KLOESEL
Engineering, P.A.

April 27, 2022

Dr. Will Hoffman
Madison County Schools
whoffman@madisonk12.net

Re: Madison High School Stadium
Marshall, NC
(KEPA No. 20220110)

Dear Dr. Hoffman,

Kloesel Engineering, P.A. (KEPA) has visually observed the existing stadium bleachers and presents this letter as a summary of our observations and recommendations.

The stadium was constructed in the early 1970's. Existing drawings prepared by J. Bertram King have been reviewed. This letter is based on these existing drawings and a site visit on April 22, 2022

Description of Existing Structure:

The bleacher system consists of soil supported sloping concrete grade beams at approximately 25 feet on center. These grade beams are keyed into the soil with 5 keyways along the slope (Refer to Figure B). Precast/prestressed concrete 'L' beams (Refer to Figure C) span between these grade beams and support the aluminum bleachers. At the base of the bleachers, a cast-in-place concrete retaining wall approximately 5' tall separates the bleachers from the track. Poured in place concrete treads and risers are located on top of the prestressed beams at the 4 stair locations along the length of the system.

Field Observations:

- Currently, access is not permitted at the easternmost 75 ft of the bleachers.
- Holes have been cut in the precast beams to allow access below the bleachers in three locations in the easternmost 75 feet of the bleachers.
- We observed concrete walls poured adjacent to the original concrete grade beams at several locations that do not appear to be original construction. Additional concrete walls have been poured in between existing concrete grade beams at several locations as well. This new concrete appears to have been a repair due to soil erosion beneath the existing concrete grade beams.

- Concrete Masonry Unit (CMU) walls were observed at several locations in the lower portions of the bleachers. These walls also appear to be a previous repair.
- Additional undercutting was observed at the concrete grade beams at locations that support the sections of bleachers that still allow access.
- Cracks were observed in several of the concrete grade beams
- Cracks were observed in several of the precast concrete beams
- Severe corrosion was observed in the steel brackets supporting the precast concrete bleachers
- Significant deflection (approximately 1.75") was observed in several of the precast concrete beams, much greater than what would normally be anticipated
- Refer to attached photographs 1 thru 13

Discussion and Recommendations:

Based on our observations, we do not recommend continued use of the grandstand bleachers. In our opinion, the observed conditions are indicative of significant structural deficiencies, and the ability of the structure to support the code required loads is greatly reduced.

Please contact me should you have any questions.

Sincerely,

Kloesel Engineering, PA
By: Christopher J. Otahal, P.E.

