

STRUCTURAL ASSESSMENT – Bryker Woods ES – Main Building (BLDG-110A)

Building Purpose	Administrative offices, Gym, Classrooms and Cafeteria
Inspection Date	September 23, 2016 (Morning)
Inspection Conditions	N/A - Indoors only

Building Description / Reported Structural Concern

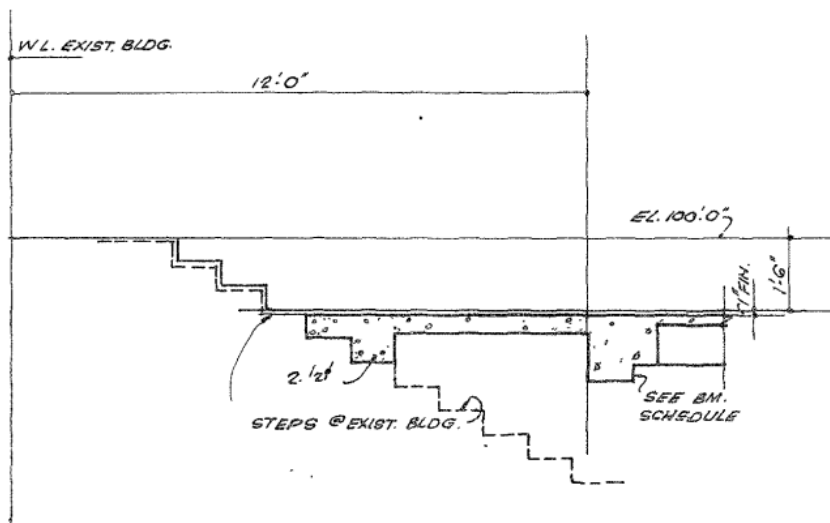
Brief Description of Existing Structure: Bryker Woods Elementary is a single-story school. The main building is primarily composed of suspended foundations with two small slab-on-grade additions. The original building was constructed in 1939 and consists of two-way floor slabs supported by interior beams and deep perimeter beams. Interior columns and perimeter beams bear on footings. The 1948 expansion consists of a pan joist floor system supported by interior beams and deep perimeter beams. Interior columns and perimeter beams bear on a combination of belled piers and footings.

Reported Structural Concern: During the crawl space assessment performed on August 31, 2016 by P.E. Structural Consultants, Inc., extensive cracking was observed in the crawl space on the side of an existing stair that had been partially demolished for the installation of a new ramp. The stairs are located at the interface of the original construction from 1939 and an addition built in 1948, and the ramp was added in 1998. PESC returned to the site to more closely observe the condition of the stair and ramp framing.

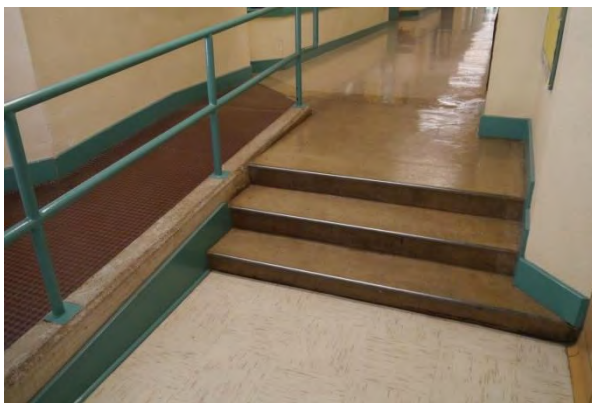
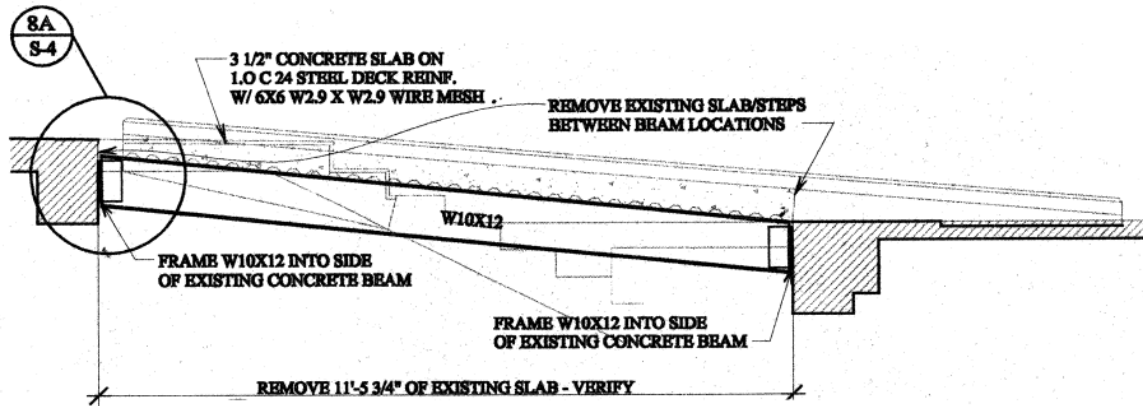
Structural Assessment Site Observations

