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April 24, 2015

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

**Subject: Spring 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 eighteenth 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 April 21st 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 April 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 but were subsequently repaired by the City.

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 ¼-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 April 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. The minor crack (less than ¼-inch) in the pavement which was observed during the previous inspection on the eastern driveway has not changed in size, and is not considered a cap integrity issue at this time. Numerous other minor cracks (less than ¼-inch) in the pavement have appeared since the previous inspection, and these should be monitored but do not currently present an issue in the integrity of the cap.

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:

- Several small holes were observed along the northern edge of the cap, which may be the result of animal burrowing. TRC pointed out the locations of the holes to the City on the day of the inspection and they were filled in immediately.
- 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

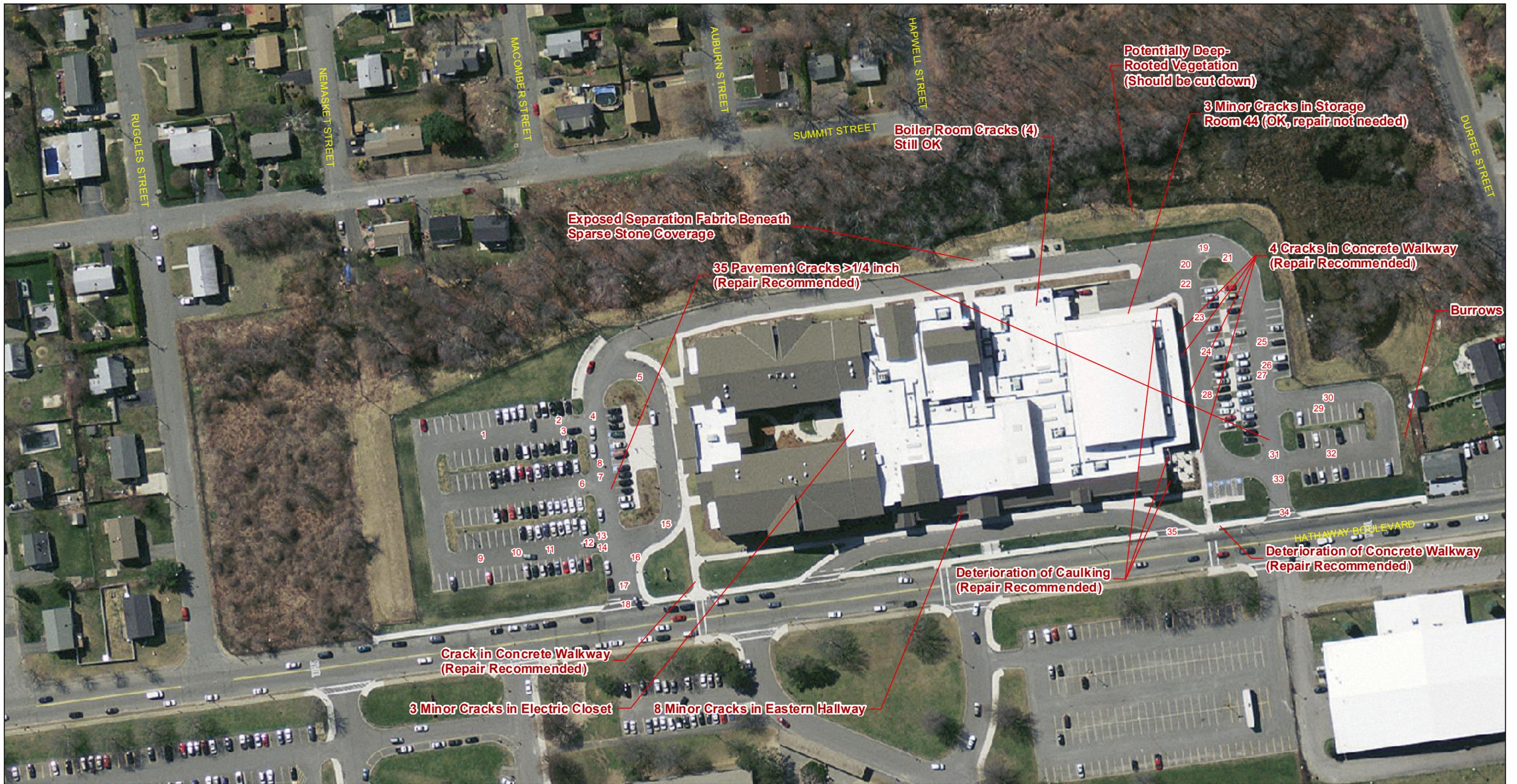


David M. Sullivan, LSP
Senior Project Manager

Attachments

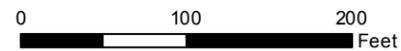
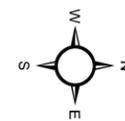
Figure 1

Site Map



Base map: 30 cm Imagery, MassGIS 2009

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MASSACHUSETTS



SITE LOCATION



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

SITE MAP
KEITH MIDDLE SCHOOL
NEW BEDFORD, MA

