PCB MONITORING AND MAINTENANCE IMPLEMENTATION PLAN

University of Massachusetts

Southwest Residential Area

Amherst, Massachusetts

223505

UMass Southwest

December 2010

woodardcurran.com
COMMITMENT & INTEGRITY DRIVE RESULTS

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

APPENDICES

1. INTRODUCTION

This monitoring and maintenance implementation plan (MMIP) has been prepared by Woodard & Curran (W&C) on behalf of the University of Massachusetts (UMass) in accordance with Inspection, Modification, and Revocation Condition 13(a) of the U. S. Environmental Protection Agency's (EPA) August 30, 2010 Polychlorinated Biphenyl (PCB) Cleanup and Disposal Approval granted under 40 CFR 761.61 (a) and (c) and 761.79(h) (the Approval).

This plan presents the monitoring and maintenance activities that will be conducted to assess the long-term effectiveness of an encapsulant applied, as an interim measure, to select surfaces after PCB remediation activities were conducted at the Southwest Residential Area on the UMass campus in Amherst, Massachusetts. The PCB Remediation work was conducted as part of a larger concourse revitalization project within the Southwest Residential Area.

1.1 BACKGROUND

The Site is a relatively small portion (approximately 5 acres) of the 1,450-acre parcel of land associated with the UMass Amherst campus. The Site is located at the southwestern end of the UMass campus east of University Drive, south of Massachusetts Avenue, and north of Fearing Street. The properties abutting the Site are all UMass-owned properties. A Site Locus Map is provided as Figure 1-1.

The Site is currently improved with five high-rise towers and eleven lower-rise buildings that serve to house approximately 5,500 UMass students. This area is referred to as the Southwest Residential Area and was constructed in the mid-1960s. The buildings are constructed of concrete and are surrounded by either grass or hardscapes (paving stones, concrete, or asphalt). Access to the Site is by driveways along Fearing Street, University Drive, and Massachusetts Avenue. A Site Plan is depicted as Figure 1-2.

The Southwest Concourse replacement project was a comprehensive revitalization of the pedestrian core of the Southwest Residential Area. Starting in May 2010, the southwest concourse underwent renovations to paved and unpaved ground surfaces within the Southwest Residence Area. The work within this approximately five-acre site included, but was not limited to: removal and disposal of existing ground surface coverings (pavement, concrete, etc.); regrading and excavating soils to support new ground surface coverings, landscaping areas, and utilities; removal and replacement of granite staircases; removal and disposal of select retaining walls; and restoring select ground surfaces with concrete, pavement, pavers, etc.

During the initiation of the project, caulking was observed along the ground level joints/seams at retaining walls, granite steps, concrete structures, and other paved surfaces. Given the potential for this caulking to contain PCBs (based on the date of construction in the mid-1960s) and that it would be disturbed during the work, samples were collected to assess proper management and disposal requirements. Eighteen caulking samples were collected for PCB analysis from joints between granite steps, various concrete walkways and ground surfaces, and one ceiling joint in a pedestrian underpass tunnel. These samples were reported with detectable concentrations of PCBs ranging between 63 and 130,000 parts per million (ppm).

Upon discovery of PCBs in the joint caulking and given that as part of this project existing soils and other adjacent materials (concrete pads, retaining walls, granite steps, etc.) would be either removed or replaced as part of the construction of the new concourse components, samples of various materials were tested to determine whether PCBs had migrated from the caulking into these materials. Samples collected in May and June 2010 detected PCBs at varying concentrations in these materials; samples collected closer to the caulking reported higher PCB concentrations with decreasing concentrations with increasing distance from the caulking.

1.2 CONCEPTUAL SITE MODEL

Certain joint caulking used as part of standard construction practices for masonry buildings and concrete structures erected between the 1950's and late 1970's is known to have been manufactured with PCBs. PCBs were added to caulking for durability, resistance to degradation, and as a softener/plasticizer for application. Production and approved usage of PCBs was halted in the United States in the late 1970s. As indicated above, the Southwest Residential Area was constructed during this time period.

Due to the porous nature of concrete and other masonry surfaces, PCBs in caulking may penetrate into adjacent materials during application or over time, may leach or weather, and/or may be disturbed during renovations or other work. Characterization data indicated that percent level concentrations of PCBs have been detected in original caulking applied to expansion joints and along the horizontal seam between the ground surface covering and masonry structures along the concourse. Lower concentrations of PCBs were also detected in adjacent concrete, adjacent ground surface coverings, and soils.

Based on the concentration and distribution of PCBs detected in adjacent materials, it is apparent that the caulking used in original construction was the source of PCBs. In general, concentration gradients identified in the adjacent materials demonstrate a reduction in total PCBs with increasing distance from caulked joints and increasing depth from the ground surface.

1.3 REMEDIATION OVERVIEW

On June 15, 2010, Ms. Kimberly Tisa of the EPA was notified by telephone of the project and a general overview of the results and plans completed as of the date of the call were communicated to EPA. During the discussion, it was agreed to submit a Remediation Plan to document the current data and proposed remedial plans to remedy the issue. A Remediation Plan was submitted to the EPA on June 25, 2010 followed by a response to comments and Addendum #1 (July 27, 2010) and Addendum #2 (August 24, 2010). EPA issued a written Approval for the work on August 30, 2010.

As described in detail in the June 2010 Remediation Plan, a risk based remedial plan under 40 CFR 761.61(c) was prepared (and approved) for portions of the remediation work. This plan consisted of a two-prong remedial approach whereby the primary plan was to remove the source material and adjacent soils, concrete, asphalt and other materials impacted by PCBs with a secondary plan of utilizing a physical barrier approach to eliminate the direct contact exposure pathway and migration pathways of any residual PCBs remaining on materials that could not be removed during the project.

In summary, all caulking encountered/disturbed within the work area was removed and disposed off-site as a $\geq$ 50 ppm PCB waste. Soils and concrete removed during the work and in direct contact or immediately adjacent to the caulking and which exhibited concentrations of PCBs > 1 ppm were excavated and disposed off-site at their respective at-found concentrations. Soils not planned for removal and that met EPA's high occupancy cleanup levels (either $\leq$ 1 ppm for unrestricted use or $\leq$ 10 ppm beneath a compliant cap) remained in place. Granite steps formerly in direct contact with caulking were decontaminated with a chemical wash and, upon meeting the high occupancy cleanup levels of 10 µg/100cm^2, re-used on site.

Residual concentrations of PCBs on concrete retaining walls, masonry structures, and a pedestrian tunnel ceiling remained in place and were encapsulated by a protective coating (following caulking removal). These areas of concrete were not scheduled for removal during the project and were not planned to be removed during the remediation phases of the project and instead were proposed to be contained behind a barrier or encapsulant to prevent direct contact with PCBs and/or potential migration effects to other media. The rationale for this decision was

that the concrete tunnel ceiling and concrete foundations are critical to the integrity of the structures and removal of portions of this concrete was not recommended. The on-site encapsulation of PCB remediation waste is an interim solution designed to shield impacted materials from the effects of weathering and leaching mechanisms, thereby eliminating potential exposure pathways and mitigating the potential for PCB transfer via direct contact and/or leaching to other media/materials.

Through the removal of the source materials (caulking), excavation and off-site disposal of those PCB-containing materials scheduled for removal (soil and concrete), reuse through decontamination to high occupancy cleanup levels (e.g., granite steps), and the application of an encapsulant on surfaces that contain residual PCBs, the remediation removed those PCB containing materials not authorized for continued use and either removed or restricted exposure pathways to residual PCBs, thereby, not posing an unreasonable risk of injury to health or the environment.

The encapsulation approach is considered a long-term interim solution given that all areas containing residual concentrations of PCBs will be managed and properly disposed of at the time of demolition and/or subsequent disturbance. To ensure the containment methods/products continue to perform as designed, this MMIP has been developed to monitor the continued effectiveness of the remedy.

1.4 PLAN ORGANIZATION

The components of the plan have been organized into the following sections:

- Section 1 – Introduction (this section)
- Section 2 - Retaining Walls and Ground Level Structures Encapsulation
- Section 3 – Pedestrian Tunnel Encapsulation
- Section 4 – Monitoring and Maintenance
- Section 5 – Training Requirements
- Section 6 – Communications and Reporting
- Section 7 – Modifications to the MMIP

2. RETAINING WALLS AND GROUND LEVEL STRUCTURES ENCAPSULATION

As presented in Section 8 of the Remediation Plan (and Addendum #1), during the initial characterization assessment, suspect caulking materials were observed at three types of locations associated with retaining walls and ground-level structures:

- Joints between granite stairs and walls (horizontal and vertical seams; see Photo 1)
- Joints between paved ground surfaces and walls (horizontal seams; see Photo 2)
- Joints between a building wall and the end of a retaining wall (vertical seams; see Photo 3)

Photo 1 (Top Left): Caulking joints between stairs and walls.

Photo 2 (Top Right): Caulking joints between paved ground surfaces and walls.

Photo 3 (Bottom Left): Caulking joints between a building wall and the end of a retaining wall.

PCB impacts to retaining walls and ground level structures scheduled to remain in place were managed through the encapsulation of PCB remediation waste as an interim solution designed to shield impacted materials from the effects of weathering and leaching mechanisms, thereby eliminating potential exposure pathways and mitigating the potential for PCB transfer via direct contact and/or leaching to other media/materials. A description of the remediation activities and baseline sampling is presented in the following sections.

2.1 ADDITIONAL CHARACTERIZATION AND PILOT TESTING ACTIVITIES

As part of the initial assessment, concrete samples were collected from three retaining walls where previous caulking samples were analyzed. Samples were collected from concrete in direct contact with the caulking (after removal of caulking) and at select distances away from the joint. The results indicated that concrete in direct contact with the caulking exhibited concentrations of PCBs. PCBs were also detected in three of the four samples collected at distances up to 6 inches from the caulking. A summary of the sample results was provided as Table 8-1 in the June 2010 PCB Remediation Plan. Based on this data, it was concluded that concrete on these structures adjacent to the caulking was impacted by PCBs.

For those structures scheduled for removal, this material was managed as PCB wastes. For those structures not scheduled for removal, additional sampling and pilot testing was conducted to support the containment remedial approach. A description of these activities is provided below.

