulated surfaces. Analytical results reported PCBs as non-detect (< 0.20 µg/100cm^2).

Webster House

- Elevator Hall Interior Walls:
    - Sikagard 62 Epoxy Coated Materials – In July 2011, prior to installation of the window frames and sheet metal cladding, six verification wipe samples were collected from encapsulated surfaces. Analytical results reported PCBs as non-detect (< 0.20 µg/100 cm^2) in the six samples collected.
    - Sikagard 550W Elastomeric Coated Materials – Six initial baseline wipe samples were collected in November 2011. Analytical results reported PCBs as non-detect (< 0.20 µg/100 cm^2) in all six samples.
- Northwest Elevation Exterior Concrete Ceiling Direct Contact Materials: Prior to installation of the sheet metal cladding, three verification wipe samples were collected from encapsulated surfaces. Analytical results reported PCBs as non-detect (< 0.20 µg/100 cm^2) in the three samples collected.

Monitoring and Maintenance Implementation Plan

The Monitoring and Maintenance Implementation Plans (MMIP) for the three buildings were submitted to EPA in January 2012 (Webster House) and in January 2014 (Field and Grayson Houses) and included visual inspections and verification wipe sampling of encapsulated surfaces.

Based on the baseline sample results (all non-detect for PCBs) and some encapsulated areas subsequently covered by window frames and sheet metal cladding, wipe sampling was limited to accessible surfaces. A summary of the monitoring plans is provided below:

Field and Grayson Houses

- Visual inspection of masonry joints along the roof lines from the ground. Due to the limited to no accessibility to these areas, verification wipe samples are not included in the long term monitoring. In areas where damage or deterioration of the encapsulant or caulking is observed, recommendations for corrective actions will be proposed.
- Visual inspections of the encapsulated surfaces will be conducted to look for signs of encapsulant deterioration and/or signs of weathering or disturbance of metal window frames and sheet metal barriers.
- Two surface wipe samples of the encapsulated concrete spandrel materials on the exterior side of the Elevator Hall Windows (Type D) will be collected to evaluate the concentration of PCBs present at the surface. The wipe samples will be collected from the portion of the joints between the first and second floors due to access limitations at higher locations (a lift would be required) as follows:
    - The specific joint on each building (north or south elevation) will be randomly selected; and
    - The side of the joint (right or left) will be randomly selected.
- One surface wipe sample of the encapsulated interior CMU block walls on the sixth floor of the Grayson and Field Houses elevator hall areas not located beneath the Type D window frames will be collected to evaluate the concentration of PCBs present at the surface. The wipe sample will be collected as follows:
    - The elevator lobby (either Grayson or Field) will be randomly selected;
    - The location of the wipe sample on the joint will be selected by randomly selecting a number between 0 and 12 (representing the upper 12 foot long horizontal joint) with the zero point assigned to the left end of the joint and proceeding to the right (i.e., 12 would be assigned to the right end of the joint); and
    - The distance of the wipe sample from the window frame will then be selected by randomly selecting a number from zero to 15 (representing the distance from the window to the ceiling in inches).
- No surface wipe samples will be collected from encapsulated surfaces formerly in direct contact with caulking at the Type G, H, and I Narrow Stairwell Windows or the Type J Stairwell Windows, as all encapsulated surfaces at these window types are located under the replacement window frames or sheet metal cladding. Direct contact access to these surfaces is prohibited by a secondary barrier (i.e., new windows and/or metal cladding installed over the encapsulant).

Attachment 4 – Orchard Hill Area
Long-Term Maintenance and Monitoring Program
In-Place Management of PCB Impacted Materials
UMass Amherst

Webster House

Based on the baseline sample results (all non-detect for PCBs) and encapsulated areas subsequently covered by window frames and sheet metal cladding associated with the new window installation, the only accessible coating is in areas at the interior CMU block walls in the elevator lobbies. Surface wipe samples of these encapsulated (Sikagard 550W) interior CMU block walls will be collected using a hexane-soaked wipe following the standard wipe test procedures described in 40 CFR 761.123. A total of three samples will be collected from randomly selected locations as follows:

- The specific floor and the side of the elevator hall to be sampled will be randomly selected using a random number generator;
- The location of the wipe sample on the joint will be selected by randomly selecting a number between 0 and 25 (representing the two 6.5 foot long vertical joints and the upper 12 foot long horizontal joint) with the zero point assigned to the bottom of the left vertical joint and proceeding clockwise around the window (i.e., 25 would be assigned to the bottom of the right vertical joint); and
- The distance of the wipe sample from the sheet metal cladding will then be selected by randomly selecting a number from zero to the total distance, in inches, to the first 90-degree angle.

