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TRC Project No. 115058

March 24, 2009

Kimberly N. Tisa
United States Environmental Protection Agency
One Congress Street
Suite 1100 – CPT
Boston, Massachusetts 02114-2023

RE: Recommended Changes
Long-Term Monitoring and Maintenance Implementation Plan (LTMMIP)
Keith Middle School (KMS) Site, New Bedford, Massachusetts

Dear Ms. Tisa:

TRC has prepared this letter to summarize recommended changes to the Long-Term Monitoring and Maintenance Implementation Plan (LTMMIP) for the above-referenced Keith Middle School (KMS) site. The LTMMIP sets forth requirements for the long-term monitoring and maintenance of the exposure management barrier, groundwater, wetland sediment, vent gas and indoor air quality of the KMS site. The LTMMIP also provides a description of the maintenance activities to be performed at the KMS site and related precautions to prevent exposure to the impacted fill layer located beneath the exposure management barrier.

TRC's use of the LTMMIP for monitoring and maintenance activities thus far through 2007 and 2008 has revealed a number of inconsistencies and technical errors that should be corrected to facilitate implementation of an effective LTMMIP. In addition, TRC has identified some activities that could be modified, reduced, or eliminated to decrease operation and maintenance costs for the KMS site and streamline monitoring and maintenance procedures while still providing useful data and effectively monitoring the protectiveness of the remedy. This letter and associated table summarize the recommended changes to the LTMMIP. Following your review and concurrence, TRC will prepare a revised LTMMIP for your review/approval.

INTRODUCTION

TRC assembled a panel of in-house technical specialists (e.g., chemists, air monitoring specialists, cap engineers, and risk assessor) to perform a comprehensive review of the LTMMIP. Members of the panel have also worked under the LTMMIP requirements. Our specialists have identified

areas in the LTMMIP where technical correction is warranted and have also identified suggested modifications to help streamline implementation and reduce monitoring costs.

RECOMMENDED CHANGES TO THE LTMMIP

The findings of the comprehensive technical review and the recommendations of the technical specialists are presented in Table 1, which summarizes the current LTMMIP element recommended to be changed or modified, the recommended change, and rationale/benefit of the change. The recommendations address technical deficiencies or suggest technical improvements, and where appropriate, potential cost savings. The recommended changes affect indoor air monitoring, groundwater monitoring, foundation vent air monitoring, wetland inspection and monitoring, and long-term cap monitoring.

With regard to cost savings, those recommended changes in Table 1 that have a significant cost impact are also summarized below. Please see Table 1 for additional details regarding the rationale/benefit of the recommended changes.

LTMMIP Section 2 – Indoor Air Monitoring

- **Indoor air sampling frequency for Volatile Organic Compounds (VOCs) –** Stop sampling of VOCs in indoor air at KMS. VOCs are not the principal contaminants of the soil/fill underlying the cap posing potential risk to building occupants. Eliminating VOC sampling for indoor air will save approximately $4,300 in annual laboratory expenses.

- **Indoor air sampling frequency for PCBs –** Reduce the frequency of sampling of PCBs to two events per year. Based on the eight rounds of indoor air monitoring conducted by TRC and six rounds conducted by the prior consultant, the remedy implemented for the KMS site has been shown to be protective of potential airborne PCB exposures associated with the capped PCB contamination. Reducing PCB indoor air sampling to two rounds per year will save approximately $34,000 in contractor labor and expense annually (assuming VOC and vent stack sampling is also reduced to the same frequency).

- **Analytical parameters –** Specify PCB air analysis by the homologue method (EPA Method 680) rather than congeners and Aroclors since it provides reliable total PCB quantification (upon which the site-specific risk-based comparison criteria are based) and the data are comparable to the air data gathered at New Bedford High School (NBHS), facilitating public communication. In addition, the Aroclor approach to the analysis of PCBs in air is not a suitable characterization methodology since PCBs do not vaporize as pure technical mixtures, whereas the homologue measurement approach is not impacted by this potentially significant source of measurement error. This change in PCB sampling for indoor air saves approximately $4,500 in annual laboratory expenses (based on the three rounds of sampling currently specified in the LTMMIP).

- **PCB sample media analysis –** Extract the quartz pre-filter and adsorbent (PUF) together per Method TO-4A, rather than separately as currently required by the LTMMIP. Separate analysis of the filter and PUF does not yield useful information about the physical state of the PCBs at the time of sampling due to evaporative losses of the analyte from the filter during sampling (as stated in the method). Eliminating this requirement would reduce analytical

laboratory costs for PCB indoor air monitoring by nearly $10,200 per year (based on the three rounds of sampling currently specified in the LTMMIP).