2.1.1 Characterization Sampling

Following removal of caulk via mechanical removal techniques, samples of adjacent concrete were collected at six locations to evaluate the nature and extent of PCB concentrations at various distances from the caulked joints. The locations for the profiles were selected as follows:

- Horizontal joints at different concrete surfaces above and below proposed final grades:
    - Along concrete retaining walls (2 locations) – samples collected from the retaining wall west of the Crampton Building approximately 11 feet south of the Crampton West Stairs and from the east retaining wall in the Berkshire Plaza approximately 12 feet south of the Hampshire South stairs.
    - Along building surfaces (1 location) – samples collected from a column on the Prince Building along the Prince concrete pad.
- Surfaces along former granite staircases – samples collected from the concrete retaining wall at the former Crampton West Stairs and from the Berkshire Building at the Berkshire Plaza Southwest stairs.
- Retaining wall and building vertical seam – samples collected from Crampton Building and concrete wall at Crampton West Stairs.

At each location, concrete samples were collected in direct contact with the caulked joint and at distances of 1", 3", 6", and 12" from the caulked joint in two directions (above and below horizontal joints and to the right and left of the vertical caulked joint) for a total of 9 samples from each location. A direct contact sample was not collected from beneath the vertical caulked joint due to the presence of a significant amount of caulking at this location. Concrete samples were collected from a depth of 0-0.5 inches using an electric rotary hammer drill and a 1-inch drill bit.

Analytical results from the characterization sampling are presented on Table 2-1. Overall findings from this sampling included:

- The highest concentrations of PCBs were detected in the direct contact samples with generally decreasing concentrations with distance from the caulked joint;
- There appeared to be a correlation between the caulking concentration and the PCB concentration detected in the concrete with higher concentrations in the caulking correlating with higher concentration in the concrete – both direct contact and distance from the caulking;

- There did not appear to be a substantial difference in PCB concentrations in concrete samples collected from above or below the horizontal joints;
- In all locations (except the sample above one horizontal joint location), the PCB concentrations decreased to $\leq$ 1 ppm at a distance of 12 inches from the joint. The one location detected PCBs at 1.14 ppm.
- The lowest PCB concentrations were observed in the concrete collected adjacent to the vertical joint where the retaining wall meets the building.

2.1.2 Containment via Encapsulation Pilot Test

As discussed in Section 8 of the Remediation Plan, the remedial plan for residual concentrations of PCBs in concrete to remain in place was to manage the impacts through containment via encapsulation with a protective coating following caulking removal. The barrier or encapsulant will contain the PCBs and prevent direct contact with PCBs and/or potential migration effects to other media.

Several products were evaluated for use on surfaces above and below the final grades. Based on this evaluation, two products were selected for implementation during the pilot test; Sikagard 62 a protective, colored, epoxy coating for below grade surfaces and Sikagard 670W a water based, clear, acrylic surface coating for above grade surfaces. The Sikagard 62 was selected given its past use on PCB sites and its applicability for use under subgrade conditions and the Sikagard 670W was selected for its aesthetics, as well as containment properties, given that it is a clear coating.

For pilot test activities, both encapsulants were applied to approximately 10 feet of a portion of the Berkshire Plaza retaining wall immediately adjacent to the characterization concrete samples. In addition, the subgrade encapsulant (Sikagard 62) was applied at several other locations in order to meet the project schedule requirements. Following curing, surface wipe samples were collected from the coatings using hexane-soaked wipes. The pilot test results indicated:

- Sikagard 62 tan - 8 sample locations – all results were non detect; < 0.5 ug/100cm^2
- Sikagard 670W clear – 3 sample locations - all results were non detect; < 0.5 ug/100cm^2

Based on these results, the Sika products listed above were used during the full-scale application.

2.2 REMEDIATION IMPLEMENTATION

All caulk from the subject areas were removed using manual techniques (i.e., scraping and peeling) with hand tools to the maximum extent practical (refer to Section 4 of the PCB Remediation Plan). Soils adjacent to these joints (2.5 feet laterally away from the joint to a depth of 1 foot below grade) were removed and disposed off-site (refer to Section 9 of the PCB Remediation Plan with addenda). Concrete within the limits of the encapsulation was manually cleaned to remove latent dust, dirt, and debris to the extent required to allow for encapsulant application.

Following caulk removal and surface preparation, two coats of the Sikagard 62 colored epoxy was applied over the former location of the caulked joint, to a minimum distance of 12 inches below the caulked joint, and to a distance of the final finished grade above the caulked joint, if the final grade was above the former caulked joint location. A tan color was selected by the project architects and team. Given that this coating will be below final grade, contrasting colors were not applied since future inspections of the coating will not be possible. As part of the project, the epoxy is being covered by the final finished material which will include, depending on location, concrete, concrete brick pavers, or landscape materials. Concrete to a distance of no less than 12 inches above the caulked joint or finished

grade was encapsulated using the Sikagard 670W clear acrylic coating. Figure 2-1 depicts the locations of the encapsulant application.

Photographs of the encapsulant coatings are shown below.

2.3 BASELINE SAMPLE COLLECTION

Following the application of the selected encapsulants, baseline wipe samples were collected at an approximate frequency of 1 wipe sample per 100 linear feet (l.f.) of caulked joint. In total, 67 wipe samples of the Sikagard 62 epoxy and 66 wipe samples of the Sikagard 670W were collected for PCB analyses following the material cure time.

Results from the baseline verification wipes were used to evaluate the overall effectiveness of the encapsulant and to develop the long term maintenance and monitoring plan. A summary of the sample results is provided on Table 2-2 and the laboratory reports are provided in Appendix A. Analytical results were evaluated as follows:

- Total PCB concentrations > 1 µg/100 cm^2 – additional evaluation of the encapsulant to be conducted including the application of additional encapsulant and follow up verification samples, as needed.

- Total PCB concentrations $\leq$ 1 µg/100 cm^2 – no additional verification testing or evaluation warranted.

The samples results indicated:

- No PCBs were detected above the laboratory's minimum reporting limits in any of the samples collected from the Sikagard 62 areas (all 67 samples were < 0.5 ug/100cm^2)

- No PCBs were detected above the laboratory's minimum reporting limits in 64 of the 66 samples collected from the Sikagard 670 W areas (< 0.5 ug/100cm^2)

    - The two samples with PCBs detected were both collected from the same area (Prince stairs) and detected PCBs at 1.14 and 1.48 ug/100cm^2. Of note, this is the only location where the clear coat was used below the finished grade line. This was done because the on-site supply of Sikagard 62 epoxy had been exhausted and new product was not available for a few days. Given the overall work schedule and deadlines, the Prince stairs needed to be re-installed at that time; therefore, the Sikagard 670 W coating was used for both below and above the former caulk line (supporting data included results received to date from the baseline wipe samples, which were all non-detect).

    - Prior to receipt of the laboratory data from the wipe samples below the caulk line and given the project schedule, the decontaminated granite stairs were replaced at this location, thereby covering up the coating with another barrier (but preventing the application of another coat prior to the granite installation). The wipe samples from the accessible encapsulated concrete above the granite steps did not detect PCBs above the minimum laboratory reporting limit of 0.5 ug/100cm^2.

3. PEDESTRIAN TUNNEL ENCAPSULATION

An outdoor pedestrian tunnel is located on the northern end of the project work area and consists of an approximately 94 foot long concrete archway tunnel beneath Massachusetts Avenue. As presented in Section 7 of the Remediation Plan, PCB containing caulking was located at an expansion joint at approximately the mid point of the concrete ceiling archway (40 linear feet) and at caulked expansion joints approximately every 10 feet along a concrete curbing on both sides of the tunnel.

The work within the Tunnel as part of the concourse revitalization project included replacing the concrete slab on the ground surface, painting the archway ceiling (including removing/replacing the expansion joint caulking on the ceiling), and installing other aesthetic features to promote the use of the tunnel as opposed to students using the street surface crossing.

A summary of the completed remediation activities followed by the results of the baseline sampling is presented in the following sections.

3.1 REMEDIATION IMPLEMENTATION

As described in the Remediation Plan, characterization samples indicted that PCBs were detected in caulking, adjacent concrete of the ceiling (within 12 inches of the joint), and soils at the base of the joint (within a riprap embankment on the sides of the tunnel). No PCBs were detected in concrete samples collected from the curbing. Given the structural limitation of the archway ceiling, extensive concrete removal was not a feasible remedial alternative; therefore, a containment remedial plan was developed incorporating the existing plans to re-paint the ceiling.

The first component of the plan was to remove the caulking, which was removed following the procedures described in Section 4 of the Remediation Plan. All caulking was removed by physical means and containerized for off-site disposal as $\geq$ 50 ppm PCB wastes. Following removal, the joint was visually inspected to ensure that all caulking was removed to the maximum extent practicable. This process was also repeated for the caulking on the concrete curb. The archway caulking was replaced (as described below); however, new caulking was not applied to the concrete curbing.

The second component of the plan involved incorporating the current planned activities into the remediation plan for PCBs - sand blasting the archway ceiling in preparation for repainting. This was accomplished by providing PCB awareness training for the sandblasting workers (workers used respirators and were already entered into a respirator program), totally encapsulating the tunnel area with polyethylene sheeting (e.g., poly on the tunnel floor and side openings), and collection of all sand blast media and paint residuals with the polyethylene sheeting and managing this material as $\geq$ 50 ppm PCB wastes.

Prior to pouring a new concrete slab at the base of the Tunnel, three soil samples were collected at locations spatially distributed throughout the tunnel, including one beneath the archway joint. All three samples were non-detect for PCBs (< 0.033 ppm). Subsequently, the new concrete pad was poured at the base of the Tunnel.

In addition to the base samples, two soil samples were collected at the point where the archway caulked joint entered into the rip rap (stone and soil) sides of the tunnel. The soil sample on the east side of the Tunnel reported PCBs at 0.78 ppm and the sample from the west side reported PCBs at 8.36 ppm. Based on construction drawings, the archway concrete (and caulked joint) terminates approximately one foot below grade into a concrete thrust block. Given this data, soils in an approximate two foot area around the joint to a depth of 21 inches feet were removed from the west side and managed as $\geq$ 50 ppm PCB wastes. Following soil removal, three verification samples were collected from the south, north, and base of the excavation and analyzed for PCBs. All three samples were reported as non-detect for PCBs (< 0.1 ppm).