FIGURE 1

APRIL 2015

Attachment 1

Log Book

Keith Middle School New Bedford 4/21/15

WEATHER: 60°, SUNNY

OBJECTIVE: CAP INSPECTION FOR SPRING 2015

9:30 BRYAN MACDONALD (TRC) ON SITE.

GARY GOMES (PLANT ENGINEER NOT W. TODAY.

FWD KEVIN (CUSTODIAN) TO LET ME IN TO
LOCKER ROOMS AROUND FIRST FLOOR OF
SCHOOL. EXPLAIN WHAT NEEDS TO BE
DONE. BEGIN INSPECTION.

9:57 OBSERVE 3 MINOR CRACKS IN ELECTRIC
CLOSET.

9:59 OBSERVE 4 MINOR CRACKS IN BOILER ROOM.

10:01 OBSERVE 9 MINOR CRACKS IN EAST HALLWAY.

10:07 OBSERVE 2 MINOR CRACKS IN MAIN ELECTRICAL
ROOM.

10:20 OBSERVE 6 CRACKS IN TILE IN BOYS'
LOCKER ROOM.

10:23 OBSERVE 3 MINOR CRACKS IN STORAGE ROOM
44.

10:23 OBSERVE ^{BOY WALKS} A CRACK IN TILE IN GIRLS' LOCKER
ROOM.

10:34 OBSERVE MINOR FAULT IN FLOOR OF CAFETERIA.

10:46 FINISH INDOOR INSPECTION.

11:10 BEGIN OUTDOOR INSPECTION.

11:16 ANIMAL BURROW NOTED ON NORTHERN FLOOR OF CAR

11:21 SMALL VEGETATION NOTED BETWEEN CURB AND
PAVEMENT THROUGHOUT NORTHERN PARKING LOT.

BTM 4/21/15

Keith Middle School New Bedford 4/21/15

11:25 16 CRACKS NOTED IN ASPHALT IN NORTH
PARKING LOT

11:45 6 FAULTS NOTED IN CONCRETE WALKWAY AND/OR
CAULKING ALONG NORTH SIDE OF BUILDING.

11:57 DETEIORATED CAULKING ALONG WESTERN EDGE OF
BUILDING.

12:09 EXPOSED SEPARATION FABRIC UNDER STONE ALONG
WESTERN SIDE OF BUILDING.

12:15 ERODED RIPRAP ALONG WETLAND EDGE.

12:40 17 CRACKS NOTED IN ASPHALT IN SOUTHERN
PARKING LOT.

12:50 TWO CRACKS IN CONCRETE ON SOUTHERN SIDE OF
BUILDING. ONE MAJOR ONE MINOR.
MINOR CRACK IN ASPHALT ON EAST SIDE DRIVEWAY
AND MAJOR CRACK IN DRIVEWAY NEAR HYDRA-MUX

12:56 POOR VEGETATIVE COVER OVER MUCH OF SOIL NEXT
TO EAST SIDE OF BUILDING.

12:59 POTENTIALLY DEEP ROOTED VEGETATION ON WESTERN
SLOPE.

13:09 TWO MORE POTENTIAL ANIMAL BURROWS DISCOVERED
ON NORTHERN SLOPE.

