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January 24, 2014

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

**Subject: Fall 2013 Cap Inspection  
Keith Middle School  
New Bedford, Massachusetts**

Dear Mr. Holberger:

At the request of the City of New Bedford (City), TRC performed the sixteenth 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 December 3<sup>rd</sup> 2013. The elevator vaults were inspected during the annual elevator inspection later in December 2013, and no cracks were noted in the concrete vault floors.

### **SUMMARY OF RESULTS**

The following issues were noted in the previous inspection report and have been addressed:

- The crack observed in the girl's locker room greater than ¼ -inch has been repaired.

The following issues were noted during the December 2013 inspection, and require repair by the next scheduled inspection:

- Animal burrows were observed on the western slope.
- Potentially deep rooted vegetation was observed on the ridge of the western and southern slopes and should be cut down.

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.
- 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.
- The cap slope is sloughing in an area adjacent to the wetland west of the school, and is undermining the concrete fence support. A crack was observed in the concrete fence support.
- A minor crack was observed in the eastern driveway pavement. Although less than ¼-inch at this time, this area should continue to be monitored and/or repaired to prevent potential further deterioration.

## **DESCRIPTION OF INSPECTION**

The December 2013 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 facility engineer, Gary Gomes and/or a school custodian. The inspection was documented in a log book, and areas where important features were discovered are depicted in Figure 1. Copies of the log book pages are presented as Attachment 1. The findings of the inspection are documented on a 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. Each of the seven cracks noted above appears in a general east-to-west orientation.

During the summer of 2012, all cracks and seams within the asphalt parking lots were repaired using an elastic asphalt sealant. All of the asphalt parking lot repairs appeared in very good condition during the December 2013 cap inspection. Several curbed areas along the exterior of the middle school had small tufts grass penetrating through the concrete and asphalt. Although these cracks were not greater than ¼-inch, they do pose potential future problems as weathering could increase crack size. A minor crack (less than ¼-inch) was observed on the eastern driveway, but is 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:

- Several small holes were observed along the western edge of the cap, which may have been borrowed by small animals.
- Sloughing riprap is undermining the concrete fence support at the top of the slope, and filling the outlet of the storm water drainage culvert on the west side of the Site. Areas of soil erosion were observed along the upper slope, as well as a crack in the concrete fence support. The area appears relatively stable at this time, but the condition is likely due to an increase in steepness. The crack in the concrete fence support is not identified as a cap integrity issue, nor is the riprap accumulating in the culvert outlet, but these issues should be addressed to maintain the integrity of the fence and the function of the culvert.
- In the April 2013 report, sparse vegetation was observed along the southern edge of the cap. The December 2013 inspection revealed an increase in vegetation coverage in this area, grass cover along the slope was greater than 70%.
- Potentially deep-rooted vegetation observed on the slopes south and west of the school and should be cut down.

## **CONCLUSIONS**

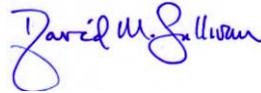
The black separation fabric that demarcates the underlying contaminated fill from the clean imported fill is not visible within the cap area, and exposures to the impacted fill beneath the cap are being prevented. However, the issues identified in this report should be addressed in order to prevent further cap damage or erosion that could eventually expose the separation fabric.

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,



David M. Pettit  
Project Engineer



David M. Sullivan, LSP  
Senior Project Manager

Attachments

# **Figure 1**

## **Site Map**



Potentially Deep-Rooted Vegetation (Should be cut down)

Burrows

Steep Slope/Undermined Fence Support

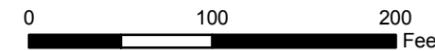
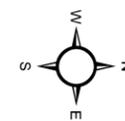
Potentially Deep-Rooted Vegetation (Should be cut down)

Boiler Room Cracks (4) Still OK

3 Minor Cracks in Storage Room 44 (OK, repair not needed)

Minor Crack on Pavement

Base map: 30 cm Imagery, MassGIS 2009



MASSACHUSETTS



SITE LOCATION



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

**SITE MAP**  
**KEITH MIDDLE SCHOOL**  
**NEW BEDFORD, MA**

FIGURE 1

DECEMBER 2013

# **Attachment 1**

## **Log Book**

12/3/13

KMS Cap Inspection

weather  
cloudy

40°F

600 Rishabh Iyer onsite.

meets Kevin (KMS custodian)  
to retrieve keys, begins inspection  
of interior floors

700 RI finds no cracks bigger  
than  $1/4$ "

730 RI observes repaired crack  
in girls locker room from, last  
visit

745 RI walks around exterior,  
no issues w/ asphalt or concrete  
walkways, minor crack observed on  
southern walkway

800 RI meets Ray from the city  
of New Bedford, begins inspection  
of vegetative area

815 observed burrows on the  
western slope, deep rooted  
vegetation on the southern slope  
that needs to be addressed

900 Ray leaves site

915 RI meets Gary Gomes to  
discuss deficiencies noted

1000 RI packed up and offsite

~~Rishabh Iyer~~ 12/3/13

**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: December 3<sup>rd</sup> 2012

Inspection by: Rishabh Iyer, TRC

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

All asphalt crack repairs appear in very good condition. A minor crack less than 1/4-inch was observed on the eastern “driveway” but appears to be OK. Small tufts of grass were observed penetrating up through the curbed sidewalk in various areas but are less than a 1/4-inch and deemed acceptable, see Photographs 1 and 2. These areas should be addressed to prevent potential cap issues in the future.