Given the description and use of the Tunnel ceiling, the concrete on the archway ceiling with residual PCBs can be considered a low occupancy area (per 40 CFR 761.3). However, the area that exhibited concentrations > 1 ppm (the high occupancy criteria) was contained via encapsulation techniques (note: the entire tunnel ceiling was also painted/coated as part of the concourse project).

The concrete in former direct contact with the caulking (inside the return of the joint with PCBs at 309 ppm) was encapsulated with two coats of the Sikagard 62 epoxy coating, followed by new caulking. The Sikagard 62 epoxy was also applied to the concrete located within 12 inches of the joint in two coats of contrasting color followed by an elastomeric acrylic coating (white color). The remaining portions of the ceiling were coated with the white elastomeric acrylic coating. A photo of the encapsulated area is shown to the right.

3.2 BASELINE SAMPLE COLLECTION

Following the application of the encapsulants, baseline wipe samples were collected for PCB analyses. Given the accelerated project schedule, weekend work was on-going throughout the project. During a weekend activity, the new caulking was applied to the archway joint prior to collecting the baseline wipe samples. Upon inspection, new caulking was not applied to a small section of the joint near the base of the joint; therefore, a wipe sample was collected from this location. As indicated on Table 3-1, a result of 7 ug/wipe (calculated to be 24 ug/100cm^2) was detected in this sample. To confirm this result, new caulking from a section of the joint was removed and a wipe sample collected from the underlying epoxy surface. This wipe sample result was 4.1 ug/wipe (calculated to be 7.16 ug/100cm^2). Given these results, a wipe of the new caulking was collected and detected PCBs at 3.66 ug/100cm^2. A sample from the encapsulated concrete adjacent to the joint was collected and PCBs were not detected in this sample above the laboratory's minimum reporting limit. All sample results are summarized on Table 3-1 and the laboratory reports are provided in Appendix A.

An evaluation of additional activities due to these residual PCB concentrations on the surface of the encapsulants is on-going (e.g., continued monitoring, potentially apply another top coating to the caulked joint, etc.). However, given the location of the caulked joint in relation to the tunnel use and potential receptors (transient pedestrian use), an immediate action is not warranted at this time.

4. MONITORING AND MAINTENANCE

This section presents the monitoring and maintenance activities that will be conducted to assess the long-term effectiveness of the encapsulant applied to the subject concrete surfaces (retaining walls, ground surface structures, and the pedestrian tunnel ceiling) as an interim measure.

4.1 INSPECTION AND MONITORING ACTIVITIES

Initially, the long term monitoring activities at the Southwest Concourse Area will be conducted on an annual basis in the Spring of each year. Representative surface wipe samples of encapsulated surfaces will be collected for laboratory analyses. In addition to sampling, a visual inspection of the encapsulated surfaces will be conducted at this time. As described further below, pending the results of these activities, the frequency of inspection or monitoring may be modified over time. This modification request will be made in the report prepared documenting the results of the monitoring and maintenance activities.

4.1.1 Visual Inspections

Visual inspections of the encapsulated surfaces will consist of an assessment of the following:

- Physical condition of the coating and new caulking (cracking, peeling, discoloration, etc.);
- Signs of the underlying coating (via color observance);
- Signs of disturbance of the coatings or new caulking; and
- A general inspection of the surrounding areas.

The inspections will be conducted by a general walk-through of the Southwest Concourse area viewing those areas subject to the encapsulation (refer to Figure 2-1). Upon completion of the visual inspections, corrective actions will be implemented, if needed, as described below. Inspections will be documented in the report to the EPA. This report will include a recommendation for continuing or refining the inspection frequency based on the results.

4.1.2 Sample Collection and Analyses

To verify the effectiveness of the encapsulating products over time, surface wipe samples will be collected and analyzed for PCBs. The locations and numbers of samples for each of the encapsulated surfaces is summarized below:

- Concrete Structures (retaining walls and ground surface structures)
    - Sub-grade areas – as indicated in previous sections, concrete coated with the Sikagard 62 epoxy (tan) has subsequently been covered by the final finished material which includes, depending on location, concrete, concrete brick pavers, or landscape materials. Given the inaccessibility to these areas and that all 67 baseline wipe samples were non-detect for PCBs, no long term monitoring samples will be collected from these areas;
    - Above-grade areas – as indicated in previous sections, all 64 baseline wipe samples collected from above the final finished grade concrete (covered with Sikagard 670 W) were non-detect for PCBs. During the monitoring period, it is proposed to collect six (6) wipe samples from randomly selected locations throughout the concourse area. Two samples will be collected from each of the three major subdivisions of the concourse area (Hampshire Plaza, Berkshire Plaza, and Washington Plaza).

- Concrete Ceiling of the Pedestrian Tunnel – as indicated in the previous section, residual concentrations of PCBs were detected on the surface of the new caulking during the baseline sampling. No PCBs were detected from the coated concrete adjacent to the new caulking. During the monitoring period, it is proposed to collect one (1) sample from the new caulking and one (1) sample from the adjacent coated concrete for PCB analyses.

Further details regarding the sampling are provided below.

- Wipe samples will be collected in accordance with the standard wipe test method as described in 40 CFR 761.123. At each sample location, a 2-inch square gauze pad, saturated with hexane, will be wiped across a 100 square centimeter template area. Due to the narrow width of some of the surfaces, wipe samples will be collected using a modified sampling procedure to ensure a 100 square centimeter area is sampled. The wipe will be folded and grasped using forceps and wiped across the surface, refolded, and wiped again in the opposite direction;
- All samples will be transported to the laboratory under standard Chain of Custody procedures, extracted using USEPA Method 3540C (Soxhlet extraction), and analyzed for PCBs using USEPA Method 8082; and
- In addition to the primary samples indicated above, a duplicate sample will be collected at a frequency of one per 20 primary samples and submitted to the laboratory as part of the QA/QC procedures associated with the sample collection procedures.

Upon receipt of the analytical results and data validation, the sample data will be compared to the action levels as described below and documented in the report submitted to EPA. This report will include a recommendation for continuing or refining the sample frequency based on the results.

4.2 ACTION LEVELS AND CORRECTIVE MEASURES

A combination of visual inspections and laboratory sample results will be used to verify the continued effectiveness of the encapsulating coatings. Upon receipt of the laboratory results after each monitoring round, the data will be compared to the following action levels to determine whether additional monitoring or corrective measures are needed.

- If ≤ 1 µg/100 cm^2 – no additional action, maintenance and monitoring to continue in accordance with this plan;
- In areas where encapsulation deterioration is observed or PCBs are reported at concentrations > 10 µg/100 cm^2, the following actions will be taken:
    - An additional encapsulant (e.g., additional coating) will be applied and follow-up wipe samples will be collected. If analytical results indicate that PCBs are still present at concentrations > 10 µg/100 cm^2 after the prescribed re-application, UMass will evaluate alternative solutions in conjunction with EPA.
- If > 1 and $\leq$ 10 µg/100 cm^2 – continued monitoring will occur to establish patterns or trends in concentration. If increasing concentrations are determined, then additional coatings may be applied and/or alternative solutions will be discussed with EPA.

NOTE: These levels are considered appropriate for this project given the anticipated occupancy and use (exterior walls or ceilings) in comparison to potential direct contact exposures. It should also be noted that there is currently a lack of substantial long-term monitoring data for products being used as encapsulants over PCB containing building materials from this or any comparable PCB remediation site. In light of recent conversations with EPA and its September 2009 guidance, additional research into this issue is required and being conducted by the Agency. These results/data will be incorporated into any decision regarding additional interim/corrective measures at this Site.

4.3 ROUTINE MAINTENANCE ACTIVITIES

Based on a review of the products' technical specifications and applied locations, it is not anticipated that the coatings or caulking will require any additional or routine maintenance activities other than potential corrective measures that may be deemed necessary as a result of visual inspections.

5. TRAINING REQUIREMENTS

Based on discussions with UMass Housing and Facilities Departments, it is not anticipated that any workers would come in routine contact with the encapsulated surfaces given that they are located on exterior retaining walls, ground level structures, and a pedestrian tunnel ceiling.

The only activities that may encounter the encapsulants are routine or planned maintenance activities. It is not anticipated that workers performing maintenance activities would require any special training or need to take extra precautions due to the presence of the new caulk or coatings; however, UMass will conduct general awareness training for Facility and maintenance personnel to ensure they are aware of the importance of maintaining the encapsulant.

For any non-routine projects that involve work that could encounter the encpasulants (e.g., planned excavations next to the structures/walls [although, this is unlikely given the recent amount of work that has been completed to revitalize the concourse ground surfaces]), relevant and appropriate worker training requirements and procedures specific to the task will be developed and implemented. Current UMass procedures dictate that all work that impacts building materials must undergo an "all hazard review". This review would indicate that the Southwest Concourse area has been flagged as a having residual PCB containing material under encapsulants/barriers. As such, any work that will disturb these materials will be conducted by appropriately trained workers following the necessary work procedures for containments (polyethylene sheeting, etc.) and disposal. These activities will be reported to EPA in the monitoring report (see Section 6). In addition, UMass has included, as a component of their annual "Right-To-Know" and Asbestos Training Program, a PCBs in materials awareness session, including the encapsulated areas of the Southwest Concourse.

6. COMMUNICATIONS AND REPORTING

The results of the monitoring and maintenance activities will be documented in a report and submitted to the EPA. Initially, this report will be submitted in December of each calendar year, as applicable, and document the following:

- Results from the visual inspections;
- Results from the sampling and analyses;
- Comparisons to action levels and recommendations for corrective measures;
- Any corrective measures implemented;
- Any non-routine major projects conducted in the area that encountered the encapsulants and the training and protective measures that were implemented;
- Any proposed modifications to the monitoring and maintenance program (e.g., based on the sampling results, the frequency of the program may be modified); and
- A statement on the continued effectiveness of the encapsulant.

A summary of this information will also be made available for review by Southwest occupants, users, or other project stakeholders. This communication will be completed via information meetings or posting of data to the UMass EHS web site.

7. MODIFICATIONS TO THE MMIP

It is possible that results of the monitoring may warrant or require modifications to this plan. In the event that a modification to the MMIP is necessary, such an amendment will be proposed to EPA for approval as part of the scheduled report. UMass will work in conjunction with EPA to develop and implement any such modifications.