While at the facility we made the following observations:

- **Review of Original Plans / Time of Ramp Renovation:** The stair in question was an exterior stair for the original 1939 construction. When the 1948 addition was constructed, the top three risers from the original stairs were retained to transition to the 1948 slab and the risers below were left in place and support a portion of the newer slab as shown in the detail below:



The east half of the 1939 stairs and 1948 slab were demolished in 1998 to install the ramp. The ramp consists of two sloping steel wide-flange stringers supporting galvanized steel conform deck. The stringers are supported by a 1948 concrete beam at the bottom and a 1939 beam at the top of the ramp. The top portion of the existing stairs was demolished to make room for the ramp slab.



View of Stairs and Ramp from Above

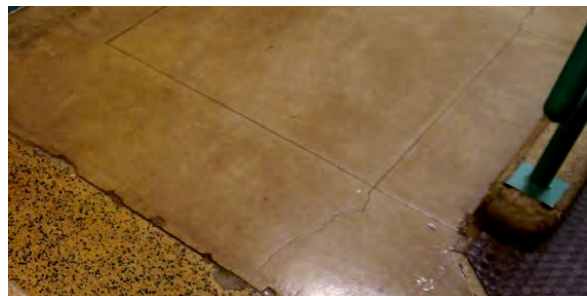


View of Stairs and Ramp from Below

- **Cracks Above Stair:** Small cracks were observed at the top of the concrete stairs.



Shrinkage Cracking in Stairs



Potential Flexural Cracking in Stairs

- **Cracks Below Stair:**

A diagonal crack is present in the side of the 1939 beam at the top of the ramp (opposite side of beam from ramp stringer connection). A longitudinal crack is present in the 1939 slab running near and parallel to the cracked beam.

(Note that we could not determine whether this crack penetrated the full depth of the slab because the top of the slab was covered with flooring material.) The slab crack continues for the full length of the slab/beam and propagates down through both supporting walls. The crack in the east wall is visible on both sides of the wall. The opposite face of the west wall could not be observed due to pipe congestion in the crawl space.



Diagonal Crack in Beam at Top of Stair



E-W Crack in Bottom of Slab Parallel to Beam



Vertical Cracking in West Wall



Vertical Cracking in East Wall

Conclusions

The cracks observed in the stair concrete framing may be due to several different factors: 1) differential settlement between the original building construction and the addition, 2) an alteration of load path when the stair were demolished and the ramp was installed, or 3) new tension forces from the ramp. Cracking in the columns and slab indicate vertical differential movement or lateral tension, while the diagonal cracking in the beam is indicative of torsion (induced by the ramp's connection to the face of the beam where originally there was no concentrated load). The perpendicular cracks at the top of the stairs are likely due to a newly introduced cantilever condition due to demolition of the east side of the stairs.

Although the cracking below the stair is extensive, we believe it will likely not progress further. The ramp has been in place for approximately 18 years so it is probable that the structure has experienced as much stress as it will during that time frame. Any settlement occurring between the 1939 construction and 1948 addition has most likely reached a balance point. Similarly, any load redistribution to accommodate the new ramp has already occurred and should not significantly change in the future. We recommend repairing the damage and returning periodically to verify the cracks do not return.

Bryker Woods ES – Summary of Structural Repair Recommendations

This document is based on current conditions observed during fieldwork and provides recommendations for corrective actions.