Monitoring Activities – August 2012

- Field and Grayson Houses – On August 9, 2012, coated concrete materials associated with the roof line concrete joints were inspected for signs of deterioration or damage to the Sikagard 62 liquid epoxy coating. No areas of damaged, flaking, or peeling were observed. No corrective actions were required based on this inspection.
- Webster House – Monitoring activities were conducted on August 9, 2012. No signs of damage were observed to the sheet metal cladding and window frames on the northwest building elevation. Sheet metal cladding and liquid coatings in the elevator lobby areas were observed to be in good condition with no signs of wear or damage. Wipe samples were collected from the coated CMU block walls on the 3rd, 5th, and 7th floors. Analytical results were all non-detect (< 0.20 µg/100cm^2).

Monitoring Activities – September 2013

- Field and Grayson Houses – On September 3, 2013, coated concrete parapet materials were inspected for signs of deterioration or damage to the Sikagard 62 liquid epoxy coating. The visual inspection found no evidence of deterioration of the coating. However, some damage was observed at one joint on the west elevation of the Field House.
- Webster House - No signs of damage were observed to the sheet metal cladding and window frames on the northwest building elevation. Sheet metal cladding and liquid coatings in the elevator lobby areas were observed to be in good condition with no signs of wear or damage. Wipe samples were collected from the coated CMU block walls on the 2nd, 5th, and 6th floors. Analytical results were all non-detect.

Monitoring Activities – July 2014

- Field and Grayson Houses:
    - Exterior Parapet Masonry Joints – Coated concrete surfaces surrounding the exterior parapet masonry joints were inspected for damage. The visual inspection found no evidence of deterioration of the coating with the exception of the single joint identified at the roofline of Field House in 2013.

- Concrete Spandrel Beams – Coated concrete surfaces surrounding exterior spandrel beams were inspected for damage. The visual inspection found no evidence of deterioration of the coating. One surface wipe sample was collected from coated surfaces at the exterior spandrel beams at both buildings. Analytical results were non-detect (< 0.20 µg/100cm^2) as summarized on Table 4-1.
- Elevator Hall CMU Block Walls – Coated CMU block materials within the elevator lobby areas were inspected. A limited amount of the coating was observed to be missing on the surfaces within the Grayson House. One wipe sample was collected from the encapsulated surfaces within Field House. Analytical results indicated that PCBs were non-detect (< 0.20 µg/100cm^2) as summarized on Table 4-1.
- Stairwell Materials – Visual inspection of the windows and sheet metal cladding was conducted at the exterior narrow stairwell window jambs of the Grayson House and on the interior stairwell window concrete sills and brick jambs. No damage to the materials was observed.

- Webster House - No signs of damage were observed to the sheet metal cladding and window frames on the northwest building elevation. Sheet metal cladding and liquid coatings in the elevator lobby areas were observed to be in good condition with no signs of wear or damage. Wipe samples were collected from the coated CMU block walls on the 2nd, 4th, and 7th floors. Analytical results indicated that PCBs were non-detect (< 0.20 µg/100cm^2) as summarized on Table 4-1.

Corrective Actions

Based on the 2014 monitoring, touch-up paint will be applied to the damaged coating on the south wall of the Field House 6th floor elevator lobby and the epoxy coating on one exterior parapet wall masonry joint needs to be repaired. These activities will be performed as part of standard maintenance activities when conducted in these areas.

Proposed Monitoring Frequency

If surface wipe sampling results are consistent in 2015, it will be proposed to modify the sampling frequency to every other year and to maintain visual inspections on an annual basis.