Table 2-1
Retaining Walls and Ground Level Surfaces Additional Characterization Sample Results
Southwest Concourse PCB Remediation Project
UMass Amherst, MA

Caulk Joint Location	Distance from Caulk (in)	Notes	Sample ID	Date	Detection Limit	Total PCBs (mg/kg)
Stairs to Retaining Wall Caulked Joint Crampton West	12	Crampton West Stairs to Retaining Wall; 12" above caulked joint	SWC-CBC-1321	7/9/10	0.054	0.949
	6	Crampton West Stairs to Retaining Wall; 6" above caulked joint	SWC-CBC-1322	7/9/10	0.0569	0.874
	3	Crampton West Stairs to Retaining Wall; 3" above caulked joint	SWC-CBC-1323	7/9/10	0.28	**2.22**
	1	Crampton West Stairs to Retaining Wall; 1" above caulked joint	SWC-CBC-1324	7/9/10	1.13	**12**
	0	Crampton West Stairs to Retaining Wall; at caulked joint	SWC-CBC-1325	7/9/10	12	**285**
	1	Crampton West Stairs to Retaining Wall; 1" below caulked joint	SWC-CBC-1326	7/9/10	0.618	**4.8**
	3	Crampton West Stairs to Retaining Wall; 3" below caulked joint	SWC-CBC-1327	7/9/10	0.118	**2.9**
	6	Crampton West Stairs to Retaining Wall; 6" below caulked joint	SWC-CBC-1328	7/9/10	0.120	0.865
	12	Crampton West Stairs to Retaining Wall; 12" below caulked joint	SWC-CBC-1329	7/9/10	0.171	0.481
Stairs to Building Caulked Joint Berkshire Plaza Southwest	12	Berkshire Plaza Southwest Stairs; 12" above caulk line	SWC-CBC-1398	7/12/10	0.072	ND
	6	Berkshire Plaza Southwest Stairs; 6" above caulk line	SWC-CBC-1397	7/12/10	0.083	ND
	3	Berkshire Plaza Southwest Stairs; 3" above caulk line	SWC-CBC-1396	7/12/10	0.086	ND
	1	Berkshire Plaza Southwest Stairs; 1" above caulk line	SWC-CBC-1395	7/12/10	0.076	ND
	0	Berkshire Plaza Southwest Stairs; at caulk line	SWC-CBC-1394	7/12/10	0.343	**2.49**
	1	Berkshire Plaza Southwest Stairs; 1" below caulk line	SWC-CBC-1393	7/12/10	0.04	0.588
	3	Berkshire Plaza Southwest Stairs; 3" below caulk line	SWC-CBC-1392	7/12/10	0.1134	0.620
	6	Berkshire Plaza Southwest Stairs; 6" below caulk line	SWC-CBC-1391	7/12/10	0.12	0.769
	12	Berkshire Plaza Southwest Stairs; 12" below caulk line	SWC-CBC-1390	7/12/10	0.64	ND
Horizontal Caulked Joint Retaining Wall Crampton West	12	Crampton West Retaining Wall; 12" above caulk line	SWC-CBC-1330	7/9/10	0.0549	0.614
	6	Crampton West Retaining Wall; 6" above caulk line	SWC-CBC-1331	7/9/10	0.576	**1.52**
	3	Crampton West Retaining Wall; 3" above caulk line	SWC-CBC-1332	7/9/10	0.113	**2.22**
	1	Crampton West Retaining Wall; 1" above caulk line	SWC-CBC-1333	7/9/10	0.31	**4.05**
	0	Crampton West Retaining Wall; at caulk line	SWC-CBC-1334	7/9/10	58.6	**292**
	1	Crampton West Retaining Wall; 1" below caulk line	SWC-CBC-1335	7/9/10	1.49	**10.8**
	3	Crampton West Retaining Wall; 3" below caulk line	SWC-CBC-1336	7/9/10	0.303	**1.85**
	6	Crampton West Retaining Wall; 6" below caulk line	SWC-CBC-1337	7/9/10	0.604	**2.29**
	12	Crampton West Retaining Wall; 12" below caulk line	SWC-CBC-1338	7/9/10	0.295	0.71

Table 2-1
Retaining Walls and Ground Level Surfaces Additional Characterization Sample Results
Southwest Concourse PCB Remediation Project
UMass Amherst, MA

Caulk Joint Location	Distance from Caulk (in)	Notes	Sample ID	Date	Detection Limit	Total PCBs (mg/kg)
Horizontal Caulked Joint Retaining Wall Berkshire Plaza East	12	Berkshire North Plaza, east retaining wall; 12" above caulked joint	SWC-CBC-1383	7/12/10	0.057	0.064
	6	Berkshire North Plaza, east retaining wall; 6" above caulked joint	SWC-CBC-1382	7/12/10	0.053	0.093
	3	Berkshire North Plaza, east retaining wall; 3" above caulked joint	SWC-CBC-1381	7/12/10	0.062	0.127
	1	Berkshire North Plaza, east retaining wall; 1" above caulked joint	SWC-CBC-1380	7/12/10	0.055	0.495
	0	Berkshire North Plaza, east retaining wall; at caulked joint	SWC-CBC-1379	7/12/10	0.384	**2.38**
	1	Berkshire North Plaza, east retaining wall; 1" below caulked joint	SWC-CBC-1378	7/12/10	0.113	0.494
	3	Berkshire North Plaza, east retaining wall; 3" below caulked joint	SWC-CBC-1377	7/12/10	0.236	0.373
	6	Berkshire North Plaza, east retaining wall; 6" below caulked joint	SWC-CBC-1376	7/12/10	0.114	0.369
	12	Berkshire North Plaza, east retaining wall; 12" below caulked joint	SWC-CBC-1375	7/12/10	0.057	0.176
Horizontal Caulked Joint Prince Building	12	Prince Building Horizontal caulk joint on building; 12" above caulked joint	SWC-CBC-1369	7/12/10	0.11	**1.14**
	6	Prince Building Horizontal caulk joint on building; 6" above caulked joint	SWC-CBC-1368	7/12/10	0.08	**1.21**
	3	Prince Building Horizontal caulk joint on building; 3" above caulked joint	SWC-CBC-1362	7/12/10	7.79	**47**
	1	Prince Building Horizontal caulk joint on building; 1" above caulked joint	SWC-CBC-1363	7/12/10	0.372	**5.2**
	0	Prince Building Horizontal caulk joint on building; at caulked joint	SWC-CBC-1370	7/12/10	6.85	**53.2**
	1	Prince Building Horizontal caulk joint on building; 1" below caulked joint	SWC-CBC-1371	7/12/10	0.93	**5.87**
	3	Prince Building Horizontal caulk joint on building; 3" below caulked joint	SWC-CBC-1373	7/12/10	0.09	0.272
	6	Prince Building Horizontal caulk joint on building; 6" below caulked joint	SWC-CBC-1372	7/12/10	0.08	0.418
	12	Prince Building Horizontal caulk joint on building; 12" below caulked joint	SWC-CBC-1374	7/12/10	0.08	0.549
Vertical Caulked Joint Building to Retaining Wall Crampton West	12	Vertical Caulked joint ; 12" to left of caulk joint	SWC-CBC-1389	7/12/10	0.09	ND
	6	Vertical Caulked joint; 6" to left of caulk joint	SWC-CBC-1388	7/12/10	0.08	ND
	3	Vertical Caulked joint; 3" to left of caulk joint	SWC-CBC-1387	7/12/10	0.08	ND
	1	Vertical Caulked joint; 1" to left of caulk joint	SWC-CBC-1386	7/12/10	0.08	ND
	1	Vertical joint; 1" to right of caulk joint	SWC-CBC-1320	7/9/10	0.0579	0.613
	3	Vertical joint; 3" to right of caulk joint	SWC-CBC-1319	7/9/10	0.058	0.629
	6	Vertical Caulked joint; 6" to right of caulk joint	SWC-CBC-1384	7/12/10	0.13	0.196
	12	Vertical Caulked joint; 12" to right of caulk joint	SWC-CBC-1385	7/12/10	0.14	0.263

Notes:
Shaded Cell denotes total PCB concentrations > 1 mg/kg.
ND = Analytical results less than the minimum laboratory reporting limit (Non-Detect).

Table 2-2
Baseline Encapsulant Wipe Sample Results
UMass Southwest Concourse - Amherst, Massachusetts

Media	Work Area	Notes	Sample ID	Date	Detection Limit	Total PCBs	Units
Concrete Sika 62	Berkshire Plaza	Pilot Test Epoxy Encapsulant 62	SWC-VWC-1981	7/28/10	0.5	ND	µg/100cm^2
Concrete Sika 62	SE Hampden Stairs	South of SE Hampden stairs along retaining wall	SWC-VWC-1982	7/28/10	0.5	ND	µg/100cm^2
Concrete Sika 62	SE Hampden Stairs	North of SE Hampden stairs along building face	SWC-VWC-1983	7/28/10	0.5	ND	µg/100cm^2
Concrete Sika 62	Prince Ramp	4" below caulk line; epoxy on wall	SWC-VWC-1984	7/29/10	0.5	ND	µg/100cm^2
Concrete Sika 62	Prince Ramp	3" below caulk line; epoxy on wall	SWC-VWC-1985	7/29/10	0.5	ND	µg/100cm^2
Concrete Sika 62	West Crampton	on retaining wall west of Crampton; 3" below caulk line; on epoxy coated concrete wall	SWC-VWE-2101	7/30/10	0.5	ND	µg/100cm^2
Concrete Sika 62	West Crampton	north of sample 2101; on epoxy coated west Crampton Bldg. wall	SWC-VWE-2102	7/30/10	0.5	ND	µg/100cm^2
Concrete Sika 62	Crampton-Across from Hampden DH	along exterior of west wall of Crampton Ramp; 1" below caulk line; on epoxy coated concrete wall	SWC-VWE-2103	7/30/10	0.5	ND	µg/100cm^2
Concrete Sika 62	South Crampton	Wipe on tan epoxy, 0" below caulking. Sample taken 17 feet from eastern edge of the east/west retaining wall	SWC-VWE-2124	8/3/10	0.5	ND	µg/100cm^2
Concrete Sika 62	South Crampton	Wipe on tan epoxy, 0" below caulking; sample taken 4 feet from Crampton building southeastern corner	SWC-VWE-2125	8/3/10	0.5	ND	µg/100cm^2
Concrete Sika 62	South Crampton	Wipe on tan epoxy, 0" below caulking; sample taken on eastern edge of northern planter	SWC-VWE-2127	8/3/10	0.5	ND	µg/100cm^2
Concrete Sika 62	South Crampton	Wipe on tan epoxy, 0" below caulking; sample taken 5 feet south of Mackimmie building northeast corner	SWC-VWE-2129	8/3/10	0.5	ND	µg/100cm^2
Concrete Sika 62	South Crampton	Wipe on tan epoxy 0" below caulking; sample taken in vicinity of sample 1248	SWC-VWE-2131	8/3/10	0.5	ND	µg/100cm^2
Concrete Sika 62	South Crampton	Wipe on tan epoxy 0" below caulking; sample taken in vicinity of sample 1342	SWC-VWE-2133	8/3/10	0.5	ND	µg/100cm^2
Concrete Sika 62	South Coolidge Stairs	North wall of steps; 7.5" west from east end of wall; 2" below caulk line	SWC-VWE-2149	8/4/10	0.5	ND	µg/100cm^2
Concrete Sika 62	South Coolidge Stairs	South wall of steps; 2' west of top of stairs; 3" below caulk line	SWC-VWE-2150	8/4/10	0.5	ND	µg/100cm^2
Concrete Sika 62	South Coolidge	On south Coolidge concrete pad; 2" above caulk line	SWC-VWE-2151	8/4/10	0.5	ND	µg/100cm^2