Bryker Woods ES Structural Repair Recommendations

1. Repair Existing Concrete Damage:

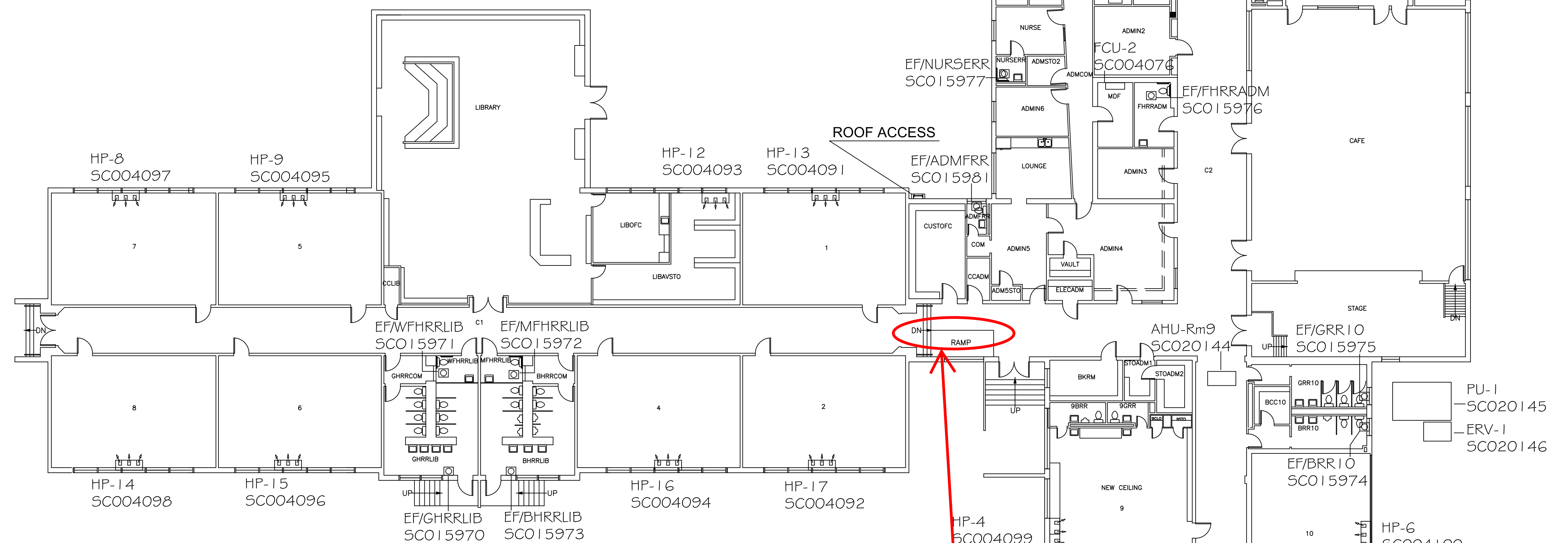
- a. Epoxy inject cracks to prohibit development of corrosion in the reinforcing steel
- b. Clean exposed slab reinforcing and repair spalled concrete

