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November 4, 2015

Mr. Ray Holberger
Environmental Planner
City of New Bedford
133 William Drive
New Bedford, MA 02740

**Subject: Fall 2015 Cap Inspection
Keith Middle School
New Bedford, Massachusetts**

Dear Mr. Holberger:

At the request of the City of New Bedford (City), TRC performed the nineteenth inspection of the protective cap installed at the Keith Middle School Site located at 225 Hathaway Boulevard in New Bedford, Massachusetts. In August 2012, TRC submitted a Revised Long-Term Monitoring and Maintenance Implementation Plan (LTMMIP) which was subsequently approved. The inspection was performed in accordance with the revised LTMMIP which requires two inspections per year to confirm that the cap is being properly maintained to prevent exposure to the impacted fill beneath.

The cap inspection was performed on October 29th 2015. The elevator vaults were inspected during the annual elevator inspection in December 2014 and no cracks were noted in the concrete vault floors at that time.

SUMMARY OF RESULTS

The following issues were noted during the October 2015 inspection and require repair by the next scheduled inspection:

- 35 major cracks greater than 1/4-inch in width were observed in the asphalt paving in the parking lots and driveways around the building that should be repaired.
- Several major cracks greater than 1/4-inch in width or areas of deterioration were observed in the concrete walkways on the north and south sides of the building and should be repaired.
- Potentially deep-rooted vegetation was observed on the western slope and should be cut down.

- Exposed separation fabric was observed beneath sparse stone coverage along the western edge of the property and should be covered to prevent exposure of the contaminated soils below.
- Animal burrow holes were observed on the northern slope and should be filled to restore the integrity of the cap in that area.

Although not necessarily required by the LTMMIP, TRC recommends addressing the following items to prevent potential cap issues in the future, or to otherwise maintain the integrity of school property:

- Vegetation was observed penetrating pavement surfaces, particularly in the areas adjacent to curbs and catch basins. Although the cracking/gaps in these areas are minor, potential expansion could occur if this situation is left untreated. These areas should continue to be monitored.
- Areas of caulking between the building walls and exterior walkways are continuing to deteriorate. These areas will likely need to be repaired in the future.
- Many minor cracks were observed in the parking lots and driveways surrounding the building. Although less than 1/4-inch at this time, these areas should continue to be monitored and/or repaired to prevent potential further deterioration.
- Poor vegetative cover exists over cap soils on the eastern side of the building, making the soils susceptible to erosion. This area should be monitored and/or repaired to prevent future damage to the integrity of the cap.

DESCRIPTION OF INSPECTION

The October 2015 cap inspection consisted of a walking traverse of the entire Site with visual observations of the cap, including the first floor concrete slab of the building (where visible), the courtyard within the building footprint, and the concrete, asphalt and landscaped surfaces outside the building. Access to most locked rooms within the building was provided by the custodial staff. Elevator vaults were not accessible and were not inspected. The inspection was documented in a log book, and areas where important features were discovered are depicted on Figure 1. Copies of the log book pages are presented as Attachment 1. The findings of the inspection are documented on the site-specific Cap Inspection Form (Attachment 2) provided in the LTMMIP. Photographs taken during the inspection are presented as Attachment 3.

Based on TRC's inspection, the concrete floor within the footprint of the building is currently acting to prevent exposure to the impacted fill beneath. Four minor cracks were previously noted in the boiler room floor and still do not present a cap integrity issue at this time. Three very minor cracks were also observed in storage room 44, and also do not require repairs at this time. Several hair line cracks were observed in the eastern hallway (approximately eight) and one hair line crack was observed in the electric closet. Each of the cracks noted above appears in a general east-to-west orientation. Six cracks in the tile flooring of the boys' locker room and an additional crack in the tile flooring of the girls' locker room were observed, but there was no evidence of damage to the concrete floor underneath.



The paved parking lots and driveways surrounding the school have developed a total of 35 cracks greater than ¼-inch, which pose a threat to the integrity of the cap and require repair prior to the next scheduled inspection in accordance with the LTMMIP. Their locations are depicted on Figure 1.