LTMMIP Section 3 – Groundwater Monitoring

- **Groundwater monitoring analytes –** Eliminate the requirement for VOC sampling and analysis for KMS groundwater, which is not a contaminant of concern. Limit monitoring to PCBs and metals. Eliminating the VOC analysis from the groundwater monitoring program saves approximately $1,000 in annual laboratory expenses (based on the two rounds of sampling currently specified in the LTMMIP).

LTMMIP Section 4 – Foundation Vent Stack Air Monitoring

- **Vent stack air sampling frequency for VOCs and PCBs –** Reduce the frequency of sampling of PCBs to two events per year and eliminate VOC sampling. Based on the eight rounds of vent stack air monitoring conducted by TRC and six rounds conducted by the prior consultant, the subslab venting system installed for the KMS building has been shown to effectively mitigate the migration of subsurface VOCs and PCBs into indoor air. This change will save approximately $34,000 in contractor labor and expense annually (assuming indoor air sampling is also reduced to the same frequency).

- **Background sampling –** Using the indoor air background sample (flag pole location) as a background sample for both indoor air and vent stack air sampling (VOCs and PCBs) saves approximately $2,100 of annual laboratory expenses (based on three rounds of sampling).

- **Analytical parameters –** Specify PCB air analysis by the homologue method (EPA Method 680) rather than congeners and Aroclors since it provides reliable total PCB quantification (upon which the site-specific risk-based comparison criteria are based) and the data are comparable to the air data gathered at NBHS, facilitating public communication. In addition, the Aroclor approach to the analysis of PCBs in air is not a suitable characterization methodology since PCBs do not vaporize as pure technical mixtures. The change in PCB sampling for vent stack air monitoring saves approximately $5,200 in annual laboratory expenses (based on three rounds of sampling).

LTMMIP Section 7 – Long-Term Cap Monitoring Plan

- **Cap inspections** – Schedule cap inspections for twice per year (spring and early fall). The change in inspection frequency saves approximately $3,000 in consultant labor and expense (assuming no need for follow-up inspections per the LTMMIP).

CONCLUSIONS

Once the recommended revisions to the LTMMIP described above and summarized in Table 1 have been agreed upon, a draft LTMMIP revision will be prepared for your regulatory review and approval. The revision will reflect the agreed-upon changes to the LTMMIP and will also provide more appropriate response actions and response action schedules that reflect the current comprehensive understanding of human health risk, sources, and air measurement data collected to

date. The draft revised LTMMIP will be provided to EPA for review and comment before implementation. Comments received by EPA will be incorporated, as warranted, into the revised LTMMIP.

Please call or write if you have any questions or comments.

Sincerely,

David M. Sullivan, LSP, CHMM
Sr. Project Manager

Attachment (Table 1)

cc: D. Fredette, S. Alfonse – City of New Bedford

Table 1 – Recommended Changes to LTMMIP
Keith Middle School Site, New Bedford, Massachusetts