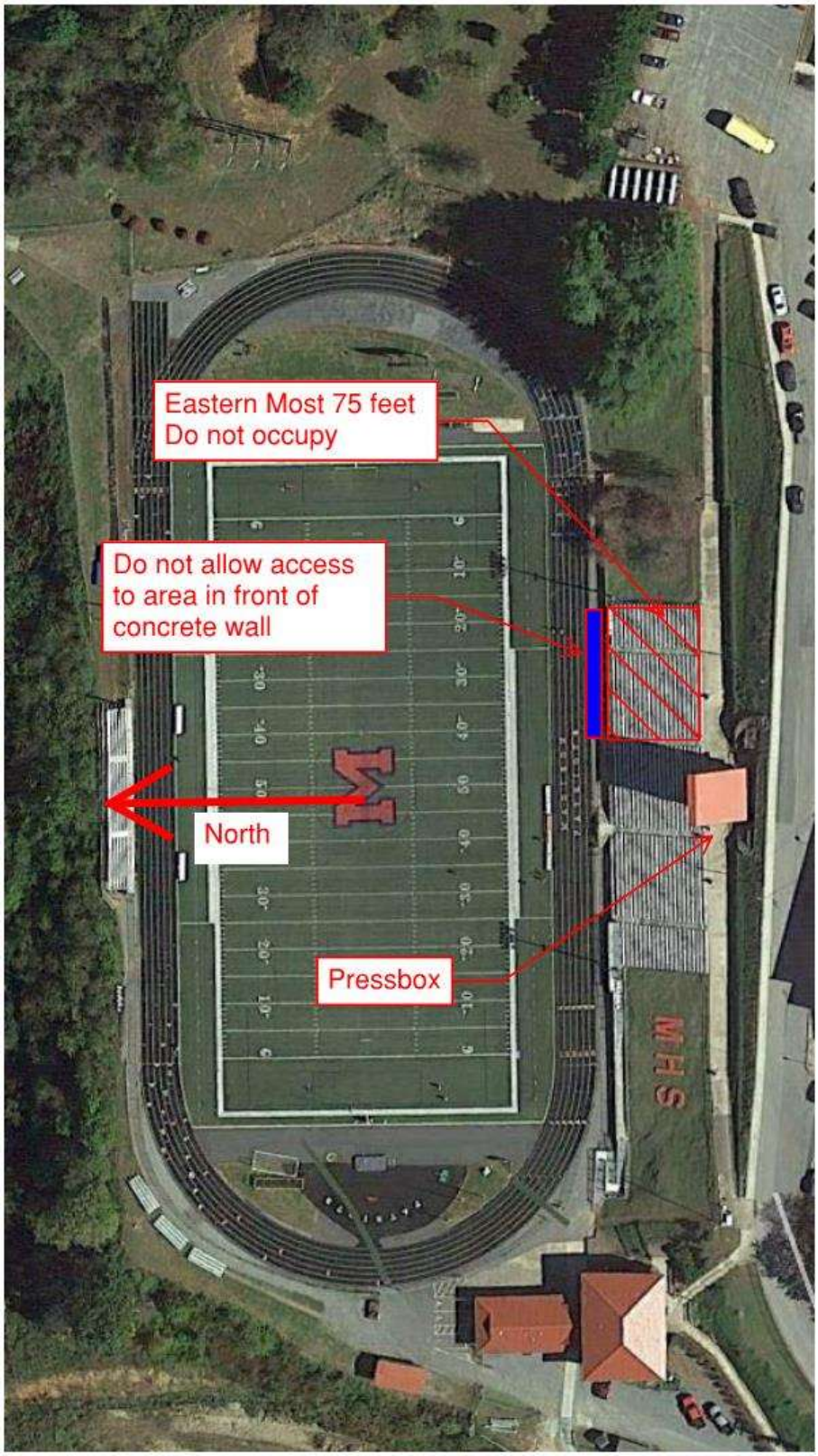

Figure A: Aerial Photograph

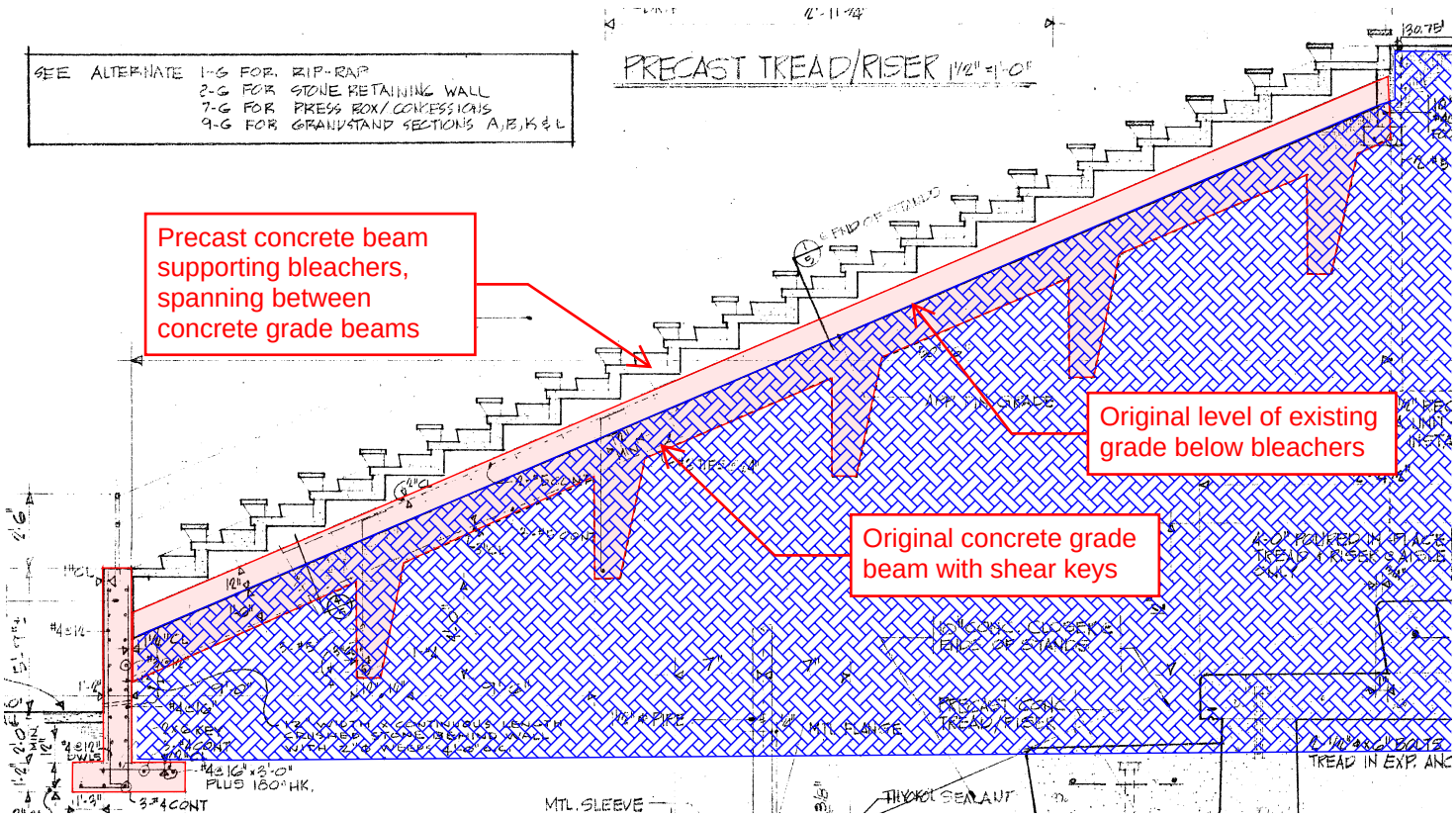