Table 4-1
Summary of Long Term Monitoring Wipe Sampling Results - Orchard Hill
UMass Amherst

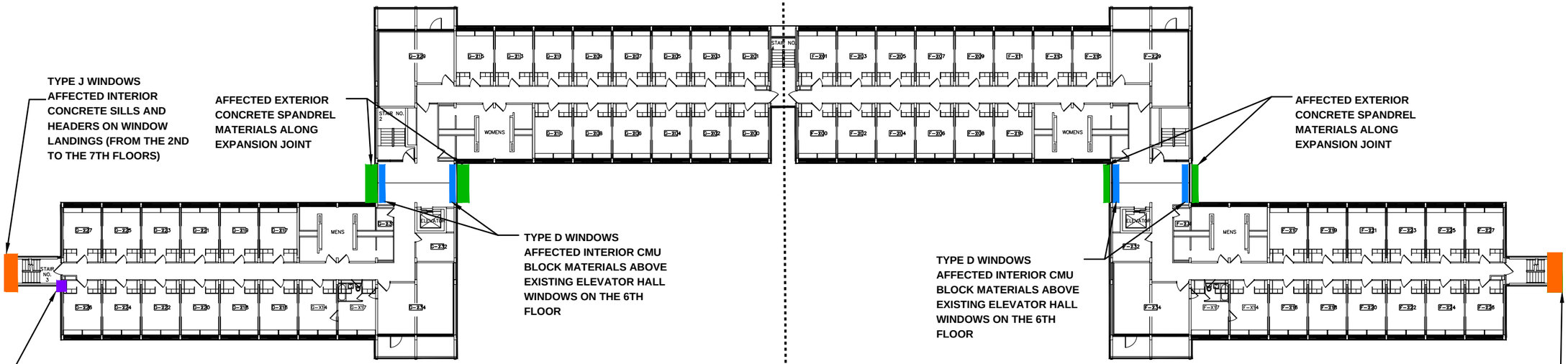
Coating/Area	Surface	Building	2012 Verification Wipes			2013 Verification Wipes			2014 Verification Wipes		
			Sample Date	Sample ID	Total PCBs ($ug/100cm^2$)	Sample Date	Sample ID	Total PCBs ($ug/100cm^2$)	Sample Date	Sample ID	Total PCBs ($ug/100cm^2$)
Sikagard 62 Epoxy	Exterior Spandrel Beams	Field House	--	--	--	--	--	--	7/22/2014	LTM-FH-VWC-228	< 0.20
		Grayson House	--	--	--	--	--	--	7/22/2014	LTM-GH-VWC-230	< 0.20
Sika 550W	Interior CMU Block Walls	Webster House	8/9/2012	LTM-WH-VWC-001	< 0.20	9/3/2013	LTWH-VWC-001	< 0.20	7/22/2014	LTM-WH-VWC-225	<0.20
			8/9/2012	LTM-WH-VWC-002	< 0.20	9/3/2013	LTWH-VWC-002	< 0.20	7/22/2014	LTM-WH-VWC-226	<0.20
			8/9/2012	LTM-WH-VWC-003	< 0.20	9/3/2013	LTWH-VWC-003	< 0.20	7/22/2014	LTM-WH-VWC-227	<0.20
		Field House	--	--	--	--	--	--	7/22/2014	LTM-FH-VWC-229	<0.20

Notes:
Samples submitted for PCB analysis via USEPA method 8082 with Soxhlet Extraction (3540C).
Wipe samples collected in accordance with the standard wipe test method of 40 CFR 761.123.

ENCAPSULATED BUILDING SURFACES

Grayson House

Field House



Notes:

1. Original design drawings by CBI Consulting, Inc. modified to show encapsulated building surfaces.
2. This drawing depicts the typical building layout for the second through seventh floors of the Grayson and Field Houses.

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ENCAPSULATED BUILDING SURFACES