Table 2-2
Baseline Encapsulant Wipe Sample Results
UMass Southwest Concourse - Amherst, Massachusetts

Media	Work Area	Notes	Sample ID	Date	Detection Limit	Total PCBs	Units
Concrete Sika 62	Northeast Coolidge Stairs	South wall of steps above top step; 1" below caulk line	SWC-VWE-2152	8/4/10	0.5	ND	µg/100cm^2
Concrete Sika 62	Northeast Coolidge Stairs	North wall of steps; 13" west from east end of wall; 2" below caulk line	SWC-VWE-2153	8/4/10	0.5	ND	µg/100cm^2
Concrete Sika 62	North Coolidge	On north Coolidge concrete pad; 3" above caulk line	SWC-VWE-2154	8/4/10	0.5	ND	µg/100cm^2
Concrete Sika 62	Southwest of Kennedy	On retaining wall west of Kennedy; 1" below caulk line	SWC-VWE-2155	8/4/10	0.5	ND	µg/100cm^2
Concrete Sika 62	Hampshire	On Hampshire wall; 1" below caulk line	SWC-VWE-2156	8/4/10	0.5	ND	µg/100cm^2
Concrete Sika 62	West Coolidge	On west Coolidge concrete pad; 2" below caulk line	SWC-VWE-2157	8/4/10	0.5	ND	µg/100cm^2
Concrete Sika 62	West Kennedy Stairs	On east wall of steps; 2" above caulking	SWC-VWE-2158	8/4/10	0.5	ND	µg/100cm^2
Concrete Sika 62	South of Thoreau	On retaining wall 6' south of Thoreau; 2" below caulk line	SWC-VWE-2159	8/4/10	0.5	ND	µg/100cm^2
Concrete Sika 62	North Kennedy	On north Kennedy concrete pad; 1" below caulk line	SWC-VWE-2161	8/4/10	0.5	ND	µg/100cm^2
Concrete Sika 62	East Kennedy	On east Kennedy concrete pad; 1" below caulk line	SWC-VWE-2162	8/4/10	0.5	ND	µg/100cm^2
Concrete Sika 62	South Kennedy	On south Kennedy concrete pad; 50.5' west from SE corner; 1" below caulk line	SWC-VWE-2163	8/4/10	0.5	ND	µg/100cm^2
Concrete Sika 62	Crampton Courtyard south stairs	At bottom of western wall of steps; 2" below caulk line	SWC-VWE-2173	8/5/10	0.5	ND	µg/100cm^2
Concrete Sika 62	Crampton Courtyard south stairs	Mid-way up steps on eastern wall; 2" below caulk line	SWC-VWE-2175	8/5/10	0.5	ND	µg/100cm^2
Concrete Sika 62	Cance	On wall of Cance pad, 13 ft from southern edge; sample taken 2" below caulk line	SWC-VWE-2176	8/5/10	0.5	ND	µg/100cm^2
Concrete Sika 62	Washington SE stairs	Taken on western wall, two steps below the landing; 1" below the caulk line	SWC-VWE-2177	8/5/10	0.5	ND	µg/100cm^2
Concrete Sika 62	Washington	Taken on eastern wall of Washington, 10 feet from southeastern corner; 1" below caulk line	SWC-VWE-2178	8/5/10	0.5	ND	µg/100cm^2
Concrete Sika 62	Washington East stairs	Taken on western wall at bottom step; 1" below caulk line.	SWC-VWE-2179	8/5/10	0.5	ND	µg/100cm^2

Table 2-2
Baseline Encapsulant Wipe Sample Results
UMass Southwest Concourse - Amherst, Massachusetts

Media	Work Area	Notes	Sample ID	Date	Detection Limit	Total PCBs	Units
Concrete Sika 62	Washington East stairs	Taken on eastern wall at top step; 1" below caulk line	SWC-VWE-2180	8/5/10	0.5	ND	µg/100cm^2
Concrete Sika 62	Washington	Taken on western wall of Washington 18 feet from northwestern wall; 2" below caulk line	SWC-VWE-2181	8/5/10	0.5	ND	µg/100cm^2
Concrete Sika 62	Berkshire Steps	Taken on retaining wall at the middle step; 1" below the caulk line	SWC-VWE-2182	8/5/10	0.5	ND	µg/100cm^2
Concrete Sika 62	Berkshire Pad	Taken in northwest corner of Berkshire stair pad; 1" below caulk line	SWC-VWE-2183	8/5/10	0.5	ND	µg/100cm^2
Concrete Sika 62	John Quincy Adams	Taken at steps south of JQA on northern wall at middle step; 1" above caulk line	SWC-VWE-2184	8/5/10	0.5	ND	µg/100cm^2
Concrete Sika 62	John Quincy Adams	Taken on northern wall 22 feet west of northeastern corner; 3" below caulk line	SWC-VWE-2185	8/5/10	0.5	ND	µg/100cm^2
Concrete Sika 62	Hampden Dining Hall	Sample taken 103' from southeastern corner; 2" below caulk line	SWC-VWE-2186	8/5/10	0.5	ND	µg/100cm^2
Concrete Sika 62	Hampden Dining Hall	Sample taken along outside of N/S retaining wall 13 feet from southeastern corner; 2" below caulk line	SWC-VWE-2187	8/5/10	0.5	ND	µg/100cm^2
Concrete Sika 62	Hampden Dining Hall	Sample taken along inside of N/S retaining wall 1 foot from northeastern corner	SWC-VWE-2188	8/5/10	0.5	ND	µg/100cm^2
Concrete Sika 62	Hampden Dining Hall	Sample taken at northeastern stairs at the top step along the western wall; 0" above caulk line	SWC-VWE-2189	8/5/10	0.5	ND	µg/100cm^2
Concrete Sika 62	Hampden Dining Hall	Sample taken at northeastern stairs at the bottom step along the eastern wall; 0" above caulk line	SWC-VWE-2190	8/5/10	0.5	ND	µg/100cm^2
Concrete Sika 62	Crampton House	Sample taken along concrete retaining wall 74 feet south of Prince South stairs; 2" below caulk line.	SWC-VWE-2191	8/6/10	0.5	ND	µg/100cm^2
Concrete Sika 62	Crampton House	Sample taken along concrete retaining wall 28 feet south of Prince South stairs; 1" below caulk line.	SWC-VWE-2203	8/6/10	0.5	ND	µg/100cm^2
Concrete Sika 62	Cance	Sample taken 18ft south of NE building corner; sample taken on top of concrete pad	SWC-VWE-2232	8/10/10	0.5	ND	µg/100cm^2

Table 2-2
Baseline Encapsulant Wipe Sample Results
UMass Southwest Concourse - Amherst, Massachusetts

Media	Work Area	Notes	Sample ID	Date	Detection Limit	Total PCBs	Units
Concrete Sika 62	Hampden	Sample taken at Hampden South stairs along building; 6.5 east of steps on landing; sample taken 0" above the caulk line	SWC-VWE-2241	8/10/10	0.5	ND	µg/100cm^2
Concrete Sika 62	Northeast Hampshire	Sample taken where steps meet building along northern end of eastern wall, approx. 1 inch below caulking line.	SWC-VWE-2279	8/13/10	0.5	ND	µg/100cm^2
Concrete Sika 62	Berkshire Plaza	Sample taken along north building face where southeast steps met building, 15 feet west of northeast building corner, 6 inches below caulking line.	SWC-VWE-2285	8/13/10	0.5	ND	µg/100cm^2
Concrete Sika 62	Pedestrian Tunnel	Sample taken along east side of tunnel wall, approximately 6 feet up from the base, 3 inches south of caulking line.	SWC-VWE-2291	8/16/10	0.5	ND	µg/100cm^2
Concrete Sika 62	Southwest Berkshire Plaza Steps	Sample taken where stairs met north building face, 8.5 feet east of corner, approx. 1 inch below caulking line.	SWC-VWE-2294	8/16/10	0.5	ND	µg/100cm^2
Concrete Sika 62	Northwest Berkshire Plaza Steps	Sample taken where stairs met with east retaining wall, 7 feet north of southern corner, approx. 2 inches below caulking line.	SWC-VWE-2295	8/16/10	0.5	ND	µg/100cm^2
Concrete Sika 62	Northeast Berkshire Plaza Steps	Sample taken where stairs met with east retaining wall, 83 feet south of northern corner, approx. 1 inch below caulking line.	SWC-VWE-2296	8/16/10	0.5	ND	µg/100cm^2
Concrete Sika 62	Berkshire Plaza	Sample taken along retaining wall bordering northern paver area, 43 feet east of west corner, approx. 3 inches below caulking line.	SWC-VWE-2298	8/16/10	0.5	ND	µg/100cm^2
Concrete Sika 62	Berkshire Plaza	Sample taken along inside of retaining wall bordering western side of northern soil area, 48 feet north of southwest corner, approx. 1 inch below caulking line	SWC-VWE-2299	8/16/10	0.5	ND	µg/100cm^2
Concrete Sika 62	South Hampden Steps	Sample taken along retaining wall bordering western side of steps, 3 feet north of southern end of wall, approx. 2 inches below caulking line.	SWC-VWE-2300	8/16/10	0.5	ND	µg/100cm^2