2. Monitor the Area for Return of Cracks:

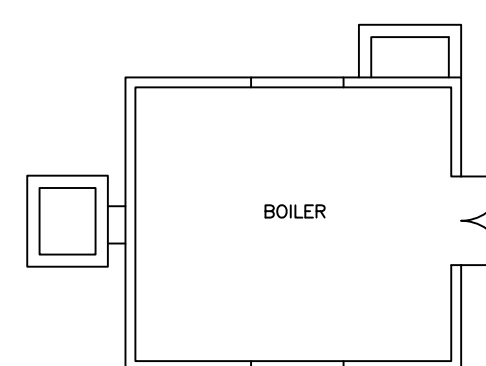
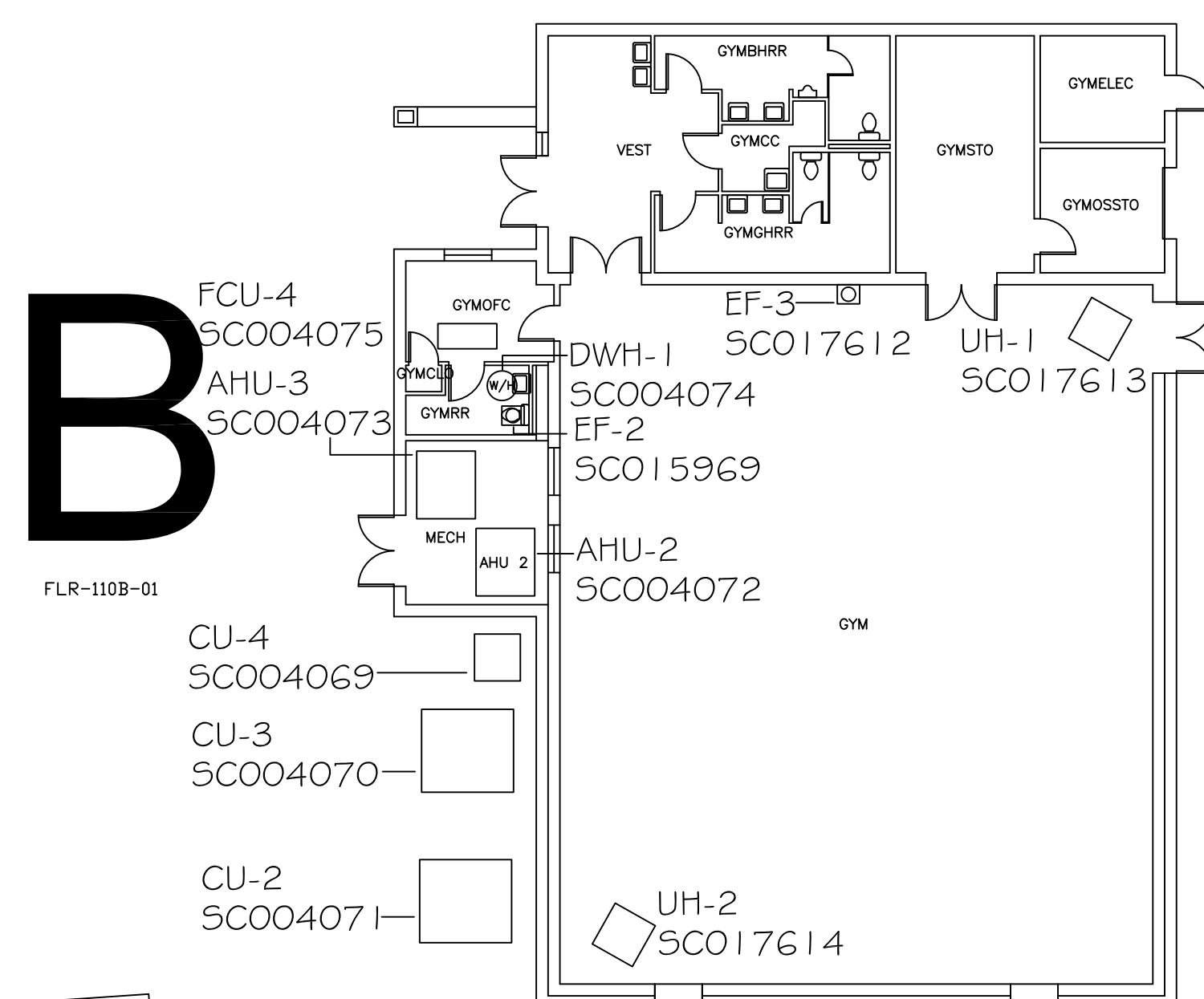
- a. Return to the site annually for 2 to 3 years (3 additional visits) to observe the area and determine if any additional cracking has occurred. (\$2,000 for each observation visit & report)
- b. If additional cracking develops in the future, then further analysis will be required to determine if structure is overstressed. If the structure is overstressed, then the concrete may need to be retrofitted to increase its structural capacity. (Note that the need for these measures is not anticipated.)

Note: This report is based on and limited to the observations and information noted above. This is not a guarantee. Additional deficiencies may exist which were not observed and which may require additional remedial work which is not listed here.

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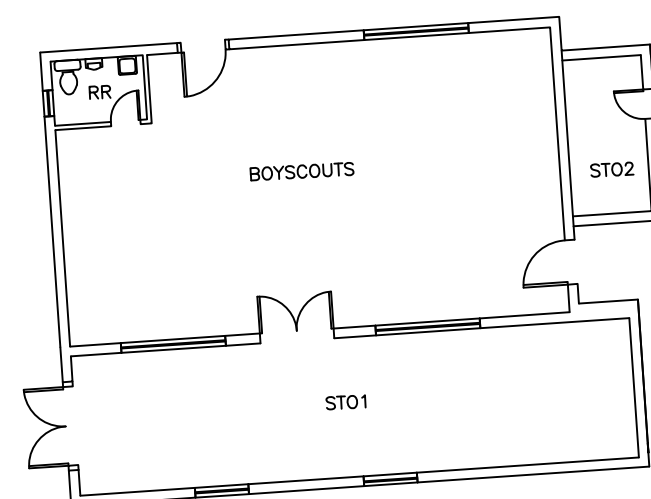


DISTRESSED CONCRETE FRAMING IN CRAWL SPACE BELOW



FLR-110C-01

FLR-110D-01



NORTH

AUSTIN_I.S.D.



DEPARTMENT OF
CONSTRUCTION MANAGEMENT

BRYKER WOODS
ELEMENTARY
SCHOOL

3309 Kerby Ln.
Austin, Texas

FLOOR PLAN
FIRST FLOOR

APPROVALS		
DRAWN	CHECKED	APPROVED
J.R.		
09/21/12		
DWG: 11001		SHEET
DRAWING SCALE		1 OF 1
1/16" = 1'-0"		