Figure B: Excerpt from original drawings - Transverse Section Thru Grandstands

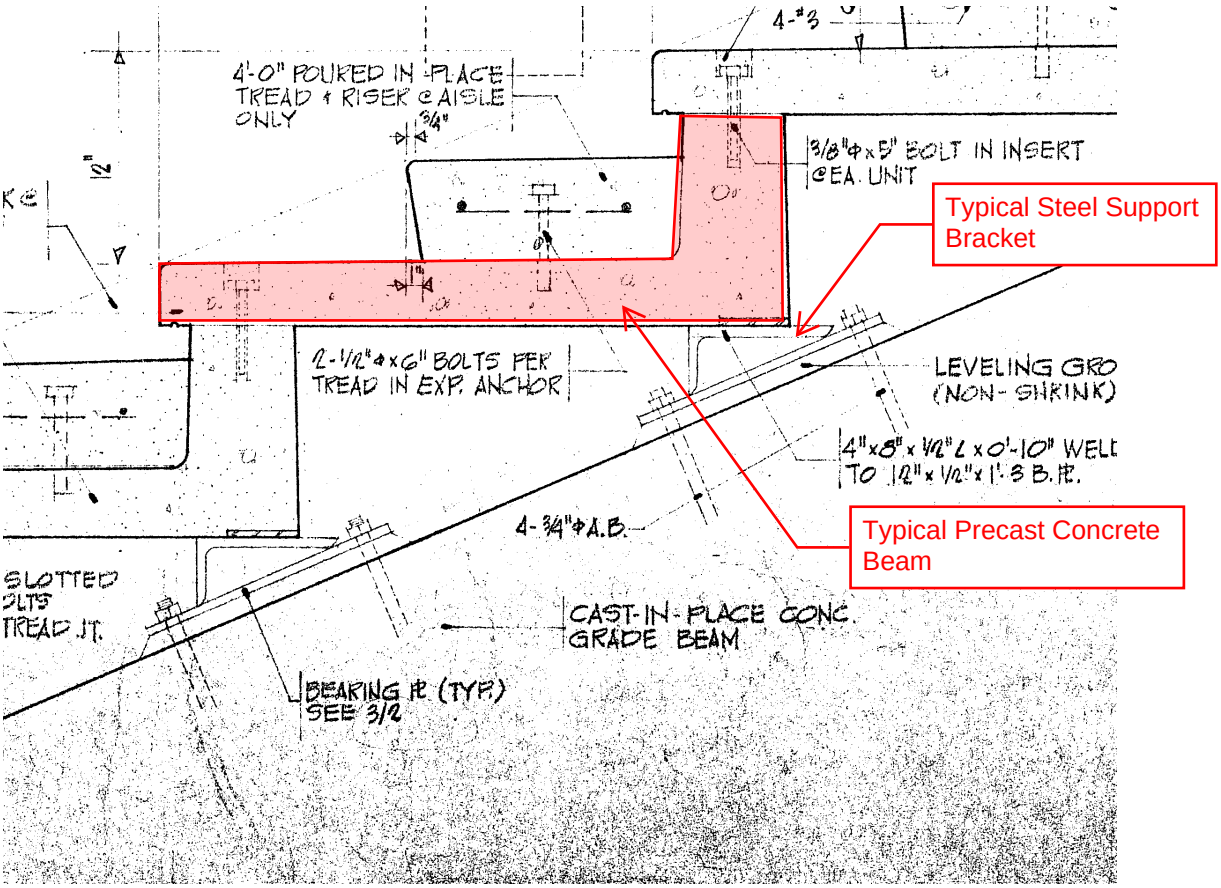

Figure C: Excerpt from original drawings

Photo 1