Comment Number	Current LTMMIP Element	Recommended Change*	Rationale/Benefit
Section 2 – Indoor Air Monitoring			
1.	**Indoor air sampling frequency for VOCs –** The LTMMIP (Section 2.1) currently calls for sampling of indoor air with a minimum frequency of three times per year for VOCs. However, the LTMMIP also states that, after the collection of one complete year of data, a request may be submitted to EPA to reduce the indoor air sampling frequency.	Eliminate the VOC sampling requirement.	VOCs are not the principal contaminant of the soil/fill underlying the cap. In addition, the indoor air and vent stack air monitoring events conducted to date have demonstrated the protectiveness and functionality of the passive ventilation system. VOCs detected to date in indoor air at KMS are associated with off-gassing from building materials, shown to be trending downward over time, or are associated with cleaning materials, solvents, paints, and equipment used in the day-to-day maintenance of the building. ***Eliminating VOC sampling for indoor air will save approximately $4,300 in annual laboratory expenses.***
2.	**Indoor air sampling frequency for PCBs –** The LTMMIP (Section 2.1) currently calls for sampling of indoor air with a minimum frequency of three times per year for PCBs. However, the LTMMIP also states that, after the collection of one complete year of data, a request may be submitted to EPA to reduce the indoor air sampling frequency.	Reduce the frequency of sampling of PCBs to twice per year. Review frequency of monitoring again after 2 years.	Based on the eight rounds of indoor air monitoring conducted by TRC and six rounds conducted by the prior consultant, the remedy implemented for the KMS site has been shown to be protective of potential airborne PCB exposures associated with the capped PCB contamination. The proposed reduced frequency to twice per year will be sufficient to demonstrate protectiveness in the foreseeable future. Sampling would be conducted during July/August and December. Sampling during the July/August period will help evaluate PCB indoor air concentrations during warm weather conditions, when the school is experiencing lower than normal air exchanges and at temperatures favorable to increased PCB volatilization to demonstrate protectiveness based on site-specific "worst-case" conditions prior to the start of the new school year. (Based on 14 rounds of indoor air sampling at KMS, the highest concentration PCB detections in indoor air have been observed from June to September.) Sampling in December would monitor potential "worst-case" vapor intrusion conditions per MassDEP guidance. ***Reducing PCB sampling for indoor air to two events per year will save approximately $34000 in contractor labor and expense annually (assuming vent stack air sampling is also reduced to the same frequency).***
3.	**Indoor air sampling locations –** The LTMMIP (Section 2.2) currently states that one indoor air sample will be collected from the ground floor of each of the three school building sections (Sections A, B and C).	Allow the selection of the indoor air sample locations to be made at the discretion of the City.	This will allow the flexibility to sample particular areas of interest and the most appropriate exposure locations to provide information suitable for the risk evaluation without additional expense.

Table 1 – Recommended Changes to LTMMIP
Keith Middle School Site, New Bedford, Massachusetts

Comment Number	Current LTMMIP Element	Recommended Change*	Rationale/Benefit
4.	**Analytical parameters –** The LTMMIP (Section 2.3) calls for the analysis of air samples for PCBs according to EPA Method TO-4A for Aroclors (-1016, -1221, -1232, -1242, -1254, -1260, -1262, and -1268) and the 209 PCB congeners.	Specify PCB air analysis by the homologue method (EPA Method 680).	The homologue analytical method is a reliable analytical method to quantify total PCBs, which are also the basis for the risk-based Action Level (AL) and Acceptable Long-Term Average Exposure Concentration (ALTAEC) used to evaluate potential risk. In addition, by quantifying PCB homologues, total PCB air data gathered at the KMS are directly comparable to total PCB air data gathered at New Bedford High School (NBHS), greatly facilitating data comparison and risk communication to local citizens during Public Involvement Plan (PIP) meetings and related public communication regarding air monitoring. The bulk of PCBs detected in air at KMS and NBHS are associated with the vapor phase and PCBs do not vaporize as pure technical mixtures (i.e., they do not vaporize as Aroclor mixtures). Consequently, the Aroclor approach to analysis of PCBs in air is not a suitable characterization methodology at KMS. The homologue measurement approach is not impacted by this potentially significant source of error. ***This change in PCB sampling for indoor air saves approximately $4,500 in annual laboratory expenses (based on three rounds of sampling).***
5.	**PCB sample media analysis –** The LTMMIP (Section 2.3) currently requires analysis of the PUF cartridge and quartz pre-filter from high-volume sampling separately to differentiate between airborne particulate contamination captured on the pre-filter and vapor-phase contamination absorbed by the PUF.	Extract the quartz pre-filter and adsorbent (PUF) together per Method TO-4A, rather than separately as currently required by the LTMMIP.	EPA Method TO-4A notes that the filter and adsorbent are extracted together in order to reach detection limits and minimize cost, and to prevent misinterpretation of data. Separate analysis of the filter and PUF does not yield useful information about the physical state of the PCBs at the time of sampling due to evaporative losses of the analyte from the filter during sampling (Method TO-4A, Section 10.3.2 – Note). In addition, sufficient data have been collected and enough analysis of the data has been performed to evaluate any differentiation, however questionable, considering the above-stated EPA method stipulations. Eliminating this requirement would significantly reduce analytical laboratory costs for PCB indoor air monitoring. ***Eliminating the requirement to analyze the pre-filter separately would reduce analytical laboratory costs for PCB indoor air monitoring by nearly $10,200 per year (based on three rounds of PCB air sampling).***
6.	**PCB Action Levels –** Section 2.5.1 of the LTMMIP refers to an Action Level of 0.05 ug/m^3 and a Maximum Acceptable Level of 0.3 ug/m^3.	Replace the term “Maximum Acceptable Level” with the term “Acceptable Long-Term Average Exposure Concentration.”	The term “Maximum Acceptable Level” is a misnomer; the concentration 0.3 µg /m^3 represents a long-term average concentration that corresponds to risk benchmarks established by the Massachusetts Department of Environmental Protection (MassDEP), assuming 25 years of daily work place exposure. TRC used BETA’s “Maximum Acceptable Level” term during TRC’s first PIP meeting (August 31, 2006) for consistency with prior presentations by BETA, but now refers to this concentration as the Acceptable Long-Term Average Exposure Concentration (ALTAEC). Short-term exposures at this concentration do not represent an immediate threat to health.