Table 2-2
Baseline Encapsulant Wipe Sample Results
UMass Southwest Concourse - Amherst, Massachusetts

Media	Work Area	Notes	Sample ID	Date	Detection Limit	Total PCBs	Units
Concrete Sika 62	Berkshire Plaza	Sample taken along outside of retaining wall bordering western side of northern soil area, 21 feet south of northwest corner, approx. 1 inch below caulking line	SWC-VWE-2302	8/16/10	0.5	ND	µg/100cm^2
Concrete Sika 62	South Washington	Sample taken along caulking line above waterproofing, approximately halfway between western-most columns.	SWC-VWE-2304	8/16/10	0.5	ND	µg/100cm^2
Concrete Sika 62	North Washington	Sample taken along eastern face of entrance structure, 2 feet south of northeast corner, directly on caulking line.	SWC-VWE-2308	8/16/10	0.5 UJ	ND	µg/100cm^2
Concrete Sika 62	West JQ Adams	Sample taken 3 feet north of southern-most column, within keyway along caulking line.	SWC-VWE-2312	8/16/10	0.5 UJ	ND	µg/100cm^2
Concrete Sika 62	East JQ Adams	Sample taken from vertical caulking joint number 12.	SWC-VWE-2314	8/17/10	0.5	ND	µg/100cm^2
Concrete Sika 62	Northwest Prince	Sample taken from vertical caulking joint number 2.	SWC-VWE-2315	8/17/10	0.5	ND	µg/100cm^2
Concrete Sika 62	East Hampden Stairs	Sample taken along northern retaining wall bordering steps (now a ramp), 16 feet east of the retaining wall's west end, on the caulking line.	SWC-VWE-2320	8/18/10	0.5	ND	µg/100cm^2
Concrete Sika 62	Northeast Hampden	Sample taken along eastern wall, 4 feet south of third column from the northeast corner, approx. 3 inches below the caulking line.	SWC-VWE-2321	8/18/10	0.5	ND	µg/100cm^2
Concrete Sika 62	East Hampden	Sample taken within raised retaining wall area, 16 feet from southeast corner along southern wall, approx. 2 inches below the caulking line.	SWC-VWE-2322	8/18/10	0.5	ND	µg/100cm^2

Table 2-2
Baseline Encapsulant Wipe Sample Results
UMass Southwest Concourse - Amherst, Massachusetts

Media	Work Area	Notes	Sample ID	Date	Detection Limit	Total PCBs	Units
Concrete Sika 670W	Prince	Sample taken 44 ft south along Prince ramp western retaining wall; sample taken 10" above caulk line	SWC-VWE-2233	8/10/10	0.5	ND	µg/100cm^2
Concrete Sika 670W	Prince	Sample taken 26 feet north along Prince ramp eastern retaining wall; sample taken 10" above caulk line	SWC-VWE-2234	8/10/10	0.5	ND	µg/100cm^2
Concrete Sika 670W	Prince	Sample taken on building, 3 ft east of N/S retaining wall; sample taken 10" above caulk line	SWC-VWE-2236	8/10/10	0.5	ND	µg/100cm^2
Concrete Sika 670W	Kennedy	Sample taken on top of concrete pad on southern side of building, 13 feet west of concrete pad corner	SWC-VWE-2237	8/10/10	0.5	ND	µg/100cm^2
Concrete Sika 670W	Kennedy	Sample taken on top of concrete pad on eastern side of building, 36 feet north of building SE corner	SWC-VWE-2238	8/10/10	0.5	ND	µg/100cm^2
Concrete Sika 670W	Kennedy	Sample taken on top of concrete pad on northern side of building, 23 feet east of building NW corner	SWC-VWE-2239	8/10/10	0.5	ND	µg/100cm^2
Concrete Sika 670W	Thoreau	Sample taken on top of concrete pad on southern side of building, 28 feet east of building SW corner	SWC-VWE-2240	8/10/10	0.5	ND	µg/100cm^2
Concrete Sika 670W	Hampden	Sample taken on building column at stair landing; sample taken 10" above caulk line	SWC-VWE-2242	8/10/10	0.5	ND	µg/100cm^2
Concrete Sika 670W	North Coolidge	Sample taken along horizontal surface in front of western-most column	SWC-VWE-2269	8/13/10	0.5	ND	µg/100cm^2
Concrete Sika 670W	West Coolidge	Sample taken approximately 2 feet from south end of horizontal surface, 4" away from caulking line	SWC-VWE-2270	8/13/10	0.5	ND	µg/100cm^2
Concrete Sika 670W	Southeast Coolidge	Sample taken at eastern-most column on southern wall, approx. 2 inches above caulking line.	SWC-VWE-2271	8/13/10	0.5	ND	µg/100cm^2
Concrete Sika 670W	Prince	Sample taken along building wall near entrance, above caulking line.	SWC-VWE-2272	8/13/10	0.5	ND	µg/100cm^2
Concrete Sika 670W	North Crampton	Sample taken 10" above caulking along west wall, approx. 13 feet south of Prince south steps	SWC-VWE-2273	8/13/10	0.5	ND	µg/100cm^2

Table 2-2
Baseline Encapsulant Wipe Sample Results
UMass Southwest Concourse - Amherst, Massachusetts

Media	Work Area	Notes	Sample ID	Date	Detection Limit	Total PCBs	Units
Concrete Sika 670W	West Crampton	Sample taken above caulking line along west retaining wall, approx. 8 feet north of west Crampton steps/ramp	SWC-VWE-2274	8/13/10	0.5	ND	µg/100cm^2
Concrete Sika 670W	West Crampton	Sample taken along west retaining wall, approx. 8 feet north of overhang south of ramp, 11 inches above the caulking line.	SWC-VWE-2275	8/13/10	0.5	ND	µg/100cm^2
Concrete Sika 670W	Northeast Hampden	Sample taken along east building face, 9 feet north of northeast steps, approx. 5 inches above caulking line.	SWC-VWE-2276	8/13/10	0.5	ND	µg/100cm^2
Concrete Sika 670W	East Hampden	Sample taken within raised retaining wall area, 16 feet from southeast corner along southern wall, approx. 8 inches above caulking line.	SWC-VWE-2277	8/13/10	0.5	ND	µg/100cm^2
Concrete Sika 670W	East Hampden	Sample taken on eastern outside portion of raised retaining wall area, 10 feet south of northeast corner, approx. 10 inches above caulking line.	SWC-VWE-2278	8/13/10	0.5	ND	µg/100cm^2
Concrete Sika 670W	Northeast Hampshire	Sample taken where steps meet building along northern end of eastern wall, approx. 4 inches above caulking line.	SWC-VWE-2281	8/13/10	0.5	ND	µg/100cm^2
Concrete Sika 670W	East Hampshire	Sample taken along building face, 69 feet north of southeast corner, approx. 11 inches above caulking line.	SWC-VWE-2282	8/13/10	0.5	ND	µg/100cm^2
Concrete Sika 670W	Southwest Crampton	Sample taken along retaining wall west of south steps, 10 feet north of southwest corner, approx. 6 inches above caulking line.	SWC-VWE-2283	8/13/10	0.5	ND	µg/100cm^2
Concrete Sika 670W	North JQ Adams	Sample taken along building face, 14 feet east of northwest corner, approx. 6 inches above caulking line.	SWC-VWE-2284	8/13/10	0.5	ND	µg/100cm^2
Concrete Sika 670W	Berkshire Plaza	Sample taken along north building face where southeast steps met building, 12 feet west of northeast building corner, 6 inches above caulking line.	SWC-VWE-2286	8/13/10	0.5	ND	µg/100cm^2
Concrete Sika 670W	South JQ Adams	Sample taken along building face, 6 feet east of southwest building corner, approx. 8 inches above caulking line.	SWC-VWE-2287	8/13/10	0.5	ND	µg/100cm^2

Table 2-2
Baseline Encapsulant Wipe Sample Results
UMass Southwest Concourse - Amherst, Massachusetts

Media	Work Area	Notes	Sample ID	Date	Detection Limit	Total PCBs	Units
Concrete Sika 670W	South Berkshire Steps	Sample taken where steps meet south retaining wall, approximately 6 inches above caulking line.	SWC-VWE-2288	8/13/10	0.5	ND	µg/100cm^2
Concrete Sika 670W	Northeast Cance	Sample taken along eastern building face, 2 feet south of northeast corner, approx. 8 inches above caulking line.	SWC-VWE-2289	8/13/10	0.5	ND	µg/100cm^2
Concrete Sika 670W	Southeast Cance	Sample taken along eastern building face, 24 feet north of southeast corner, approx. 8 inches above caulking line.	SWC-VWE-2290	8/13/10	0.5	ND	µg/100cm^2
Concrete Sika 670W	Southwest Crampton	Sample taken along retaining wall bordering the east side of the ramp, 12 feet north of southern corner of wall, 5 inches above caulking line.	SWC-VWE-2292	8/16/10	0.5	ND	µg/100cm^2
Concrete Sika 670W	West Kennedy Ramp	Sample taken along ramp retaining wall directly west of southwest building corner, approx. 2 inches above caulking line.	SWC-VWE-2293	8/16/10	0.5	ND	µg/100cm^2
Concrete Sika 670W	Northeast Berkshire Plaza Steps	Sample taken where stairs met with east retaining wall, 83 feet south of northern corner, approx. 4 inches below caulking line.	SWC-VWE-2297	8/16/10	0.5	ND	µg/100cm^2
Concrete Sika 670W	South Washington	Sample taken along west side of eastern-most column, 3 inches above caulking line.	SWC-VWE-2303	8/16/10	0.5	ND	µg/100cm^2
Concrete Sika 670W	Southeast Washington	Sample taken along northern retaining wall bordering steps, 11 feet east of west retaining wall end, 3 inches above caulking line.	SWC-VWE-2305	8/16/10	0.5	ND	µg/100cm^2
Concrete Sika 670W	East Washington	Sample taken along building face, 12 feet south of northeast corner, approx. 3" above caulking line.	SWC-VWE-2306	8/16/10	0.5	ND	µg/100cm^2
Concrete Sika 670W	East Washington Stairs	Sample taken along eastern retaining wall, approximately 3 feet north of southern end, 2 inches above caulking line.	SWC-VWE-2307	8/16/10	0.5	ND	µg/100cm^2
Concrete Sika 670W	North Washington	Sample taken 3 feet east of western-most column, approx. 4 inches above caulking line.	SWC-VWE-2309	8/16/10	0.5	ND	µg/100cm^2