DESIGNED BY: GJF
DRAWN BY: PF
CHECKED BY: GJF
224824-UMA-GRAYSON-U2-1*.dwg

UMASS GRAYSON & FIELD HOUSE
AMHERST, MASSACHUSETTS

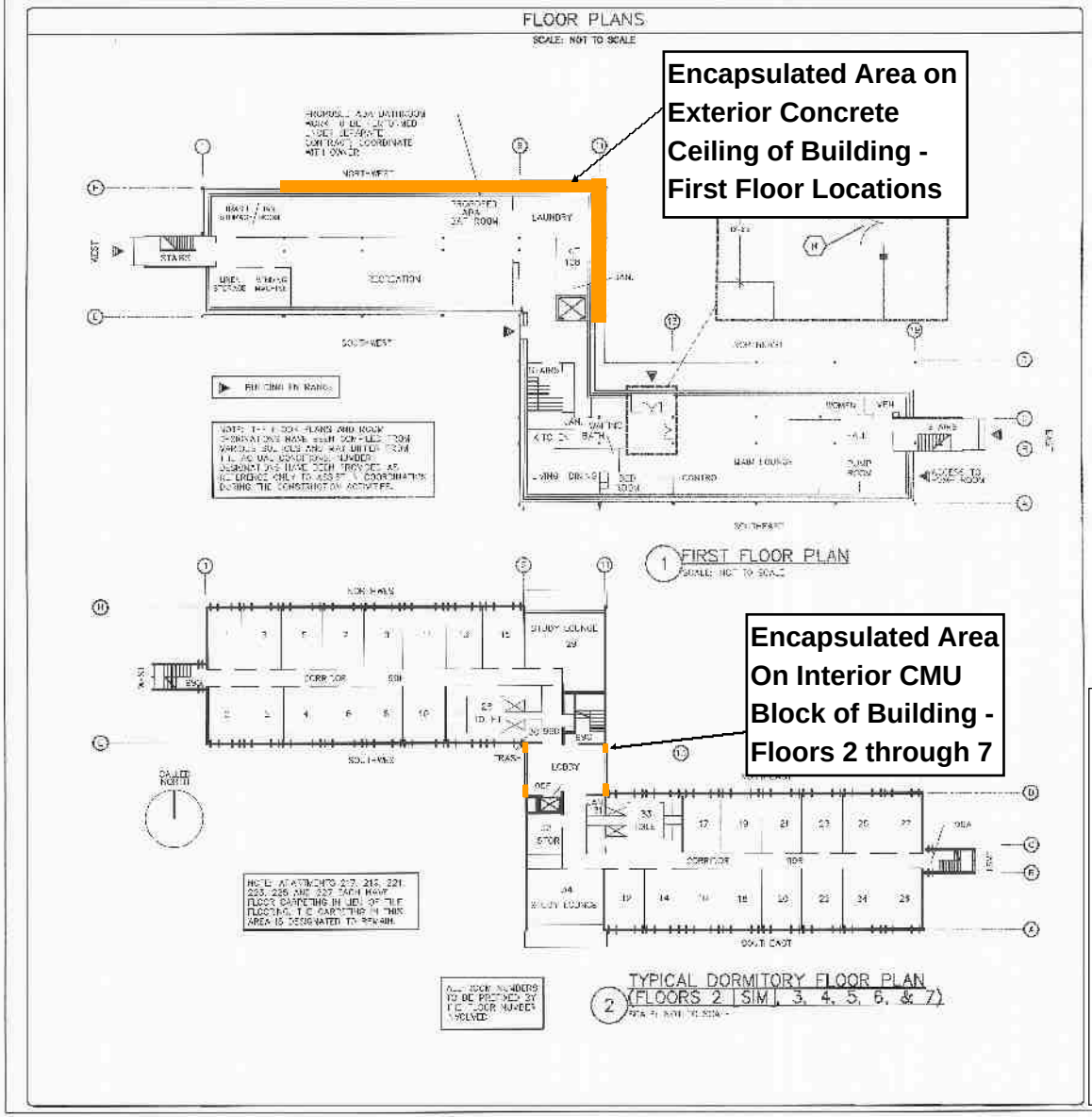
Long Term Monitoring and Maintenance Report