Table 1 – Recommended Changes to LTMMIP
Keith Middle School Site, New Bedford, Massachusetts

Comment Number	Current LTMMIP Element	Recommended Change*	Rationale/Benefit
7.	**Comparison Criteria for Indoor Air VOC Sample Results –** The LTMMIP (Section 2.5.2) currently requires that VOC results for each indoor air sample be evaluated by comparison to a combination of the contemporary outdoor air sample results and the 1995 MassDEP Threshold Effects Limits (TELs) and Allowable Ambient Limits (AALs) for ambient air. For VOCs lacking either a TEL or AAL, the LTMMIP charges the LSP-of-record with individual evaluation of the VOCs for human health risk to demonstrate a condition of No Significant Risk as defined in 310 CMR 40.0006.	Replace the use of TEL and AALs with a flexible approach to the selection and use of comparison criteria, given that changes do periodically occur in consensus standards/criteria as new technical data emerge meriting re-evaluation. For example, MassDEP recently solicited review comments on draft indoor air upper percentile values (UPVs), representative of air concentrations of VOCs in the absence of a site source, and indoor air threshold values which consider both typical VOC concentrations found indoors as well as risk-based air concentrations. In addition, EPA has developed risk-based screening values for indoor air in both residential and non-residential settings for a wide variety of VOCs.	The directives specified in the LTMMIP concerning VOC comparisons are not technically sound because TELs and AALs are toxicologically outdated (last updated in 1995) and comparison to ambient air criteria does not recognize the many and varied indoor sources of VOCs including paints, cleaning products, off-gassing from furniture and building materials, and indoor storage of VOC-containing products. There are more suitable and defensible values to use as comparison criteria for VOCs in indoor air. TRC recommends that the LTMMIP be revised to provide flexibility in the selection of the most appropriate manner in which to evaluate the indoor air VOC concentrations as long as VOC sampling and analysis is part of the KMS monitoring program. ***Note that eliminating VOC analysis as suggested under Comment Number 1 would eliminate the need for this change.***
8.	**Triggers for further analysis/evaluation of indoor air quality results –** The LTMMIP (Sections 2.5.1.1 and 2.5.2.1) currently specifies that if any indoor air sample result for PCBs or VOCs exceeds the PCB action level, TELs/AALs, or the VOC outdoor sample result by greater than 50-percent, follow-up assessment will be initiated including visual inspection of the sampling location, interviews with site personnel to identify activities that may have occurred during sample collection, consultation with the analytical laboratory to confirm the validity of the result, re-sampling of the location within seven days, supplemental assessment activities, submission of the laboratory data to a toxicologist/risk assessor for further evaluation, and/or additional monitoring or corrective actions.	Re-evaluate and re-state triggers for follow-up actions based on the degree of risk posed. This will result in a more rationale, cost-effective, yet health-protective, mechanism to address the detection of PCBs or VOCs in excess of a comparison criterion. Once the comparison criteria are updated and technically representative of specific risk levels (i.e., cancer risk of 1 x 10^{-6} or hazard quotient of 0.2), triggers for follow-up actions can be based on pre-specified risk levels (e.g., cancer risk of 1 x 10^{-5} or hazard quotient of 1) and/or exceedances of upper percentile indoor air levels. The follow-up actions can then be tailored to the degree of risk posed by the exceedance and the probability that the exceedance is associated with a source, not from a background condition.	Based on 12 monthly rounds of monitoring, and several rounds of tri-annual monitoring, TRC has had an opportunity to evaluate both the risks posed, the trends in the data, and the potential causes of exceedances (e.g., use and storage of cleaners and solvents at the school, off-gassing from building components). The LTMMIP specified follow-up actions are costly and time-consuming and can be triggered even when detected concentrations exceed comparison criteria and background concentrations to a minor degree. ***Note that eliminating VOC analysis as suggested under Comment Number 1 would eliminate the need for this change.***
9.	**Reporting/Timeframes –** The LTMMIP (Section 2.6) requires that all air monitoring analytical results be provided verbally to school officials within 72 hours of receipt of results from the laboratory. In addition, the LTMMIP calls for the City to contact EPA within 24 hours if a PCB or VOC action level is exceeded. Section 2.6 also calls for preparation of a written summary report within 10 days of receipt of results, with validated data to be provided separately within 21 days of receipt of results.	Modify the reporting timeframe requirements to allow for the following: ▪ Eliminate the need to contact the EPA within 24 hours if a VOC action level is exceeded. ▪ Retain the requirement to contact EPA within 24-hours if a PCB action level is exceeded. ▪ Provide the results to the City and school officials in a written report so that the results can be evaluated and explained in context. ▪ Prepare the written report only with validated data to eliminate the potential for reporting erroneous results.	Based on 12 monthly rounds of monitoring, and several rounds of tri-annual monitoring, TRC has had an opportunity to evaluate both the risks posed, the trends in the data, and the potential causes of exceedances (e.g., use and storage of cleansers and solvents at the school, off-gassing from building components). At this point, the conceptual model for detections and sources of VOCs and PCBs are well understood at KMS and do not present a significant risk to building occupants, even though as has been shown for VOCs, some detected levels exceed current reporting triggers. In the context of the conceptual model that has developed for the KMS, expediting reporting at the expense of rationale data review and reporting and risk analysis could be counterproductive.