Table 2-2
Baseline Encapsulant Wipe Sample Results
UMass Southwest Concourse - Amherst, Massachusetts

Media	Work Area	Notes	Sample ID	Date	Detection Limit	Total PCBs	Units
Concrete Sika 670W	West Washington	Sample taken 3 feet north of southern corner of horizontal surface, approx. 4" away from caulking line.	SWC-VWE-2310	8/16/10	0.5	ND	µg/100cm^2
Concrete Sika 670W	South JQ Adams	Sample taken where stairs meet building, 11 feet west of southeast corner, approx. 3 inches above caulking line.	SWC-VWE-2311	8/16/10	0.5	ND	µg/100cm^2
Concrete Sika 670W	West JQ Adams	Sample taken 14 feet north of sample 2312, approx. 3 inches above caulk line	SWC-VWE-2313	8/16/10	0.5 UJ	ND	µg/100cm^2
Concrete Sika 670W	South Prince Steps	Sample taken from east retaining wall, 3 feet from the northern edge, approx. 2" above the caulking line.	SWC-VWE-2316	8/17/10	0.5	ND	µg/100cm^2
Concrete Sika 670W	South Prince Steps	Sample taken from west retaining wall, 3 feet from the southern edge, approx. 3" above the caulking line.	SWC-VWE-2317	8/17/10	0.5	ND	µg/100cm^2
Concrete Sika 670W	South Crampton Steps	Sample taken from west retaining wall, 4 feet from the northern edge, approx. 4" above the caulking line.	SWC-VWE-2318	8/18/10	0.5	ND	µg/100cm^2
Concrete Sika 670W	Kennedy/Coolidge Steps	Sample taken from northern retaining wall abutting former steps, at the same location as sample 2153, 3 inches above the caulking	SWC-VWE-2319	8/18/10	0.5	ND	µg/100cm^2
Concrete Sika 670W	West MacKimmie Steps	Sample taken along southern retaining wall abutting steps, 6 feet east of the western-most edge, 2 inches above the caulking line.	SWC-VWE-2323	8/18/10	0.5	ND	µg/100cm^2
Concrete Sika 670W	Southeast Berkshire	Sample taken along southern retaining wall within the small western portion of the pad, directly south of sample 2183, approx. 4" above the caulking line.	SWC-VWE-2324	8/18/10	0.5	ND	µg/100cm^2
Concrete Sika 670W	West Kennedy	Sample taken along east retaining wall of former steps, 8 feet south from north end, approx. 2" above caulking line.	SWC-VWE-2325	8/19/10	0.5	ND	µg/100cm^2
Concrete Sika 670W	South Coolidge Stairs	Sample taken along south retaining wall, 8' east of west end, approx. 3" above caulking line.	SWC-VWE-2327	8/19/10	0.5	ND	µg/100cm^2

Table 2-2
Baseline Encapsulant Wipe Sample Results
UMass Southwest Concourse - Amherst, Massachusetts

Media	Work Area	Notes	Sample ID	Date	Detection Limit	Total PCBs	Units
Concrete Sika 670W	North Hampden Stairs	Sample taken at northeastern stairs at the bottom step along the eastern wall; 2" above caulk line	SWC-VWE-2328	8/19/10	0.5	ND	µg/100cm^2
Concrete Sika 670W	East Hampden Stairs	Sample taken along northern retaining wall bordering steps (now a ramp), 16 feet east of the retaining wall's west end, 3" above the caulking line.	SWC-VWE-2329	8/19/10	0.5	ND	µg/100cm^2
Concrete Sika 670W	South Hampden Stairs	Sample taken along retaining wall bordering western side of steps, 3 feet north of southern end of wall, approx. 2 inches above caulking line.	SWC-VWE-2330	8/19/10	0.5	ND	µg/100cm^2
Concrete Sika 670W	Southwest Hampden	Sample taken along outside of retaining wall bordering western side of northern soil area, 7 feet south of northwest corner, approx. 2" above caulking line	SWC-VWE-2331	8/19/10	0.5	ND	µg/100cm^2
Concrete Sika 670W	Northwest Berkshire Plaza Steps	Sample taken where stairs met with east retaining wall, 7 feet north of southern corner, approx. 3" above caulking line.	SWC-VWE-2332	8/19/10	0.5	ND	µg/100cm^2
Concrete Sika 670W	Southwest Berkshire Plaza Steps	Sample taken where stairs met north building face, 12.5 feet east of corner, approx. 3" above caulking line.	SWC-VWE-2333	8/19/10	0.5	ND	µg/100cm^2
Concrete Sika 670W	Berkshire Plaza	Sample taken along retaining wall bordering northern paver area, 22 feet east of west corner, approx. 6" above caulking line.	SWC-VWE-2334	8/19/10	0.5	ND	µg/100cm^2
Concrete Sika 670W	Berkshire Plaza	Sample taken along inside of retaining wall bordering western side of northern soil area, 31 feet north of southwest corner, approx. 4" above caulking line	SWC-VWE-2335	8/19/10	0.5	ND	µg/100cm^2
Concrete Sika 670W	Berkshire Plaza	Pilot test; Clear 670W	SWC-VWC-1980	7/28/10	0.5	ND	µg/100cm^2
Concrete Sika 670W	Hampshire	above caulk line; on wall	SWC-VWC-1986	7/29/10	0.5	ND	µg/100cm^2
Concrete Sika 670W	West MacKimmie	North wall of West MacKimmie steps above caulk line at 5th step from the top	SWC-VWC-2010	7/29/10	0.5	ND	µg/100cm^2
Concrete Sika 670W	South Crampton	4" above caulking; sample taken 4 feet from Crampton building southeastern corner	SWC-VWE-2126	8/3/10	0.5	ND	µg/100cm^2

Table 2-2
Baseline Encapsulant Wipe Sample Results
UMass Southwest Concourse - Amherst, Massachusetts

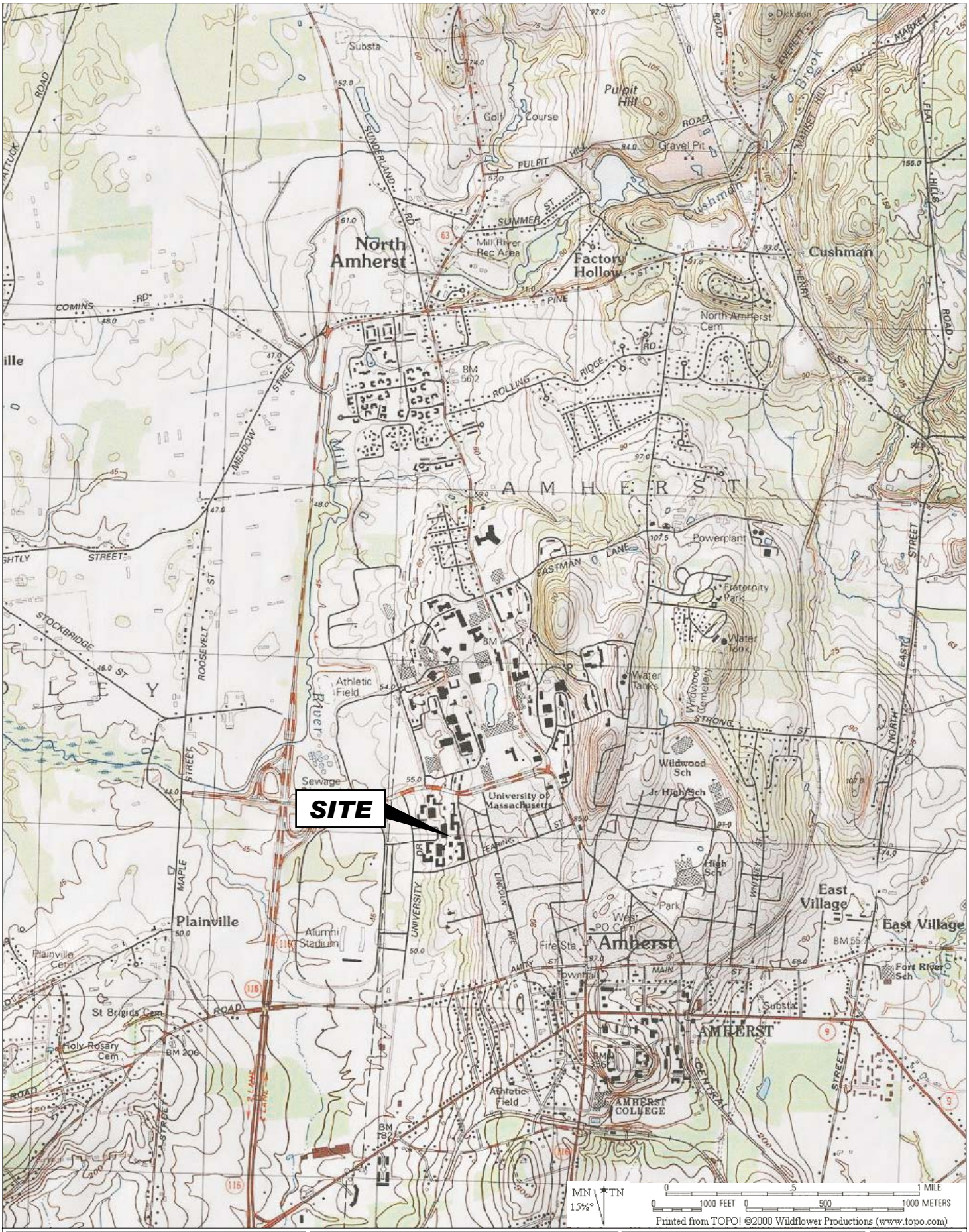
Media	Work Area	Notes	Sample ID	Date	Detection Limit	Total PCBs	Units
Concrete Sika 670W	South Crampton	5" above caulking; sample taken on eastern edge of northern planter	SWC-VWE-2128	8/3/10	0.5	ND	µg/100cm^2
Concrete Sika 670W	South Crampton	7" above caulking; sample taken 5 feet south of Mackimmie building northeast corner	SWC-VWE-2130	8/3/10	0.5	ND	µg/100cm^2
Concrete Sika 670W	South Crampton	5" above caulking; sample taken in vicinity of sample 1249	SWC-VWE-2132	8/3/10	0.5	ND	µg/100cm^2
Concrete Sika 670W	South Crampton	5" above caulking; sample taken in vicinity of sample 1302	SWC-VWE-2134	8/3/10	0.5	ND	µg/100cm^2
Concrete Sika 670W	Prince Stairs	Sample taken at top of steps, west wall, 2-3" below caulk line; clear coat 670W	SWC-VWE-2195	8/5/10	0.5	1.14 J	µg/100cm^2
Concrete Sika 670W	Prince Stairs	Sample taken at 3rd step from the top of steps along eastern wall; clear coat 670W; 1" below caulk line	SWC-VWE-2196	8/5/10	0.5	1.48 J	µg/100cm^2
Concrete Sika 670W	John Quincy Adams	Sample adjacent to vertical joint	SWC-VWE-2475	8/25/10	0.5	ND	ug/100cm2
Concrete Sika 670W	Prince	Sample adjacent to vertical joint	SWC-VWE-2476	8/25/10	0.5	ND	ug/100cm2