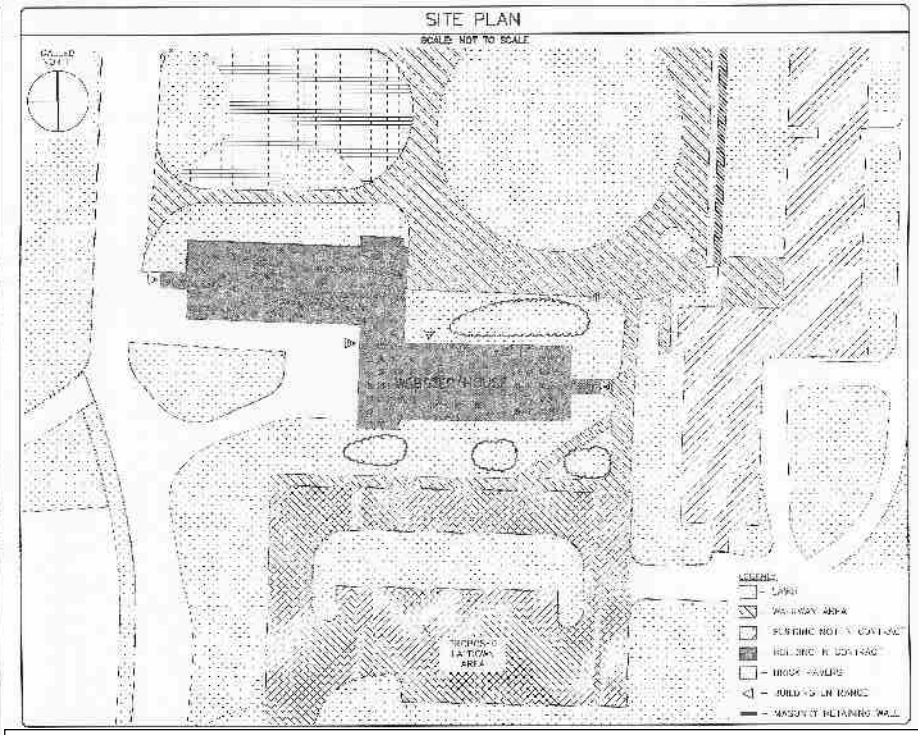
JOB NO: 224824.00
DATE: NOVEMBER 2013
SCALE: NONE

Figure 4-1

Figure 4-2 Encapsulated Building Surfaces
Webster House

Drawing details taken from Webster House Window Replacement drawing D-A-333-10-001711-01-T2 dated February 3, 2011 by Gale Associates, Inc. of Weymouth, Massachusetts.





Attachment 5 – Sylvan Residential Complex

Attachment 5 – Sylvan Residential Complex
Long-Term Maintenance and Monitoring Program
In-Place Management of PCB Impacted Materials
UMass Amherst

Location: Sylvan Residential Area

Building: Brown, Cashin, McNamara

Summary of Remedial Areas

In-Place Management: Residual PCBs are being managed in place at interior and exterior locations on the three buildings within the Sylvan complex. A summary of the locations is as follows:

- Exterior Locations – along horizontal and vertical expansion joints in both high occupancy areas (i.e., within 8'8" of the ground surface) and low occupancy areas (i.e., > 8'8" from the ground surface):
    - Exterior Brick Within the Return of Horizontal and Vertical Control Joints (20,690 l.f.) – Brick materials located within the return of the horizontal and vertical control joints were encapsulated with up to three coats of Sikagard 62 liquid epoxy coating and subsequently covered with replacement caulking.
    - Exterior Brick Adjacent to Horizontal Control Joints in High Occupancy Areas (860 l.f.) – One full row of brick above and three full rows of brick below horizontal control joints within 8' 8" of the ground surface were encapsulated with up to three coats of Sikagard 670W clear acrylic coating in high occupancy areas.
    - Exterior Brick Adjacent to Vertical Control Joints in High and Low Occupancy Areas (5,690 l.f.) – One full row of brick on either side of the vertical control joints were coated with up to three coats of Sikagard 670W clear acrylic coating in both high and low occupancy areas.
- Interior Locations – along former caulked joints and adjacent building materials as follows:
    - Interior Concrete Columns/Walls (352 s.f.) – Select interior concrete columns and walls at the Brown and McNamara Residences were coated with liquid coatings as part of the ADA restroom upgrades at the Brown and McNamara Residences and interior renovations to the lower level common areas at McNamara. Materials formerly in direct contact with the removed source materials were coated with two coats of Sikagard 62 liquid epoxy coating. Materials containing PCBs > 1 ppm away from the former source materials were coated with a minimum of two coats of Sikagard 670W acrylic, and/or Sikagard 550W elastomeric paint.
    - Interior Concrete Ceilings (835 s.f.) – Concrete ceilings outside the ADA Restroom upgrades at Brown and McNamara and the ceiling within the first floor common area (now the first floor office space) at Cashin were coated with liquid coatings. Materials formerly in direct contact with the source materials were coated with two coats of Sikagard 62 liquid epoxy coatings. Materials containing PCBs > 1 ppm away from the former source materials were coated with a minimum of two coats of Sikagard 670W acrylic and/or Sikagard 550W elastomeric paint.

Photographs of typical coating application areas are provided below.

