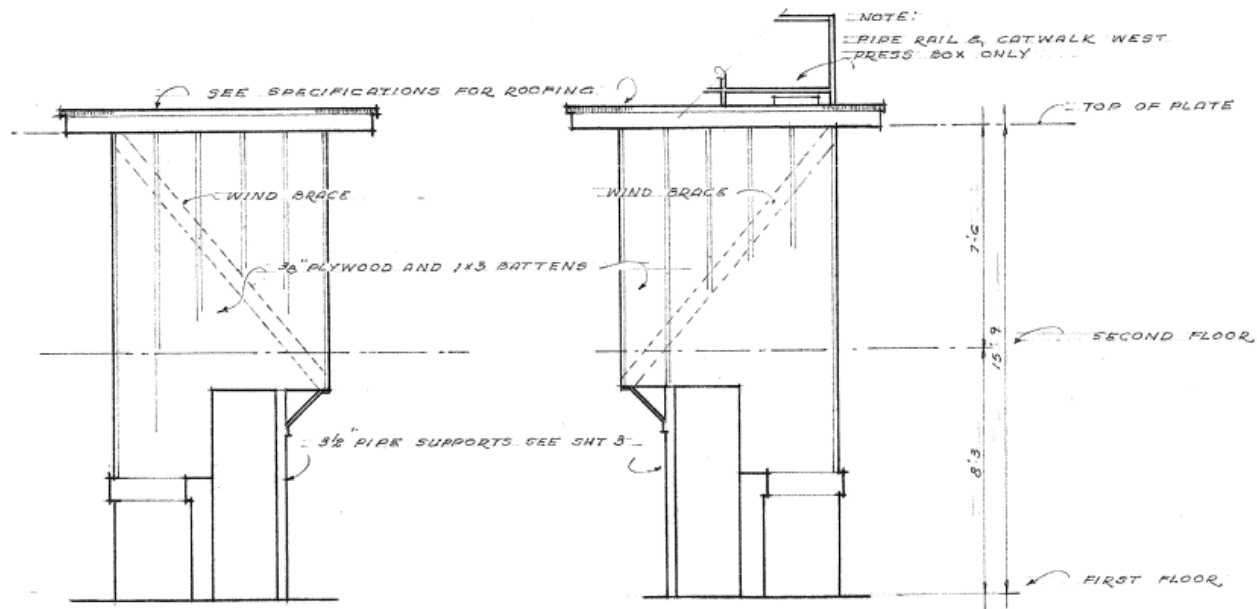


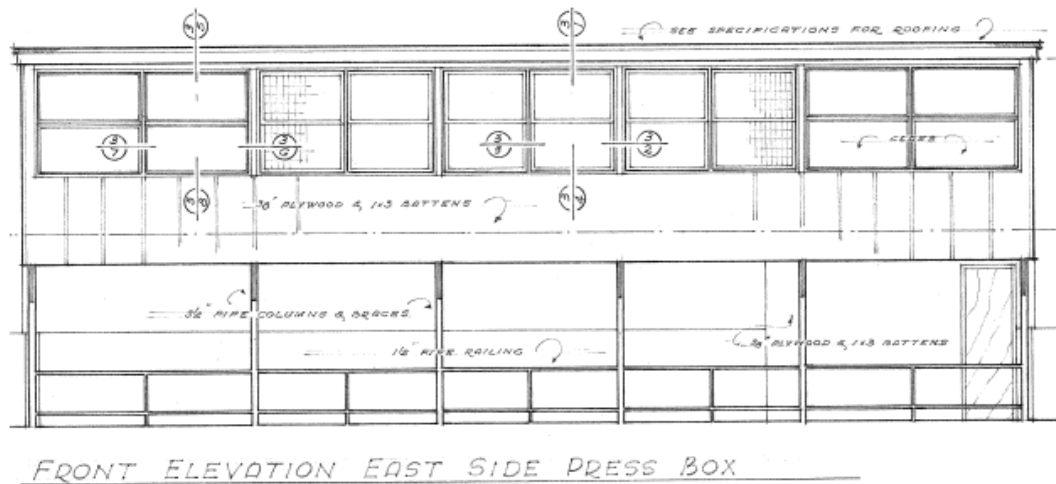
STRUCTURAL ASSESSMENT – House Park Athletic Facility (BLDG-280)

Building Purpose	Press Boxes, Scoreboard & Stadium Seating
Inspection Date	October 14, 2016 (Morning)
Inspection Conditions	80° - Cloudy