Notes:
1. All samples were extracted by USEPA Method 3540C (Soxhlet) and analyzed by USEPA Method 8082.
2. ND = Not detected above laboratory's minimum reporting limit, as indicated.
3. All PCBs reported as Aroclor 1254 unless otherwise indicated.
4. J = estimated concentration; UJ = estimated non-detect

Table 3-1
Baseline Encapsulant Wipe Sample Results - Pedestrian Tunnel
UMass Southwest Concourse - Amherst, Massachusetts

Media	Work Area	Notes	Sample ID	Date	Detection Limit	Total PCBs	Units
Concrete Sika 62	Pedestrian Tunnel	Sample taken at bottom of joint along east edge. Result includes multiplier of 3.44 for reported result of 7.0 ug; sample area was 1.5" x 3", or 29cm^2 instead of 100cm^2.	SWC-VWE-2198	8/5/10	0.5	24.1	µg/100cm^3
Concrete Sika 62	Pedestrian Tunnel	East side of tunnel wall joint, approx 5 feet above base, where new caulking was removed. Result to include multiplier of 1.72; sample area was 0.75" x 12", or 58 cm^2	SWC-VWE-2268	8/13/10	0.5	7.16	µg/100cm^2
Concrete Sika 62	Pedestrial Tunnel	Sample taken along east side of tunnel wall, approximately 6 feet up from the base, 3 inches south of caulking line.	SWC-VWE-2291	8/16/10	0.5	ND	µg/100cm^2
New Caulking	Pedestrian Tunnel	Sample taken along western side of tunnel, 5' from the base, on the new caulking	SWC-VWK-2336	8/19/10	0.5	3.66	µg/100cm^2

Notes:
1. All samples were extracted by USEPA Method 3540C (Soxhlet) and analyzed by USEPA Method 8082.
2. ND = Not detected above laboratory's minimum reporting limit, as indicated.
3. All PCBs reported as Aroclor 1254 unless otherwise indicated.



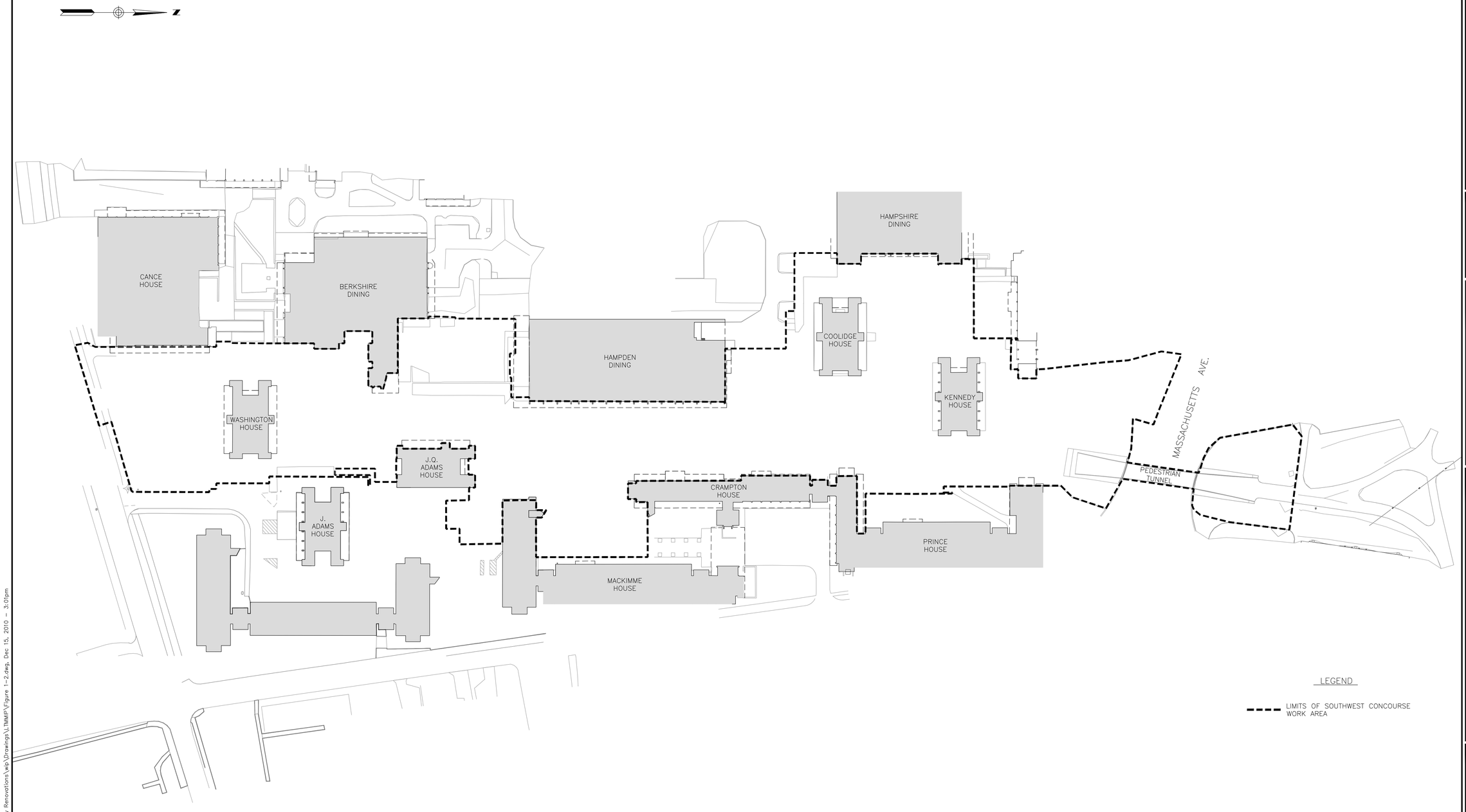
WOODARD & CURRAN
35 New England Business Center
Andover, MA 01810
COMMITMENT & INTEGRITY DRIVE RESULTS

UMASS AMHERST
SOUTHWEST CONCOURSE
AMHERST, MASSACHUSETTS

SCALE: AS NOTED	JOB NO.: 223505
DATE: JUNE 2010	FILE: Figure 1-1.cnv

SITE LOCUS

DES.BY: EVR	
DR.BY: EVR	
CK.BY: ALW	
1-1	



35 NEW ENGLAND BUSINESS CENTER
ANDOVER, MASSACHUSETTS 01810
866.702.5571 | www.woodardcurran.com

COMMITMENT & INTEGRITY DRIVE RESULTS

WOODARD & CURRAN

REV	DESCRIPTION	DATE
DESIGNED BY:	CJF	CHECKED BY: JAH
DRAWN BY:	EVR	Figure 1-2.dwg

SITE PLAN

UNIVERSITY OF MASSACHUSETTS
AMHERST, MASSACHUSETTS

SOUTHWEST CONCOURSE
PCB REMEDIATION PLAN

JOB NO.: 223505
DATE: DECEMBER 2010
SCALE: AS NOTED
SHEET: OF

FIGURE 1-2

CANCE HOUSE

BERKSHIRE DINING

HAMPDEN DINING

HAMPSHIRE DINING

COOLIDGE HOUSE

KENNEDY HOUSE

WASHINGTON HOUSE

J.Q. ADAMS HOUSE

J. ADAMS HOUSE

CRAMPTON HOUSE

PRINCE HOUSE

MACKIMME HOUSE

MASSACHUSETTS AVE.

PEDESTRIAN TUNNEL

LEGEND

LIMITS OF SOUTHWEST CONCOURSE WORK AREA

CONCRETE RETAINING WALL

ENCAPSULATED SURFACE

0 60 120

SCALE IN FEET

35 NEW ENGLAND BUSINESS CENTER
ANDOVER, MASSACHUSETTS 01810
866.702.6371 | www.woodardcurran.com

COMMITMENT & INTEGRITY DRIVE RESULTS

WOODARD & CURRAN

REV	DESCRIPTION	DATE
DESIGNED BY:	ALW	
DRAWN BY:	EVR	
CHECKED BY:	JAH	
Figure 2-1.dwg		

AREAS OF ENCAPSULATED SURFACES

UNIVERSITY OF MASSACHUSETTS
AMHERST, MASSACHUSETTS

SOUTHWEST CONCOURSE
LTMMP

JOB NO.: 223505
DATE: DECEMBER 2010
SCALE: AS NOTED
SHEET: OF

FIGURE 2-1

S:\223505 UMass Amherst - SW Walkway Renovations\vip\Drawings\LTMMP\Figure 2-1.dwg, Dec 29, 2010 - 9:42am

APPENDIX A: ANALYTICAL LABORATORY REPORTS