Attachment 5 – Sylvan Residential Complex
Long-Term Maintenance and Monitoring Program
In-Place Management of PCB Impacted Materials
UMass Amherst

Typical Interior Encapsulated Surfaces
(Concrete Walls and Ceiling)

Typical Vertical and Horizontal Control Joints
(Caulking and Clear Coating Visible)

Baseline Verification Data Summary: Following remediation activities, baseline verification wipe samples were collected from encapsulated surfaces as follows:

- Exterior - former direct contact areas:
    - Horizontal control joints on the building's façade:
        - 83 wipe samples collected;
        - Of which 79 samples were reported as < 1 ug/100cm^2 total PCBs (95% of the samples); and
        - 4 samples > 1 ug/100cm^2 at 1,2, 1.3, 2.4, and 4.8 ug/100cm^2 (3 at McNamara and 1 at Cashin).
    - Vertical control joints on the building's façade:
        - 38 wipe samples collected;
        - Of which 23 samples were reported as < 1 ug/100cm^2 total PCBs (60% of the samples); and
        - 15 samples > 1 ug/100cm^2; 12 of the 15 samples were collected from McNamara (up to 250 ug/100cm^2), 1 at Brown (1.2 ug/100cm^2; and 2 at Cashin (1.15 and 3.5 ug/100cm^2).
- Exterior - areas away from the former caulked joints:
    - Horizontal control joints on the building's façade in high occupancy areas:
        - 19 wipe samples collected; and
        - All 19 samples were reported as < 1 ug/100cm^2 total PCBs (100%).
    - Vertical control joints on the building's façade:
        - 44 wipe samples collected;
        - Of which 35 samples were reported as < 1 ug/100cm^2 total PCBs (80%);
        - 9 samples > 1 ug/100cm^2; 8 of the 9 samples were collected from McNamara (up to 2.3 ug/100cm^2) and 1 at Brown (1.8 ug/100cm^2); and

- All baseline verification wipe samples from the interior encapsulated areas were below the target level of 1 ug/100cm^2 with the exception of three samples from McNamara (1.3, 1.5, and 1.6 ug/100cm^2).

As indicated above, most locations met the target levels (with some minor areas slightly above the target level) with the exception of the vertical control joints at McNamara. As data was reviewed during the McNamara exterior renovation project, additional measures were conducted including additional coats of epoxy and more frequent inspections. Given the limited size of the joints, observations indicated some of the backing material deep within the return of the narrow joint could not be removed without substantial damage to the façade; residual PCBs in this material may be affecting the epoxy wipe results; however, this material was subsequently covered by the epoxy, new backing material, and new caulking.

Monitoring and Maintenance Implementation Plan

The Monitoring and Maintenance Implementation Plan (MMIP) was submitted to EPA in February 2014 and included visual inspections and verification wipe sampling.

Visual inspections will be conducted on representative areas of each of the types of encapsulated surfaces to confirm the presence of the encapsulating coatings/barriers.

Surface wipe samples will be collected from select encapsulated surfaces to aid in determining the effectiveness of the encapsulants over time. Surface wipe samples will be collected using a laboratory-supplied gauze pad over a 100 square centimeter surface area. Wipe samples will be transported to the laboratory under standard chain of custody procedures, extracted by USEPA Method 3540C (Soxhlet) and analyzed for PCBs by USEPA Method 8082.

Encapsulated surfaces associated with the following locations have been selected for sampling as part of the long-term monitoring plan:

- Areas Adjacent to Exterior Façade Horizontal Control Joints in High Occupancy Areas (< 8'-8" ags) (860 l.f.) – 1 sample per building façade (total of 12 samples proposed; 4 per building);
- Areas Adjacent to Exterior Façade Vertical Control Joints in High Occupancy Areas (< 8' -8" ags) (878 l.f.) – 1 sample per building façade (total of 12 samples proposed; 4 per building);
- Interior Concrete Columns/Walls (Brown and McNamara) (352 s.f.) – 1 sample per work area (total of 3 samples proposed; 1 at Brown and 2 at McNamara); and
- Interior Concrete Ceilings (Brown, McNamara, and Cashin) (835 s.f.) – a total of five samples to be collected with a minimum of 1 sample per work area (1 at Brown; 2 at McNamara; and 2 at Cashin).

In summary, a total of 32 surface wipe samples will be collected from representative locations of the encapsulated surfaces. Where applicable, sample locations will be biased towards locations selected during baseline sampling activities.