Table 1 – Recommended Changes to LTMMIP

Comment Number	Current LTMMIP Element	Recommended Change*	Rationale/Benefit
Section 3 – Groundwater Monitoring			
10.	**Groundwater monitoring analytes –** The current LTMMIP (Section 3.3) calls for the analysis of groundwater samples for VOCs, PCBs, and select heavy metals.	Eliminate the requirement for VOC sampling and analysis. Limit monitoring to PCBs and metals.	PCBs, heavy metals and PAHs are the principal contaminants of concern in KMS fill/soil. VOCs were not present in significant quantities at the KMS site, nor are there significant sources of VOCs on-site warranting regular monitoring of groundwater. The added expense of VOC analysis is not justifiable. ***Eliminating the VOC analysis from the groundwater monitoring program saves approximately $1,000 in annual laboratory expenses (based on two rounds of sampling).***
11.	**Chromatography evaluation –** The LTMMIP (Section 3.4) currently requires a qualitative evaluation of gas chromatograms for PCB analysis to evaluate the potential presence of unidentified compounds.	Eliminate the requirement for a qualitative evaluation of GC chromatograms for unidentified compounds from the PCB analysis.	The qualitative screening requirement is technically erroneous given the "cleanup" procedures employed by the laboratory for the specified method. The laboratory currently performs acid cleanup on PCB extracts. The acid cleanup removes most of the organic chemicals with the exception of PCBs. Therefore, review of the resulting chromatograms for the presence of unidentified compounds is not a useful exercise.
12.	**Action level reporting triggers for groundwater –** Section 3.5 of the LTMMIP currently requires that laboratory results of the initial groundwater sampling be verbally reported to the School Department in 24 hours and in writing within 7 days of receipt, but in Section 3.6, the LTMMIP requires verbal transmission of results within 72 hours.	Reporting timeframes should be made consistent and lengthened to allow a reasonable timeframe for evaluation of results. In addition, laboratory errors have already been encountered that were eventually resolved, but not before LTMMIP reporting requirements were fulfilled. The reporting trigger timeframes do not allow sufficient time for resolution of such issues before triggering a reporting requirement.	Contradictory reporting timeframes only contribute to confusion. Also, as a practical matter, additional time should be allowed for technical evaluation and verification of results so that the City can be more fully informed of the situation, especially any potential regulatory reporting obligations.
13.	**Groundwater standards used for comparison –** The LTMMIP (Section 3.5) specifies comparison to GW-2 and GW-3 standards.	The KMS monitoring well results should be compared to the following MCP Method 1 groundwater standards: ▪ MW-1 – GW-3 ▪ MW-2 – GW-1, GW-2 and GW-3 ▪ MW-3 – GW-1, GW-2 and GW-3	The comparison recommendations are due to the proximity of a private drinking water supply well on Summit Street and the actual distance of the wells from occupied structures as per the Massachusetts Contingency Plan (MCP; 310 CMR 40.0000). **Note:** To achieve GW-1 standards for metals, the analytical method may need to be Method 6020A instead of Method 6010B as currently set forth in the LTMMIP, which is a negligible cost impact.
14.	**Follow-up verification for groundwater exceedance –** Section 3.5 of the LTMMIP requires at least one of the following activities: 1) a Phase I Initial Site Investigation; 2) a Method 3 risk assessment; or 3) other response actions determined by EPA and the LSP-of-Record if groundwater contamination in excess of GW-2 and GW-3 standards is confirmed.	The follow-up response actions should be determined on a case-by-case basis in consultation with an LSP.	The follow-up for the discovery of a condition of groundwater contamination in excess of MCP groundwater standards should be evaluated by the LSP. The EPA does not have jurisdiction relative to MCP cleanup standards; therefore, EPA does not need to be part of the decision process. However, EPA can be party to communication on these matters as a courtesy.