Photo 2

Photo 3

Photo 4

Photo 5

Photo 6

Photo 7

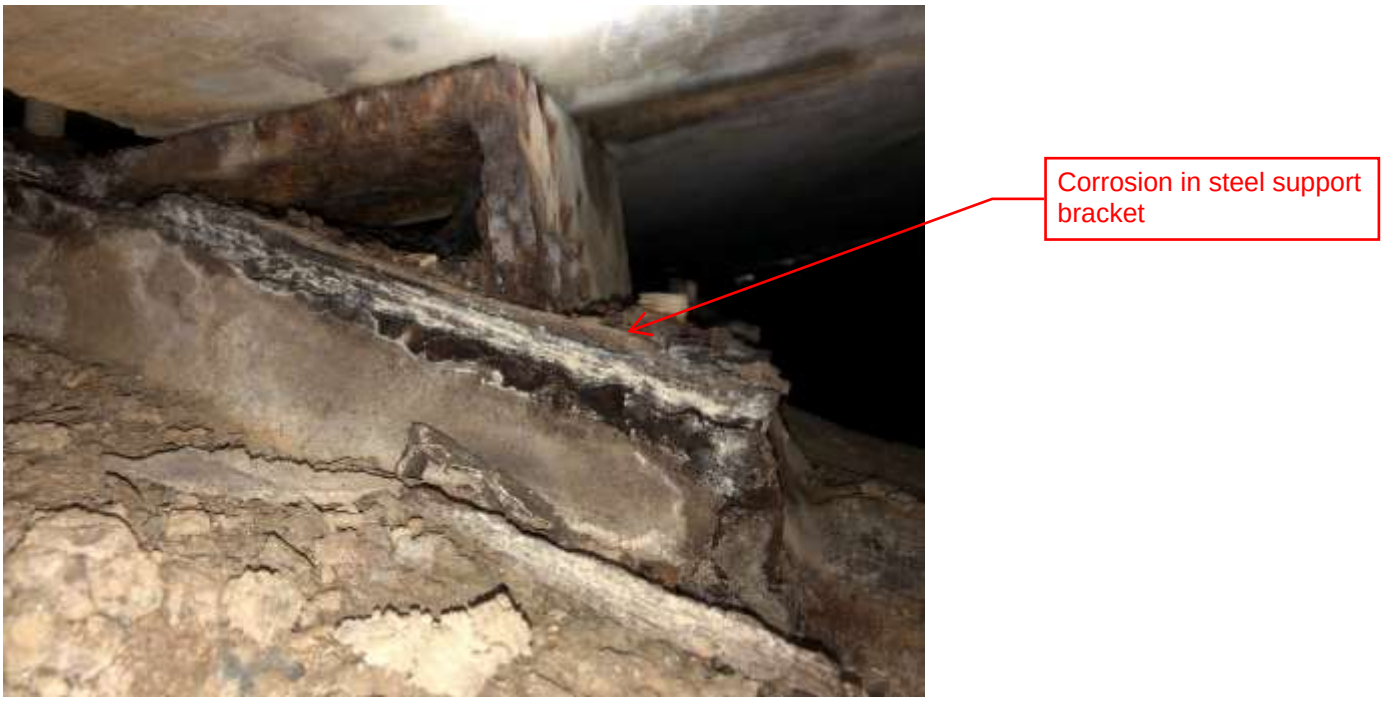