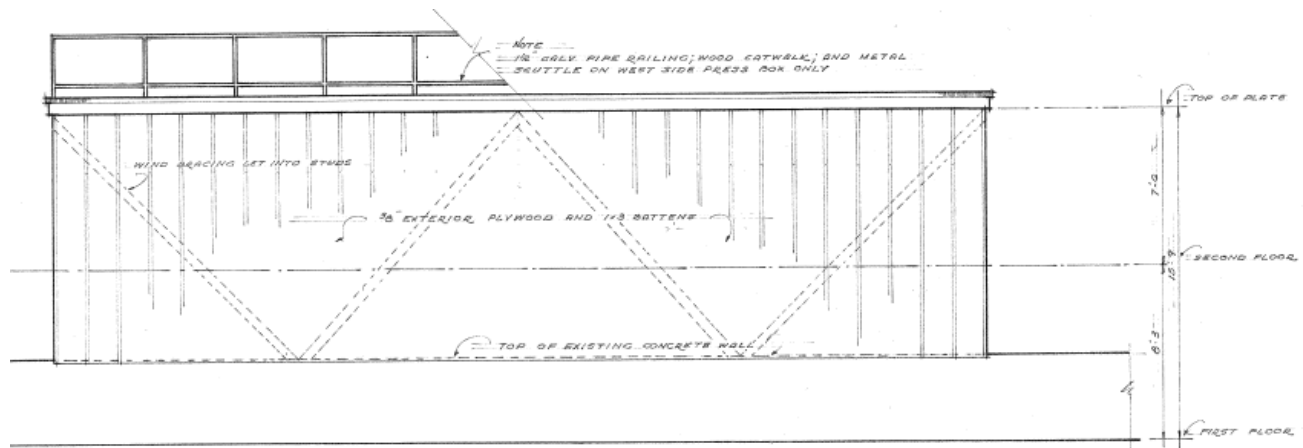
Building Description / Reported Structural Concern

Brief Description of Existing Structure: The House Park press boxes are identical and are supported on top of the cast-in-place concrete stadium structures on each side of the football field. Both concrete stadium structural systems are four bays wide and fifteen bays long. The west stadium structure tapers to a reduced width on the south side due to clearance limitations with the adjacent roadway. Both press box structures are two levels and are constructed with conventional 2" x 4" wood framing and plywood siding. First floor steel pipe columns support the overhanging second floor. The back of both press boxes sit on the 4ft tall concrete wall along the back of the stadium. See side and front elevations of press boxes below:





The west press box contains pipe railing around the roof; however, a notice was posted indicating access to the roof is not permitted due to safety concerns. Wind forces are transferred through 1" x 6" wood diagonal wind braces located at the ends of the press boxes and across the back wall. The orientations of the braces are shown above and in the figure below.



Aluminum stadium seating is bolted to galvanized WT sections which are bolted to the vertical faces of the stepped concrete stadium deck.

Reported Structural Concern: It was reported that both press boxes sway with the wind and are considered structurally hazardous. We were also asked to evaluate the condition of the seating.

Structural Assessment Site Observations

While at the facility we made the following observations:

- **West Side Press Box:** The west side press box showed indications of lateral movement in the east-west direction. The steel pipe hand rails at each end of the press boxes spanning from steel pipe columns to the concrete back wall have visibly separated from the concrete and the two bolts connecting the rails to the concrete have failed. The hand rail on

the south side of the press box had a larger separation than the north side. All the pipe columns supporting the front of the press box appeared out of plumb, pitched towards the field. The walls and the built-in desks inside the press box also appeared to tilt towards the field. These visual observations were confirmed with a level.

Wall-mounted air conditioning units are installed on the north and south sides of the press box. Although we were unable to observe the wind braces in these walls due to the plywood sheathing, it is possible that the wind braces were partially cut during the AC unit installation.