Table 1 – Recommended Changes to LTMMIP

Comment Number	Current LTMMIP Element	Recommended Change*	Rationale/Benefit
Section 4 – Foundation Vent Air Monitoring			
15.	**Vent Stack Sealing –** Section 4.1 of the LTMMIP calls for sealing all vent stacks with temporary covers for the 24 hours immediately preceding sampling. After 24 hours have elapsed, the sample will be collected from one of the vent stacks through a sample port in the vent stack cover, with one other vent stack cover removed to allow the inflow of air.	Just prior to sampling, remove covers from all vent stacks that are not being sampled to allow for the inflow of air.	This approach is a modification to the procedure outlined in the LTMMIP to improve representativeness by allowing sample air to be drawn from the entire vent stack zone without potential stagnation of flow caused by capped vent stacks.
16.	**Vent stack air sampling frequency for VOCs and PCBs –** The LTMMIP (Section 4.1) currently calls for sampling of vent stack air with a frequency of three times per year.	Reduce the frequency of sampling of PCBs to once per year in July/August and in December to be re-evaluated in two years. Eliminate the requirement for VOC sampling of the stacks.	The vent stack air monitoring events conducted to date have demonstrated the protectiveness and functionality of the passive ventilation system. The proposed reduced sampling frequency of twice per year will be sufficient to monitor PCBs emitted by the subsurface, if any, and evaluate temporal trends going forward. Sampling during the July/August period will help evaluate PCB concentrations during warm weather conditions when volatilization from the subsurface is expected to be greatest and when access to the steeper sections of the roof is safest. Sampling during December would monitor what MassDEP considers to be worst-case conditions for vapor intrusion. ***Reducing sampling for vent stack air to two events per year will save approximately $34,000 in contractor labor and expense annually (assuming VOC vent and indoor air PCB/VOC sampling is also reduced to the same frequency).***
17.	**Background sampling –** The LTMMIP (Section 4.2) specifies that one VOC and one PCB sample be collected from one upwind location to provide comparative background results for the vent stack sampling. In addition, Section 2.2 of the LTMMP specifies that at least one VOC and one PCB sample will be collected from immediately outside the building to provide comparative background results for the indoor air sampling.	Use the indoor air background sample (flag pole location) as a background sample for both indoor air and vent stack sampling.	The rationale for this change is follows: ▪ Provides equivalent data since the indoor air and vent stack sampling events occur concurrently. ▪ Eliminates unnecessarily duplicative sample collection since this sample can be used as a background sample for both indoor air and vent sampling. ***Using the indoor air background sample (flag pole location) as a background sample for both indoor air and vent stack sampling (VOCs and PCBs) saves approximately $2,100 of annual laboratory expenses (based on three rounds of sampling).***
18.	**Field screening –** Section 4.2 of the LTMMIP specifies that, to aid in the selection of sample collection locations, ambient air screening of each of the 16 rooftop foundation vent stacks be performed for VOCs with a PID prior to sampling. The rotation of monitoring for vent stacks should be established with emphasis on those stacks at which the highest PID reading is recorded.	Eliminate the field screening requirement.	Field screening of the vent stacks for VOCs has not aided in the selection of vent stack sampling locations due to the low levels of VOCs present in vent stack air and the uniform distribution of the low level VOCs. The KMS foundation venting system is comprised of six sub-slab vapor collection zones, each vented by two or four vent stacks penetrating the roof. The stacks sampled during each round of monitoring include VS-1 and VS-4, which vent from the two collection zones located under building Section A (classrooms), and one of two other vent stacks that are rotated to cover the remaining collection zones. Going forward, in lieu of field screening, TRC recommends either randomly selecting the third vent monitoring location or selecting a fixed third location to obtain comparative information over time from a third location.