Photo 8

Photo 9

Photo 10

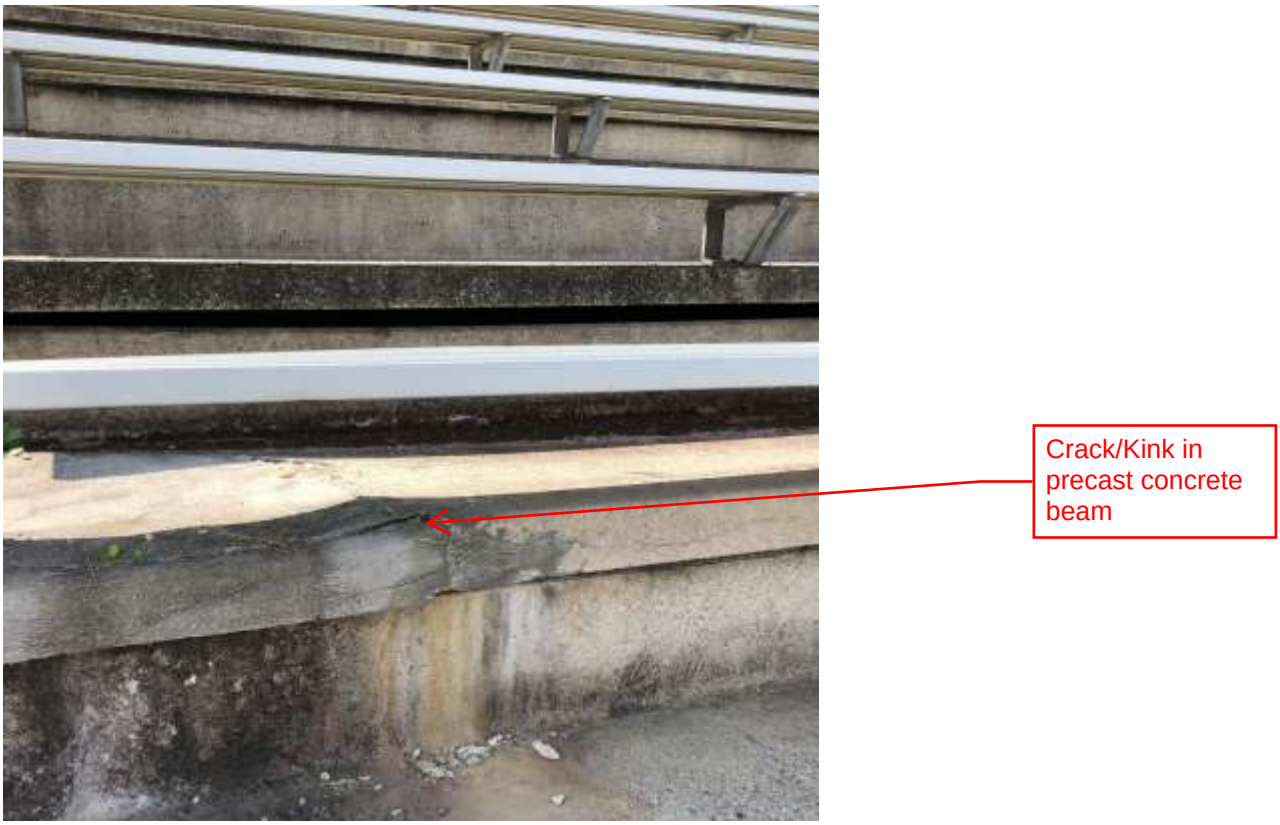

Photo 11