Several curbed areas along the exterior of the middle school had small tufts of grass penetrating through the concrete and asphalt. This issue has been monitored and treated following previous inspection reports, and the results have been positive. Although the cracks through which vegetation is penetrating are not greater than ¼-inch, they do pose potential future problems as weathering could increase crack size. Numerous minor cracks (less than ¼-inch) in the pavement observed during the previous inspection have not changed in size and are not considered a cap integrity issue at this time.

In several areas around the exterior of the school building, a bead of caulking has been installed in the joint between the foot of the brick building walls and the concrete walkways. The caulking prevents weather elements (i.e., rain, snow, and ice) from entering the joint space. As noted in previous reports, the caulking appeared deteriorated in several areas. The caulking used to repair cracks in the walkways also appears to be deteriorating. Although conditions were not indicative of a potential for soil exposures, TRC recommends continuous observation and repair/replacement of the caulking, as necessary. Continued infiltration of weather elements into the joint could eventually separate and deteriorate the walkway.

The landscaped areas around the exterior of the building were acceptable with the exception of the following:

- Two small holes were observed along the northern edge of the cap, which may be the result of animal burrowing.
- The black separation fabric that demarcates the underlying contaminated fill from the clean imported fill is visible beneath sparse stone coverage on the perimeter of the driveway running along the western side of the building. The stone should be augmented or adjusted to ensure that exposure to the impacted fill beneath the cap is prevented.
- Potentially deep-rooted vegetation was observed on the slope to the west of the school and should be cut down.
- Poor vegetative cover exists over cap soils on the eastern side of the building, making the soils susceptible to erosion. This area should be monitored and/or repaired to prevent further damage to the integrity of the cap.

CONCLUSIONS

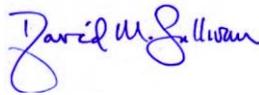
The black separation fabric that demarcates the underlying contaminated fill from the clean imported fill is visible in one location within the cap area, which must be addressed. Otherwise, exposures to the impacted fill beneath the cap are being prevented. However, the other issues identified in this report should also be addressed in order to prevent further cap damage or erosion that could eventually allow for exposure to the contaminated fill.

Please refer to the attached Cap Inspection Form and photographs for additional details concerning the conditions described above. If you have any questions, please contact either of the undersigned at 978-970-5600.