Table 1 – Recommended Changes to LTMMIP			
Comment Number	**Current LTMMIP Element**	**Recommended Change***	**Rationale/Benefit**
19.	**Analytical parameters –** The LTMMIP (Section 4.3) calls for the analysis of air samples for PCBs according to EPA Method TO-4A for Aroclors (-1016, -1221, -1232, -1242, -1254, -1260, -1262, and -1268) and the 209 PCB congeners.	Specify PCB air analysis by the homologue method (EPA Method 680).	The homologue analytical method is a reliable analytical method to quantify total PCBs, which are also the basis for the risk-based AL and ALTAEC used to evaluate potential risk. In addition, by quantifying PCB homologues, total PCB air data gathered at the KMS are directly comparable to total PCB air data gathered at NBHS, greatly facilitating data comparison and risk communication to local citizens during PIP meetings and related public communication regarding air monitoring. The bulk of PCBs detected in air at KMS and NBHS are associated with the vapor phase and PCBs do not vaporize as pure technical mixtures (i.e., they do not vaporize as Aroclor mixtures). Consequently, the Aroclor approach to analysis of PCBs in air is not a suitable characterization methodology. ***The change in PCB sampling for vent monitoring saves approximately $5,200 in annual laboratory expenses (based on three rounds of sampling).***
20.	**Vent Stack Data Comparisons –** The LTMMIP (Sections 4.51 and 4.5.2) currently mandates that PCB and VOC results for each vent stack air sample be evaluated by comparison to site-specific PCB action levels and, for VOCs, the 1995 MassDEP TELs and AALs for ambient air.	Recommend eliminating the comparison of the vent stack sampling results to risk-based criteria. Instead provide a qualitative evaluation and trend analysis of the vent stack sampling results.	The City and School Department decided to install a vapor barrier on top of the soil beneath the school building concrete floor as an added layer of protection against intrusion of any gases that may accumulate under the building. Passive ventilation has been installed to allow any sub-slab soil gases to migrate from beneath the vapor barrier to the vent stacks installed through the school building roof. Sampling of vent stack air is conducted to confirm the proper functioning of the passive ventilation system, not to determine whether there is a risk or hazard associated with the inhalation of air from the passive ventilation system. The comparison of vent stack air sampling results to the criteria currently set forth in the LTMMIP is inappropriate because the inhalation of vent stack air is an incomplete human exposure pathway. The lack of a complete pathway renders the comparison to such criteria conceptually irrelevant. TRC recommends the vent stack air sampling for VOCs (if continued) and PCBs no longer be compared to risk-based criteria. Instead, TRC recommends evaluating the data over time to monitor concentration trends and comparing the data to historical soil gas sampling results to monitor system performance/functionality.
21.	**PCB Action Levels –** Section 4.5.1 of the LTMMIP refers to an Action Level of 0.05 ug/m^3 and a Maximum Acceptable Level of 0.3 ug/m^3.	Eliminate any reference to PCB Action Levels for vent stack sampling.	Because the comparison of vent stack air sampling results to the criteria currently set forth in the LTMMIP is inappropriate due to the lack of a complete human exposure pathway, TRC recommends the vent stack air sampling for PCBs no longer be compared to risk-based criteria.
22.	**Triggers for further analysis/evaluation of vent stack air results –** The LTMMIP (Sections 4.5.1 and 4.5.2) currently specifies that if any foundation vent stack sample result for PCBs or VOCs exceeds the PCB action level or TELs/AALs, follow-up assessment will be initiated including resampling of the location within seven days, supplemental assessment activities, submission of the laboratory data to a toxicologist/risk assessor for further evaluation, and/or additional monitoring or corrective actions.	Eliminate triggers for follow-up actions because of the recommendation for no comparison of vent stack air data to comparison criteria. Instead provide a qualitative evaluation and trend analysis of the vent stack sampling results. This will result in a more rationale and cost-effective mechanism to evaluate the vent stack air data since human exposure to vent stack air is not occurring.	These LTMMIP requirements are costly and time-consuming follow-up actions to be implemented when even minor exceedances of comparison criteria and background concentrations occur. Based on 12 monthly rounds of monitoring, and several rounds of tri-annual monitoring, TRC has had an opportunity to evaluate the trends in the data and the potential causes of exceedances (e.g., off-gassing from vent system components, evidence of proper functioning of the vent system that is designed to convey soil gases to the atmosphere). Due to a lack of human exposure to vent stack air, no risk-based evaluation is required and no triggers for follow-up actions are necessary.

