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Timothy Rose
PBK Sports
11 Greenway Plaza, Suite 2200
Houston, Texas 77046
P:1.713.965.0608 **VIA E-MAIL: timothy.rose@pbk.com**

**Re: Clements Field House at Clements High School**
**Fort Bend ISD**
**Sugarland, Texas**

Dear Mr. Rose:

As you know AG&E-SE has been aiding PBK for all structural specific scope for the current district wide Fort Bend ISD assessment work. Similar to all other facilities, which were observed/assessed for structural scope, we have entered the Clements Field House items into the Smart Sheet file; however, given the volume, complexity, and severity of the items observed at Clements Field House we felt it appropriate to provide a more lengthy executive-type summary for all items in report form.

Prior to PBK's official selection for the FBISD assessment work, AG&E-SE had previously visited Clements Field House and Clements High School on behalf of another Architect. This initial visit was on February 8th, 2016 and at that time I walked the field house building and spoke with staff about the observed movement/distress. Additionally, during the walk I collected numerous photos of the various conditions, acquired general slab movement measurements, and researched the previous repair work that had been previously performed by a foundation repair contractor. A few photos of the conditions in 2016 have been provided and paired side by side with a current photo of the same condition taken during the more recent walk on January 9th, 2018.

Generally speaking, the movement at the field house has been observed to be between 1" to 4". A typical structure is usually designed for up to 1" of potential movement; therefore, the values observed are in excess of what a typical building can tolerate. Below is a bulleted list of items we observed structurally on the field house building.

**Bullet Legend:**

- Condition/Observation
  - Potential Cause
    - *Proposed Repair*
      - Potential Cost

- Movement in the slab-on-grade was observed between 1" and 4"
  - During initial construction the potential PVR of the subgrade soils were not properly/adequately improved.
    - *In an extreme case a soils engineer would take borings to determine if the soils are indeed inappropriate for near surface slab-on-grade support and if any moisture/chemical improvements can be performed.*
    - *If the building is not planned for replacement for many years and a serious repair is desired by the district, we would recommend gutting the entire interior of the facility, sawcutting and demolishing the slab-on-grade, removing and replacing the existing subgrade soils with select fill and then replacing the slab-on-grade with grade beams below the interior "non-structural" cmu walls.*
      - Cost of fix is roughly $35/sqft. As directed to AG&E, the field house is about 14437sqft in area. Total cost of repair is approx. $505K.

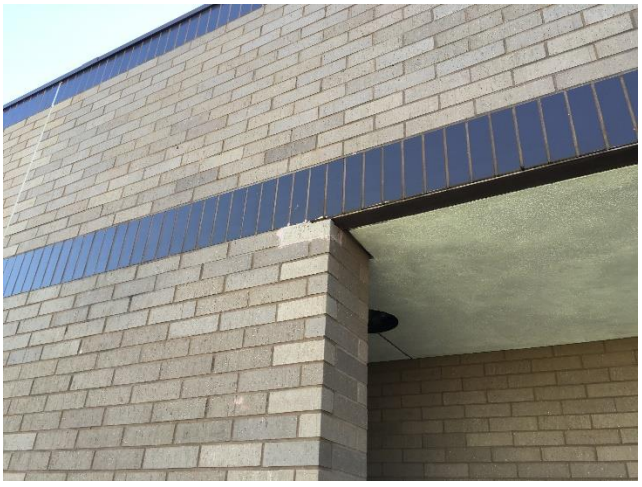
- Movement of column bases was observed between 1" to 3"
  - The piers are founded at a depth that is too shallow and the bearing elevation is within the active zone of the local soils.
    - *This is a difficult and very expensive item to correct. If this was truly desired we would recommend the addition of some supplemental piers along the perimeter edge of the building. These would be typical drilled belled piers and the recommendations for depths and bearing strengths would need to be provided by a Geotechnical Engineer.*
      - Up to $200K for full perimeter. Roughly $7.5K per column pier

- Cracking of the brick below structured lintels on the exterior of the building.
  - This is an item that was incorrectly constructed during initial construction and then the same error was repeated during the "repair project" that was completed from a few years back. After initially being formed and kiln dried at the brick factory a brick will swell due to normal atmospheric conditions for the

remainder of its lifespan. It is generally believed that 90% of the brick swelling will occur in the first 7 years of installed service life. What this means is that, if brick swelling will cause a problem it will generally make itself known within the first 10 years. What has occurred on this building is that we have long runs of brick that are supported by structurally suspended lintels. Because these are "structured" lintels and not "loose" lintels the brick at the jambs should not be constructed tight to the bottom of the lintel, OR the structured lintel should stop short of the jambs. Our present condition has the structured lintel extending into the brick jambs on each end and the brick in the jambs has been built tight to the bottom of the structured lintel; therefore, as the brick swelled over time it was jammed under the structured lintel and the bricks in the local area broke/split apart from excessive compression load.

- *Replace the rigid mortar in the top course of brick directly below the lintel with caulking or another approved material that is flexible.*
  - $3.5K

- The cmu walls within the facility were initially constructed in stacked bond vs running bond.
  - Due to the active subgrade soils it would have behooved the condition to have running bond cmu vs stacked bond cmu. Stacked bond cmu is far more susceptible to cracking from equivalent movement when compared to running bond cmu.
    - *We recommend that any cmu block that is removed and replaced due to excessive cracking, is replaced in running bond in lieu of stacked bond.*
    - *Additionally, due to the movement observed, it is recommended to add additional saw-cut joints, control joints, in the cmu. This will give existing cmu as well as any new cmu, in stacked or running bond, better ability to tolerate slab-on-grade movement without cracking to the extent that has been currently observed.*
      - Usual CMU demo and replacement cost on an as-needed basis

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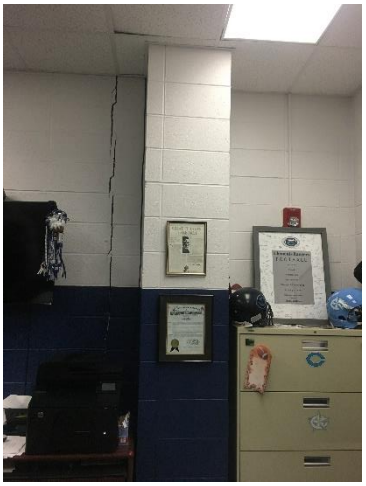
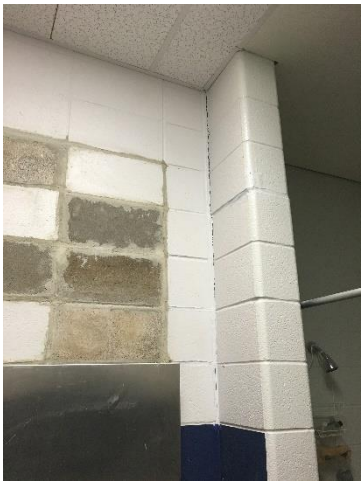
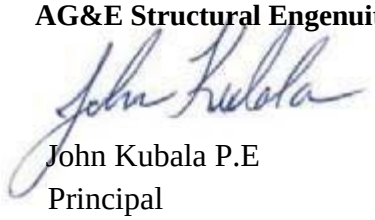




Please let me know if there are any further questions or concerns or if additional information or recommendations are required.

Respectfully,
**AG&E Structural Engenuity**



John Kubala P.E
Principal

**Texas Firm Number F-8435**