Sincerely,



Bryan MacDonald
Project Engineer

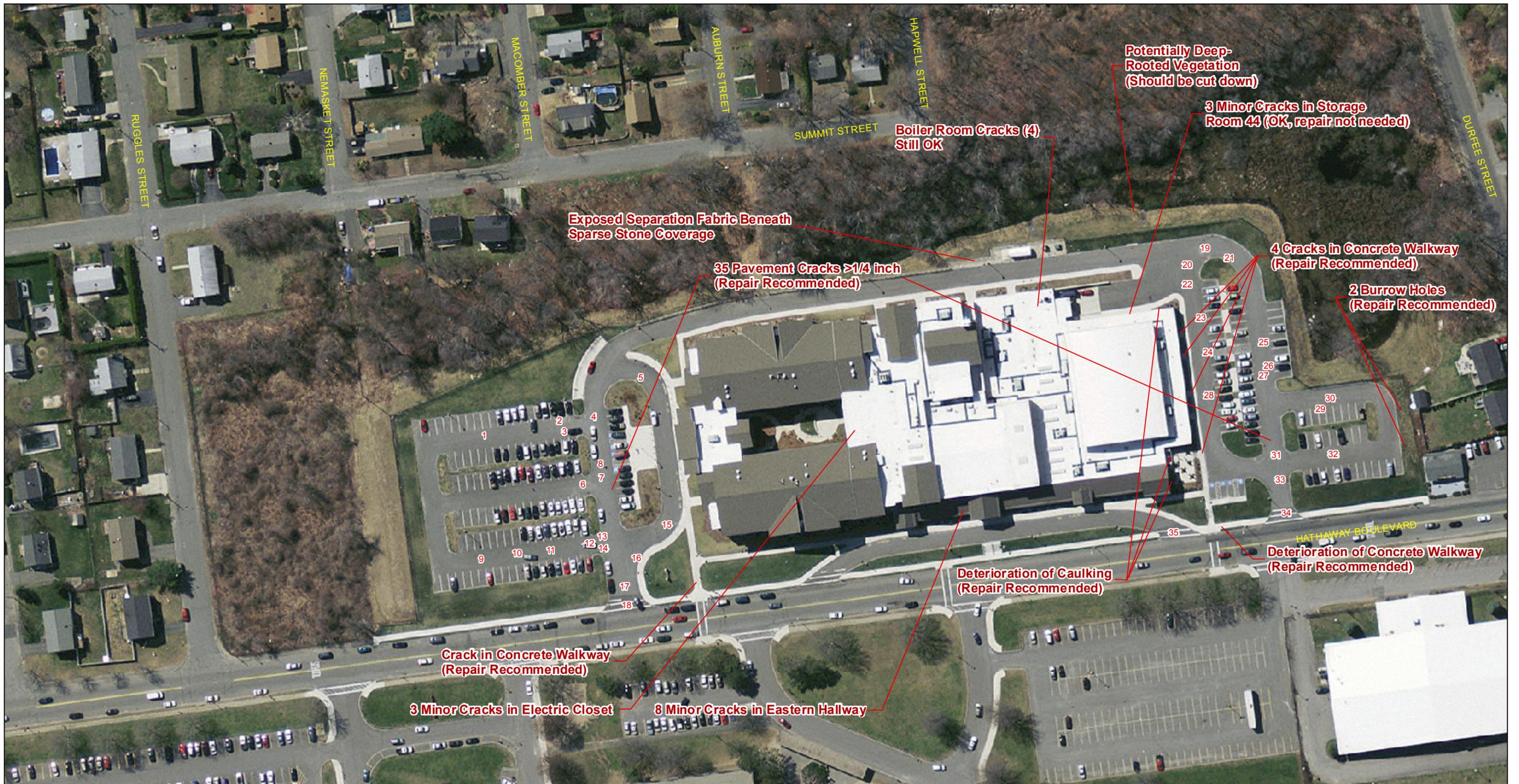


David M. Sullivan, LSP
Senior Project Manager

Attachments

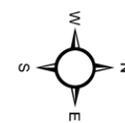
Figure 1

Site Map



Base map: 30 cm Imagery, MassGIS 2009

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0 100 200 Feet

MASSACHUSETTS



SITE LOCATION



Wannalancit Mills
650 Suffolk Street
Lowell, MA 01854
978-970-5600

SITE MAP
KEITH MIDDLE SCHOOL
NEW BEDFORD, MA

FIGURE 1

OCTOBER 2015

Attachment 1

Log Book

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New Bedford Keith Middle School 10/29/15 094