Based on the criteria presented above, the rationale for excluding the remaining encapsulated surfaces from the sampling program is summarized below:

- Former Direct Contact Surfaces – no samples are proposed to be collected from surfaces in former direct contact with caulking based on the baseline epoxy wipe sample results and given that each of these surfaces are located beneath a secondary physical barrier (e.g., new caulking, drywall, etc.). The one exception to this condition is that given the baseline results from the exterior façade vertical joints at McNamara (12 samples with reported PCB concentrations > 1 µg/100cm^2), wipe samples are proposed to be collected from the caulking at the same 4 locations described above for the wipe samples to be collected from adjacent brick surfaces. This is proposed to be conducted during the first year of monitoring only with the results and recommendations provided in the first year report. In addition to the hexane saturated gauze

samples of the caulking, at each location a wipe sample will also be collected using a saline saturated gauze pad.

- Low-Occupancy Areas – as described above, no samples are proposed to be collected from exterior surfaces in low-occupancy areas (i.e., surfaces at heights greater than 8'-8" above ground surfaces) due to the low likelihood that these surfaces will be contacted by occupants or building users.

Monitoring Activities – July 2014

Visual inspection and verification wipe sampling of encapsulated surfaces was conducted in accordance with the MMIP as described above on July 22, 2014. In addition, due to internal laboratory quality control issues (low surrogate recoveries as described in Attachment 6), limited wipe sampling was conducted during a second site visit on August 20, 2014. Results of the monitoring activities are summarized below:

Visual Inspection: Results of the visual inspections are as follows:

- Exterior Expansion Joint Caulking: Visual inspection of the caulking within the horizontal and vertical controls joints indicated that the caulking was in good physical condition with no damaged or missing sections observed.
- Exterior Brick Surfaces: Visual inspection of the Sikagard 670W clear acrylic coating applied along the exterior horizontal and vertical controls joints indicated that the coating remains in good condition over the encapsulated surfaces.
- Interior Concrete Columns/Walls: Visual inspection indicated that coatings installed to masonry materials were in good condition. No deterioration was observed.
- Interior Concrete Ceilings: Visual inspection indicated that coatings installed to masonry materials were in good condition. No deterioration was observed.

Verification Wipe Samples: Verification wipe samples were collected from coated masonry surfaces as described above. Analytical results are presented in Table 5-1. A summary of the samples collected is as follows:

- Sikagard 670W Clear Acrylic Coating: Wipe samples were collected from brick along horizontal and vertical control joints within high occupancy areas at the three buildings. A total of 24 samples were collected (12 along vertical joints and 12 along horizontal joints) as follows:
    - Horizontal Control Joints – PCBs were reported as either non-detect (7 samples at < 0.20 µg/100cm^2) or present at concentrations < 1 µg/100cm^2 (5 samples with PCB reported at concentrations up to 0.58 µg/100cm^2). These results are consistent with the baseline data;
    - Vertical Control Joints – PCBs were reported as non-detect (4 samples at < 0.20 µg/100cm^2) or at concentrations ranging from 0.23 to 3.3 µg/100cm^2 (8 samples with an average reported concentration of 1.35 µg/100cm^2). Three of the four samples with reported concentrations > 1 µg/100cm^2 were collected from brick surfaces at the McNamara Residence. These results are consistent with the baseline data.
- Interior Concrete Columns/Walls: Three hexane wipe samples were collected from interior concrete columns/walls encapsulated with Sikagard 550W elastomeric coating (the final coating applied to interior concrete columns and walls). Analytical results from the samples indicated that PCBs were either non-detect (2 samples at < 0.20 µg/100cm^2) or present at a concentration of 0.75 µg/100cm^2.
- Interior Concrete Ceiling: Five hexane wipe samples were collected from interior concrete ceiling surfaces encapsulated with interior acrylic paint (the final coating applied over Sikagard 62 liquid epoxy and/or Sikagard 670w clear acrylic). Analytical results indicated that PCBs were either non-detect (3 samples at < 0.20 µg/100cm^2) or present at concentrations of 0.42 and 0.81 µg/100cm^2.

As indicated above, based on the baseline data, four wipe samples (one per building elevation) were collected from the surface of the replacement caulking at the McNamara building. Analytical results indicated that PCBs were present in the samples at concentrations of 13, 15, 30, and 53 µg/100cm^2. These results were consistent with the verification/baseline monitoring wipes collected at the completion of the project where analytical results had indicated that PCBs were present at a maximum concentration of 95 µg/100cm^2 on the surface of the liquid epoxy coating.