Table 1 – Recommended Changes to LTMMIP

Comment Number	Current LTMMIP Element	Recommended Change*	Rationale/Benefit
23.	**Reporting/Timeframes –** The LTMMIP (Section 4.6) requires that all vent stack air monitoring analytical results be provided verbally to school officials within 72 hours of receipt of results from the laboratory. In addition, the LTMMIP calls for the City to contact EPA within 24 hours if a PCB or VOC action level is exceeded. Section 4.6 also calls for preparation of a written summary report within 10 days of receipt of results, with validated data to be provided separately within 21 days of receipt of results.	Modify the reporting timeframe requirements to allow for the following: ▪ Eliminate the need to contact the EPA within 24 hours if a VOC or PCB action level is exceeded since no comparison to VOC or PCB action levels will be recommended in the revised LTMMIP. ▪ Provide the results to the City and school officials in a written report so that the results can be evaluated and explained in context. ▪ Prepare the written report only with validated data to eliminate the potential for reporting erroneous results.	Based on 12 monthly rounds of monitoring, and several rounds of tri-annual monitoring, TRC has had an opportunity to evaluate both the trends in the data and the potential causes of exceedances (e.g., off-gassing from vent system components, evidence of proper functioning of vent system which is designed to convey soil gases to the atmosphere). At this point, the conceptual model for detections and sources of VOCs and PCBs are well understood at KMS. In the context of the conceptual model that has developed for the KMS, expediting reporting at the expense of rationale data review and reporting could be counterproductive especially for vent stack air for which no complete human exposure pathway has been identified.
Section 5 – Wetland Sediment Inspection and Monitoring			
24.	**Reporting/Timeframes –** The LTMMIP (Section 5.7) requires that all analytical results be provided verbally to school officials within 10 days of sample collection. Section 5.7 also calls for preparation of a written summary report within 10 days of receipt of results, with validated data to be provided separately within 21 days of receipt of results.	Modify the reporting timeframe requirements to allow for the following: ▪ Provide draft data to project monitors in the City's Department of Environmental Stewardship as soon as possible after data are reported from the laboratory, conference with the project monitors to discuss the results and evaluate appropriate response actions. ▪ Provide the results to the City and school officials in a written report so that the results can be evaluated and explained in context. ▪ Prepare the written report only with validated data to eliminate the potential for reporting erroneous results.	TRC's recommendation is to provide draft data to project monitors in the City's Department of Environmental Stewardship as soon as possible after data are reported from the laboratory and conferencing with the project monitors to discuss the results and evaluate appropriate response actions. This reporting paradigm allows for case-by-case evaluation/assessment.
Section 6 – Laboratory QC & Data Useability			
25.	**Data Validation and Usability –** The LTMMIP (Section 6.4) calls for Tier II data validation to be performed in accordance with EPA New England guidelines for all analyses.	Continue validation of PCB analyses, but perform MassDEP data usability assessments for VOCs and metals instead. Also, perform data usability assessments for PCBs.	Mass DEP requires data usability assessments. Data validation per EPA guidelines is not consistent with this MCP requirement. Retain data validation for PCB analysis given EPA's over-sight role and jurisdiction regarding PCBs at this Site.
Section 7 – Long-Term Cap Monitoring Plan			
26.	**Cap Inspections –** The LTMMIP (Section 7.3) requires cap inspections three times per year: April 1 through 15, August 1 through 15 and November 1 through 15.	Schedule cap inspections for twice per year (spring and late summer/early fall).	TRC's recommendation to perform KMS site cap inspections twice per year (spring and late summer/early fall) is consistent with typical EPA Superfund landfill cap inspection protocols. In addition, the timing of the two inspections allows sufficient time for repairing areas of damaged vegetative growth that would be difficult to accomplish following a November inspection. ***Scheduling cap inspections for twice per year (spring and late summer/early fall) saves approximately $3,000 in consultant labor and expense (assuming no need for follow-up inspections per the LTMMIP).***

Notes:

*** -** Appendices will be revised to be consistent with the proposed changes to the revised LTMMIP text.