Weather: 70°F, sun & clouds

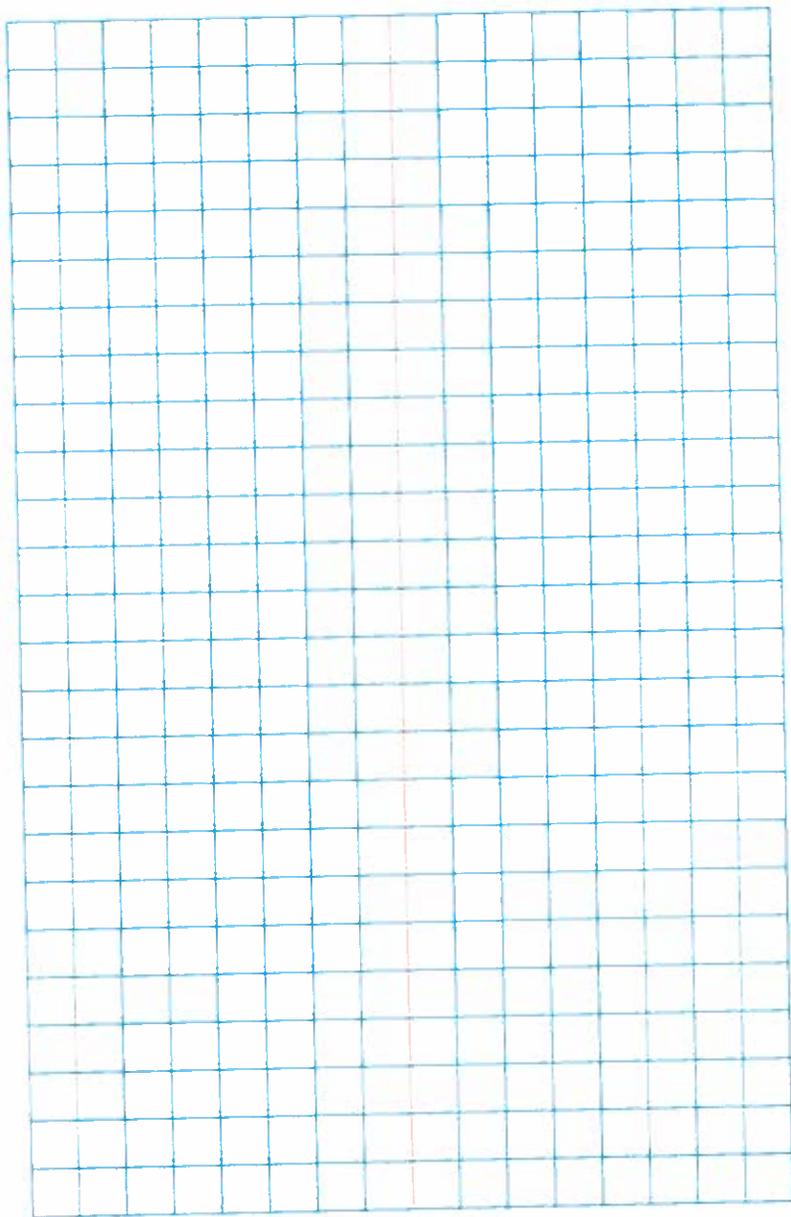
- 1140 Bryan MacDonald (TRC) on site.
SOW: semi-annual cap inspection.
- 1150 Get Keys from Gary G.
- 1200 Begin indoor portion of inspection
- 1210 Cracks in boiler room still less than
 $\frac{1}{4}$ -inch (unchanged).
- 1220 Cracks in main electrical room unchanged.
- 1225 Cracks in tile in boys' locker room
unchanged.
- 1230 Cracks in storage room 44 unchanged.
- 1235 Cracks in tile in girls' locker room
unchanged.
- 1245 Cracks in electrical closet unchanged.
- 1250 No cracks in any classrooms
- 1315 Cracks in eastern hallway unchanged.
All indoor floor cracking $< \frac{1}{4}$ -inch.
- 1320 Return keys and begin outdoor
portion of inspection.
- 1335 Note animal burrow holes on northern slope
- 1340 No new cracks in northern parking lot.
Cracks noted in previous report still present
but have not changed.
- 1350 Deep rooted vegetation and exposed fibre
beneath rip-rap still present on western
edge of property.

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BTM 10/29/15

95 New Bedford Keith Middle School 10/22/15

- 1400 No new cracks on pavement in southern parking lot. Old ones still unrepaired though.
- 1410 No new cracks on eastern side of building. Poor vegetative cover again noted next to building.
- 1420 Overall no new issues not noted in last report except for new burrow holes on northern slope. Document their location.
- 1450 Finish inspection.
- 1500 TRC off site.

Erin M. Smith



Attachment 2
Cap Inspection Form

CAP INSPECTION FORM KEITH MIDDLE SCHOOL

Use this inspection form to document cap inspections. If unacceptable conditions are observed, complete an additional form immediately after repairs are completed.

Inspection Date: October 29th 2015

Inspection by: Bryan MacDonald, TRC

A. ASPHALT AND CONCRETE PAVING – observe asphalt and concrete paving for cracking, holes, and asphalt removed during construction, other damage.

Cracking of the asphalt parking lots and concrete sidewalks was observed, some cracks require repair and others will be monitored during future inspections. Deterioration of caulking in joints between brick walls and concrete walkways also observed.