In addition to the hexane wipes, four saline wipes were collected from the locations co-located with the hexane wipe samples to evaluate alternative wipe sampling procedures to assess "surface" concentrations of PCBs to determine if the hexane was "extracting" or "pulling" the PCBs from within the porous caulking. Analytical results from the saline wipes indicated that PCBs were present at concentrations of 0.28, 0.88, 1.0, and 1.4 µg/100cm^2. Based on these results, the hexane wipes may not be truly representative of surficial PCBs that could be available for direct contact and/or leaching through normal anticipated pathways (e.g., incidental contact, rain water, etc.).

Corrective Actions

Although PCBs have been detected in wipe samples from the vertical joint replacement caulking at McNamara building, additional coatings could not have been applied during the remediation work given the project schedule and concerns that additional epoxy coatings could interfere with the proper installation of the replacement caulking. These areas have a low probability of direct contact given their location and the size of the joint (narrow joints approximately ½-inch wide). As such, no corrective actions will be conducted at this time and these conditions will continue to be monitored.

Proposed Monitoring Frequency

Based on the results of the 2014 monitoring and that this marks the first annual monitoring event, it is proposed to maintain visual inspections and verification wipe sampling on an annual basis.

Table 5-1
Summary of Long Term Monitoring Wipe Sampling Results - Sylvan Complex

UMass Amherst

Coating/Area	Surface	2014 Verification Wipes		
		Sample Date	Sample ID	Total PCBs (ug/100cm^2)
Exterior Control Joints				
High Occupancy Areas - Adjacent Brick Materials	Vertical Joints	7/22/2014	LTM-MR-VWBV-200	1.75
		7/22/2014	LTM-MR-VWBV-202	0.69
		7/22/2014	LTM-MR-VWBV-204	3.3
		7/22/2014	LTM-MR-VWBV-206	2.4
		7/22/2014	LTM-BR-VWBV-208	<0.20
		7/22/2014	LTM-BR-VWBV-210	<0.20
		7/22/2014	LTM-BR-VWBV-212	<0.20
		7/22/2014	LTM-BR-VWBV-214	1.2
		7/22/2014	LTM-CR-VWBV-216	0.23 J
		7/22/2014	LTM-CR-VWBV-218	0.9
		7/22/2014	LTM-CR-VWBV-220	<0.20 UJ
		7/22/2014	LTM-CR-VWBV-222	0.33
	Horizontal Joints	7/22/2014	LTM-MR-VWBH-201	0.5
		7/22/2014	LTM-MR-VWBH-203	0.58
		7/22/2014	LTM-MR-VWBH-205	0.51
		7/22/2014	LTM-MR-VWBH-207	0.5
		7/22/2014	LTM-BR-VWBH-209	<0.20
		7/22/2014	LTM-BR-VWBH-211	<0.20
		7/22/2014	LTM-BR-VWBH-213	<0.20
		7/22/2014	LTM-BR-VWBH-215	<0.20
		7/22/2014	LTM-CR-VWBH-217	<0.20
		7/22/2014	LTM-CR-VWBH-219	0.54
		7/22/2014	LTM-CR-VWBH-221	<0.20
		7/22/2014	LTM-CR-VWBH-223	<0.20
Interior Renovation Areas				
Encapsulated Ceiling	Ceiling	7/22/2014	LTM-CRI-VWC-232	<0.20
		7/22/2014	LTM-CRI-VWC-233	<0.20
		7/22/2014	LTM-MRI-VWC-244	0.42 J
		7/22/2014	LTM-MRI-VWC-245	0.81
		7/22/2014	LTM-BRI-VWC-247	<0.20
Encapsulated Walls	Wall	7/22/2014	LTM-MRI-VWC-242	0.75
		7/22/2014	LTM-MRI-VWC-243	<0.20
		7/22/2014	LTM-BRI-VWC-246	<0.20

Notes:
Samples submitted for PCB analysis via USEPA method 8082 with Soxhlet Extraction (3540C).
Wipe samples collected in accordance with the standard wipe test method of 40 CFR 761.123.
Total PCBs reported as Aroclor 1248 , 1254 and/or Aroclor 1260. No other Aroclors reported at

Attachment 6 – Data Validation Summary and Analytical Laboratory Reports