All Asphalt and concrete paving acceptable?  YES  NO

If no, attach photograph

If no, describe unacceptable condition:

Location:

Condition:

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

There have been no repairs conducted to the asphalt and/or concrete since last visit.

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.

A crack greater than 1/4-inch wide that have been observed previously in the Women’s Locker room has been fixed. Four cracks in the boiler room floor are less than 1/4-inch wide and have not increased in size. Three minor cracks in storage room 44 are also less than 1/4-inch wide and have not increased in size, see Photograph 3. Another small crack was observed in the tile of the Art room but is less than 1/4 inch wide, see photograph 4. The majority of interior concrete floors are covered with tiles or other type of flooring material. 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.

Landscaping was inspected by Rishabh Iyer and Ray Holberger from the City of New Bedford to observe unacceptable conditions. Several animal borrows were observed along the west and southwest slopes. Deep rooted vegetation was observed on the western slope. Sloughing and erosion under the fence to the west of the school appears to be stable and the extent of erosion similar to conditions observed during past inspections.

The structural integrity of this fence may be compromised if the sloughing and erosion continues, see Photograph 5. The cap soils beneath the riprap may also become exposed and susceptible to erosion. The area appears stable at the moment, but the condition is likely due to an increase in steepness beyond the cap design slope. The extent of erosion seems similar to the conditions observed during several previous inspections. See inspection report letters dated May 23, 2013, January 24, 2013, May 4, 2012 and August 31, 2011

All landscaped areas acceptable?  YES  NO

If no, attach photograph

If no, describe unacceptable condition:

Location:

- 1) The slopes to the, west and southwest of the school.
- 2) Riprap at base of slope to the west of the school.

Condition:

- 1) Animal burrow holes were observed on the slopes to the west of the school, see Photographs 6 & 7. Talked with Gary Gomes, plant engineer, he had stated that they were able to catch 5 gophers since last visit, current borrows may not be occupied. Potentially deep rooted vegetation was observed on the slope to the south and west of the school and should be cut down, see Photographs 8 and 9.
- 2) Potentially deep rooted vegetation was observed by riprap at the base of the slope to the west of the school, see Photograph 10

Describe any repairs to landscaping since previous inspection:

All repairs adequate  YES  NO      Photograph of repair attached

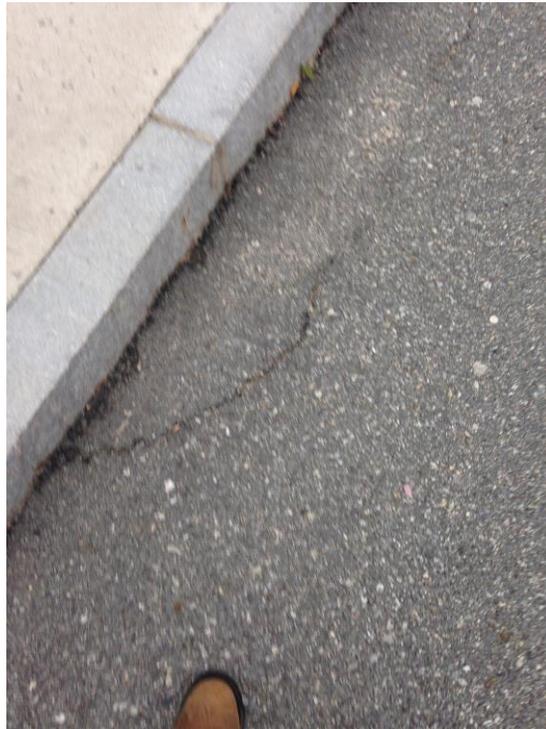
Deep-rooted vegetation had not been cut down. Borrows need to be filled in.

D. Areas Not Inspected:

- 1) The elevator vaults were not inspected.

**Attachment 3**  
**Site Inspection Photographs**

**SITE PHOTOGRAPHS**  
**April 2013 Cap Inspection**  
**Keith Middle School**  
**New Bedford, Massachusetts**



- 1) Small crack observed on asphalt.**



- 2) Tufts of grass protruding through the curb.**

**SITE PHOTOGRAPHS**  
**April 2013 Cap Inspection**  
**Keith Middle School**  
**New Bedford, Massachusetts**



**3) Minor crack storage room 44**



**4) Minor crack in tile in Art Room.**

**SITE PHOTOGRAPHS**  
**April 2013 Cap Inspection**  
**Keith Middle School**  
**New Bedford, Massachusetts**



**5) Undermining of concrete structure for fence west of school.**



**6) Animal burrows at west slope of cap.**

**SITE PHOTOGRAPHS**  
**April 2013 Cap Inspection**  
**Keith Middle School**  
**New Bedford, Massachusetts**



**7) Animal burrows along land bridge to the west of the school.**



**8) Deep rooted vegetation at western slope of cap.**

**SITE PHOTOGRAPHS**  
**April 2013 Cap Inspection**  
**Keith Middle School**  
**New Bedford, Massachusetts**



**9) Potentially deep-rooted at southern slope of cape.**



**SITE PHOTOGRAPHS**  
**April 2013 Cap Inspection**  
**Keith Middle School**  
**New Bedford, Massachusetts**



**10) Potentially deep-rooted vegetation at western slope of cap by rip rap.**