All Asphalt and concrete paving acceptable? YES NO

If no, attach photograph

If no, describe unacceptable condition:

Location:

- 1) In the parking lot to the north of the school
- 2) In the parking lot to the south of the school
- 3) At the northern end of the driveway that lies on the eastern side of the building
- 4) In the building footprint on the north side of the school
- 5) In the building footprint on the south side of the school
- 6) Concrete walkway along Hathaway Boulevard

Condition:

- 1) 16 cracks in asphalt paving greater than ¼-inch in width, see Photograph 1 for example and Figure 1 for individual locations.
- 2) 18 cracks in asphalt paving greater than ¼-inch in width, see Photograph 2 for example and Figure 1 for locations.
- 3) Crack in asphalt paving greater than ¼-inch in width, see Photograph 3.
- 4) 4 cracks in concrete walkway greater than ¼-inch in width, see Photograph 4. Deterioration of caulking in joints between brick walls and concrete walkways. See Photograph 5.
- 5) Crack in concrete walkway greater than ¼-inch in width, see Photograph 6.

Describe any repairs to asphalt and/or concrete paving conducted since previous inspection:

All repairs adequate YES NO Photograph of repair attached

No repairs to asphalt and concrete paving since last inspection were observed. TRC maintains its recommendation that the issues noted above be repaired before the next inspection in the spring of 2016.

B. INTERIOR CONCRETE FLOORS – observe concrete for cracking, holes, and concrete removed during construction, other damage.

Four cracks in the boiler room floor are less than ¼-inch wide and have not increased in size, see Photograph 7. Three minor cracks in storage room 44 are also less than ¼-inch wide and have not increased in size, see Photograph 8. Three minor cracks in the electrical closet are less than ¼-inch wide, see Photograph 9. Two minor cracks in the main electrical room are also less than ¼-inch wide, see Photograph 10. Approximately eight minor cracks were observed along the eastern hallway, see Photograph 11. The majority of interior concrete floors are covered with tiles or other type of flooring material. Approximately six cracks in the tile in the boys' locker room and one crack in the tile in the girls' locker room were observed, but there was no evidence of damage to the concrete floor underneath, see Photograph 12. Based on visual inspection and conversations with current employees, there are no breaches or other significant damage or deterioration of the interior surficial flooring materials or, where visible, concrete floors. No construction was occurring within the building at the time of the inspection.

All interior concrete floors acceptable? YES NO

If no, attach photograph

If no, describe unacceptable condition:

Location:

Condition:

Describe any repairs to interior concrete floors conducted since previous inspection:

All repairs adequate YES NO Photograph of repair attached

C. LANDSCAPING – observe landscaping for erosion, animal holes, excavation, and health of erosion control vegetation.

Animal burrow holes and potentially deep-rooted vegetation were observed on the slopes to the north and to the west of the school, respectively, and the black separation fabric was exposed beneath sparse stone coverage in one area on the western side of the building. These issues require repair prior to the next scheduled inspection in the spring of 2016. Poor vegetative cover on the eastern side of the building were also observed and will be monitored but does not yet require repair.

All landscaped areas acceptable? YES NO

If no, attach photograph

If no, describe unacceptable condition:

Location:

- 1) The exterior slope to the north of the school
- 2) The exterior slope to the west of the school
- 3) Along the perimeter of the paved driveway on the western side of the building

Condition:

- 1) Two animal burrow holes were observed on the slope to the north of the school near the Corner Sports building, see Photograph 13.
- 2) Potentially deep-rooted vegetation was observed on the slope to the west of the school and should be cut down.
- 3) Exposed separation fabric was observed beneath sparse stone coverage along the western edge of the property, see Photograph 14.

Describe any repairs to landscaping since previous inspection:

All repairs adequate YES NO Photograph of repair attached

Repairs to the animal burrow holes on the northern slope near the Corner Sports building were adequate. The two holes TRC observed during this inspection are in new locations and indicate more recent animal activity. No repairs were made to the deep-rooted vegetation and exposed separation fabric on the western side of the property. TRC maintains its recommendation that the issues noted above be repaired before the next inspection in the spring of 2016.