13:20 RAY WOLBERGER (CITY OF NB) ON SITE. SHOW ME
ANIMAL BURROWS AND HE FILLS THEM IN.

13:45 TRC + RAY W OFF SITE.

JULY ON
MacDonald

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: April 21st 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.
- 6) Major deterioration in concrete walkway, see Photograph 7.

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

All repairs adequate YES NO Photograph of repair attached

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 8. Three minor cracks in storage room 44 are also less than ¼-inch wide and have not

increased in size, see Photograph 9. Three minor cracks in the electrical closet are less than ¼-inch wide, see Photograph 10. Two minor cracks in the main electrical room are also less than ¼-inch wide, see Photograph 11. The clean out drain in the boiler room has become badly deteriorated but no cracks greater than ¼-inch were observed. Approximately eight minor cracks were observed along the eastern hallway, see Photograph 12. 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 13. 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, erosion control vegetation health.

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 fall of 2015. Minor erosion of the sloughing riprap on the western slope and poor vegetative cover on the eastern side of the building were also observed and will be monitored, but they do 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) Three animal burrow holes were observed on the slope to the north of the school near the Corner Sports building, see Photograph 14. The City filled in the holes while TRC was on Site.
- 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 15.

Describe any repairs to landscaping since previous inspection:

All repairs adequate YES NO Photograph of repair attached

D. Areas Not Inspected:

1) The elevator vaults were not inspected.

Reason: Not accessible. They will be inspected concurrent with elevator inspections.

Attachment 3

Site Inspection Photographs

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



3) Crack in pavement greater than 1/4-inch, located on northern side of eastern driveway.



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

SITE PHOTOGRAPHS
April 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 ¼-inch, located on southeastern side of building.**

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



7) Deterioration of concrete walkway, located on northeastern side of building.



8) Crack in concrete floor less than ¼-inch, located in boiler room.

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



9) Crack in concrete floor less than ¼-inch, located in storage room 44.

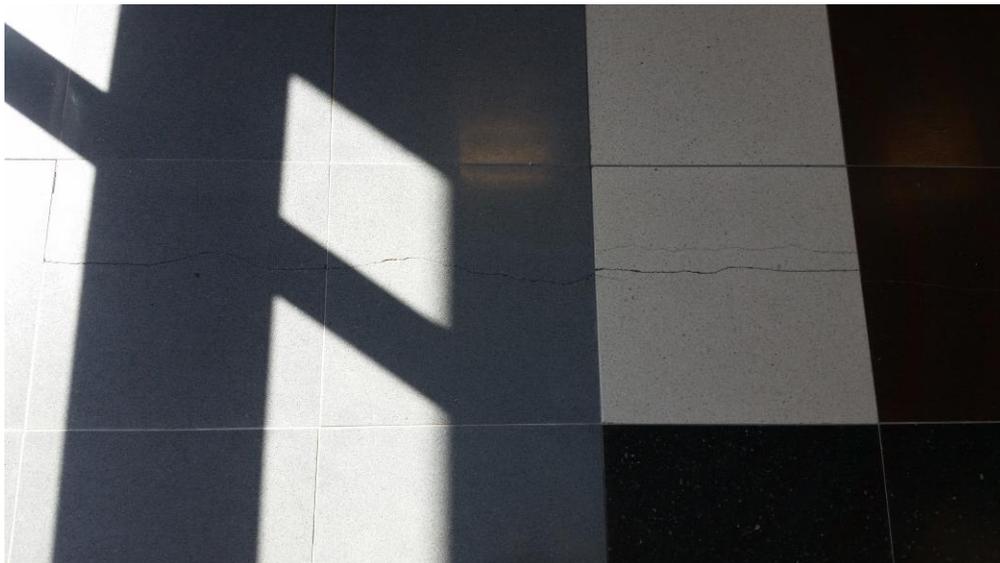


10) Crack in concrete floor less than ¼-inch, located in electric closet.

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



11) Crack in pavement greater than 1/4-inch, located in main electrical room.



12) Crack in tile flooring less than 1/4-inch, located in eastern hallway.

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



13) Crack in tile flooring of boys' locker room.



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

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



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



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