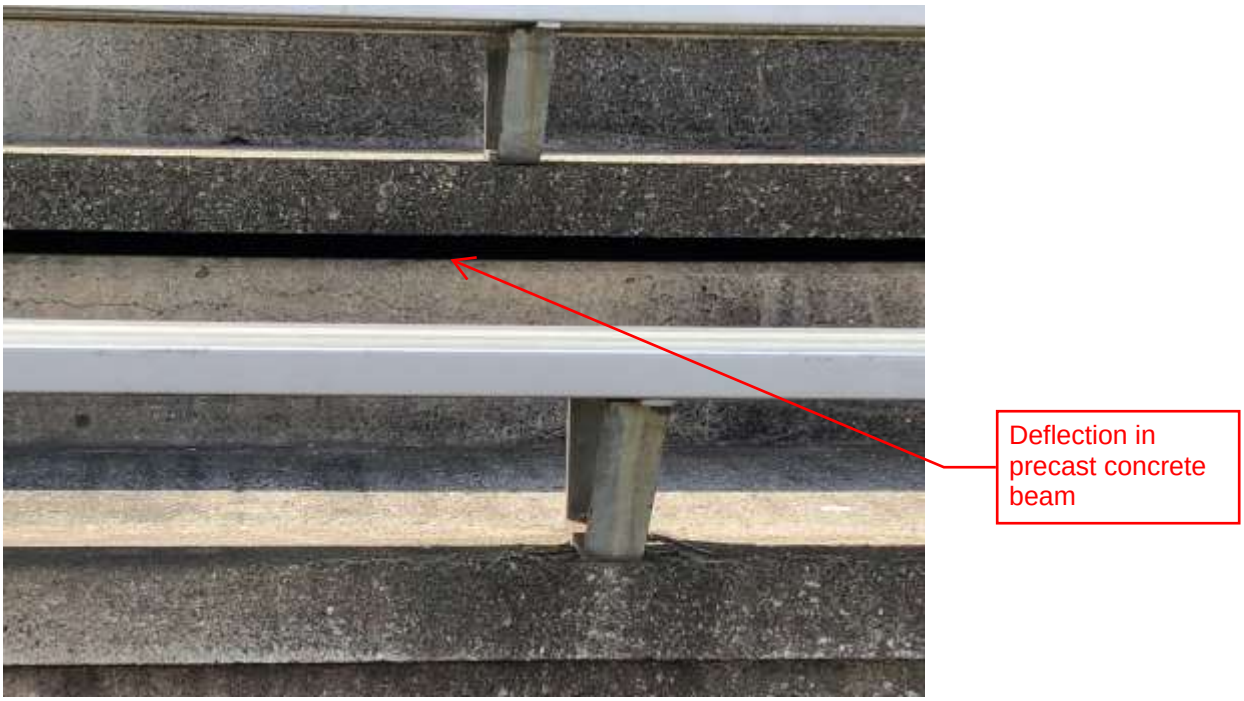

Photo 12

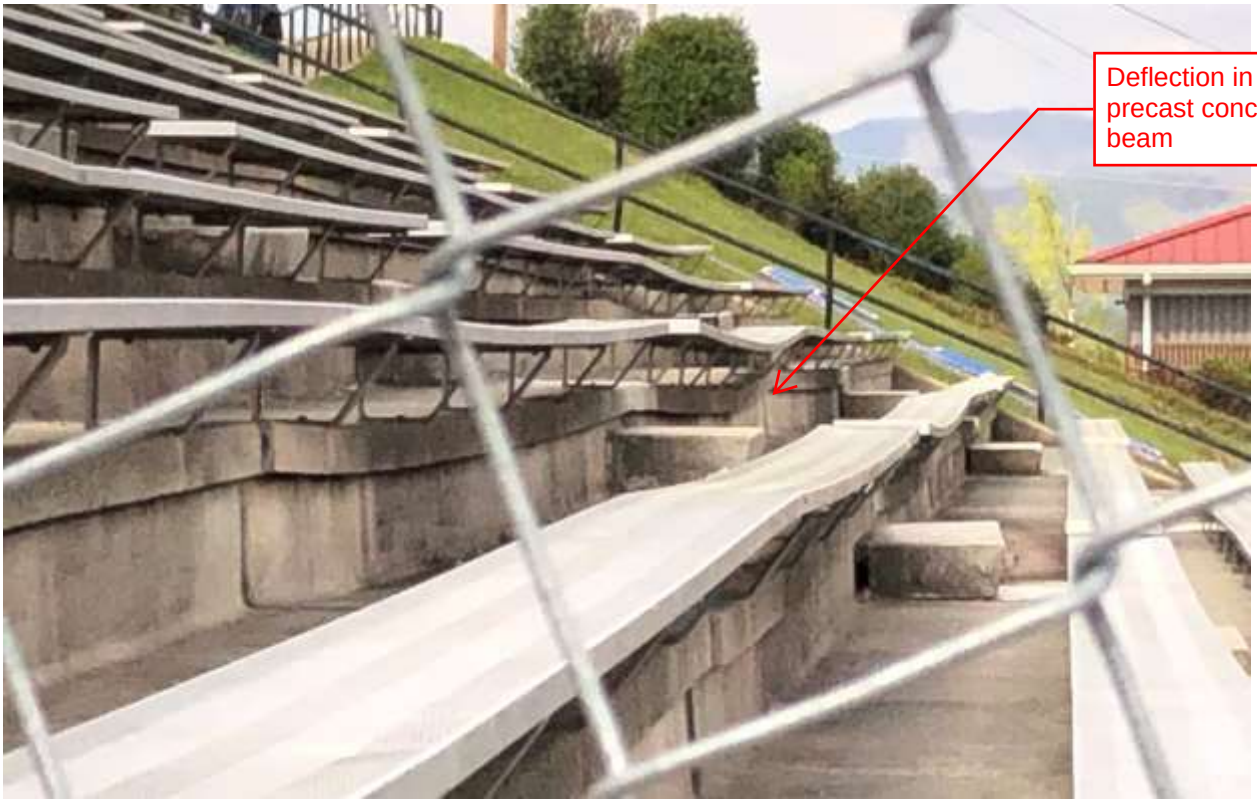

Photo 13