D. Areas Not Inspected:
All areas were inspected.

Reason: N/A

Attachment 3

Site Inspection Photographs

SITE PHOTOGRAPHS
October 2015 Cap Inspection
Keith Middle School
New Bedford, Massachusetts



1) Crack in pavement greater than 1/4-inch, located in northern parking lot.



2) Crack in pavement greater than 1/4-inch, located in southern parking lot.

SITE PHOTOGRAPHS
October 2015 Cap Inspection
Keith Middle School
New Bedford, Massachusetts



3) Crack in pavement greater than ¼-inch, located on northern side of eastern driveway.



4) Crack in concrete walkway greater than ¼-inch, located on northern side of building.

SITE PHOTOGRAPHS
October 2015 Cap Inspection
Keith Middle School
New Bedford, Massachusetts



- 5) **Deteriorated caulking in joint between brick wall and concrete walkway, located on northern side of building.**



- 6) **Crack in concrete walkway greater than 1/4-inch, located on southeastern side of building.**

SITE PHOTOGRAPHS
October 2015 Cap Inspection
Keith Middle School
New Bedford, Massachusetts



7) Crack in concrete floor less than 1/4-inch, located in boiler room.

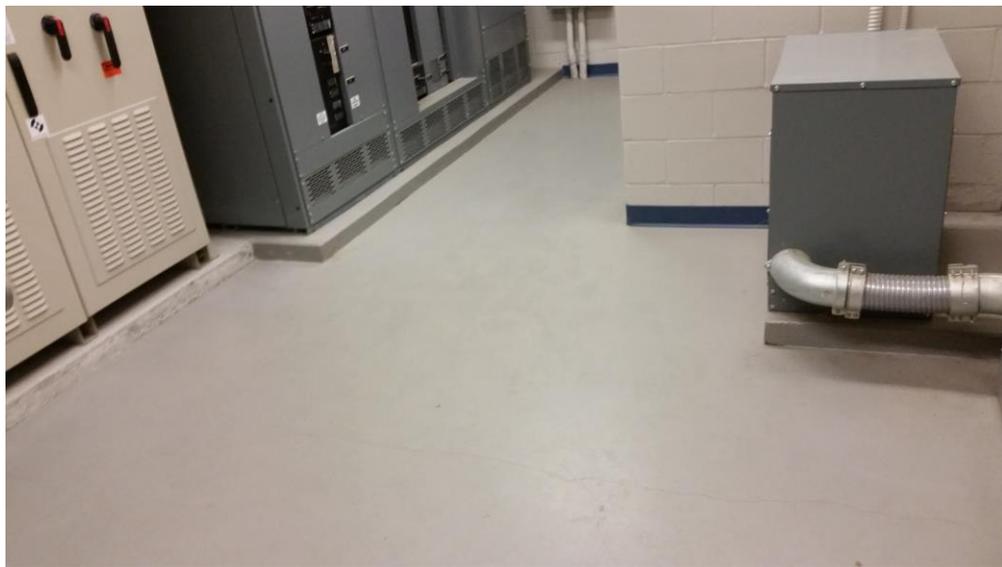


8) Crack in concrete floor less than 1/4-inch, located in storage room 44.

SITE PHOTOGRAPHS
October 2015 Cap Inspection
Keith Middle School
New Bedford, Massachusetts



9) Crack in concrete floor less than 1/4-inch, located in electric closet.



10) Crack in concrete floor less than 1/4-inch, located in main electrical room.

SITE PHOTOGRAPHS
October 2015 Cap Inspection
Keith Middle School
New Bedford, Massachusetts



11) Cracks in tile flooring less than ¼-inch, located in eastern hallway.



12) Cracks in tile flooring of boys' locker room.

SITE PHOTOGRAPHS
October 2015 Cap Inspection
Keith Middle School
New Bedford, Massachusetts



13) Animal burrow hole in slope on northern edge of property.



14) Exposed separation fabric beneath sparse stone coverage along perimeter of driveway, located on western side of building.

SITE PHOTOGRAPHS
October 2015 Cap Inspection
Keith Middle School
New Bedford, Massachusetts



15) Poor vegetative cover over soil inside building footprint, located on eastern side of school.