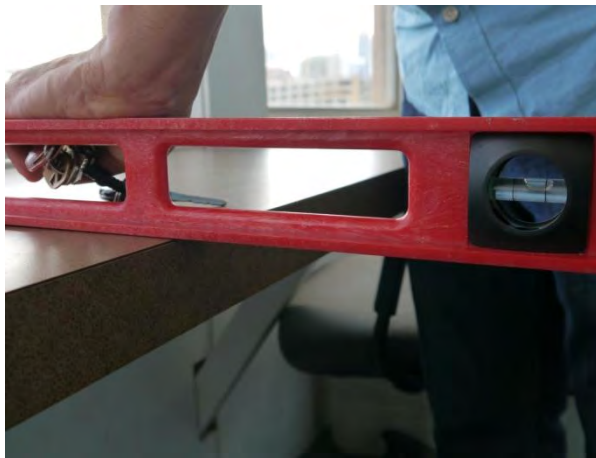
North hand rail connection separation, Broken bolts



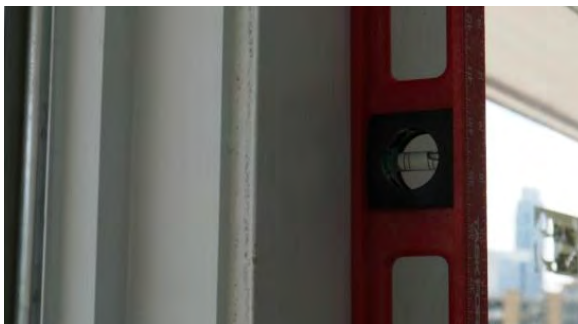
South hand rail connection separation, Broken bolts



South pipe column is tilting towards field



Desk tops inside press box appear to be tilting towards field



Interior wall of press box is leaning towards field



North wall – Possible AC unit conflict with wind brace



South wall – Possible AC unit conflict with wind brace

- **East Side Press Box:** The east press box was also examined for signs of lateral movement. The end hand rails were also slightly separated from the concrete back wall confirming movement in the east-west direction.

Additionally, air conditioning units were observed in both the north and south ends of the press box. The air conditioning unit on the north end of the press box is definitely installed in the location of the wind brace as shown in the existing plans. The AC unit on the south end of the press box may also be installed within the path of the original wind brace.



North hand rail connection separation



South hand rail connection separation



North wall – Definite AC unit conflict with wind brace



South wall – Possible AC unit conflict with wind brace

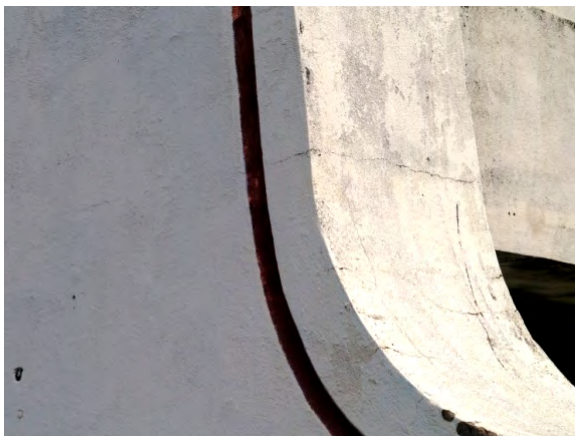
- **Scoreboard:** While traveling between the east and west stadium seating, distress was observed in the scoreboard structure. The concrete scoreboard is supported by four cast-in-place concrete columns. Small cracks were observed on the two exterior columns near a change in cross section. The cracks are located on both the front and back faces of the columns. Horizontal cracks were also observed on the two interior columns at near the top of the two exterior columns and at the bottom about 3-4 ft. above the ground. The back of the scoreboard has exposed reinforcement near the bottom.



Crack on back face of east column



Crack on front face of west column



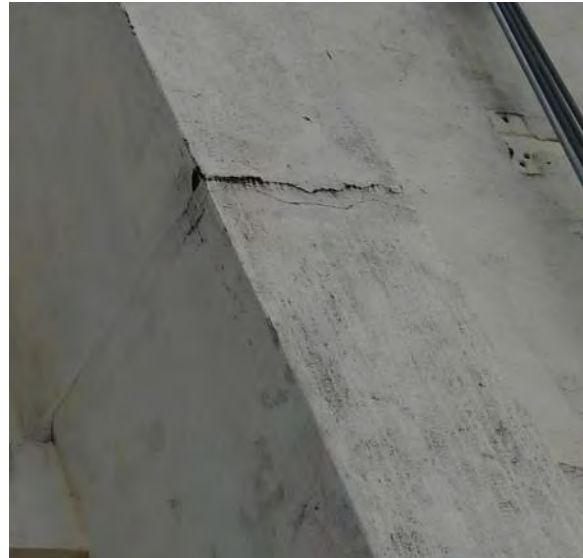
Crack on back face of east column



Crack on bottom of interior column



Exposed reinforcement on back of scoreboard



Crack on interior column

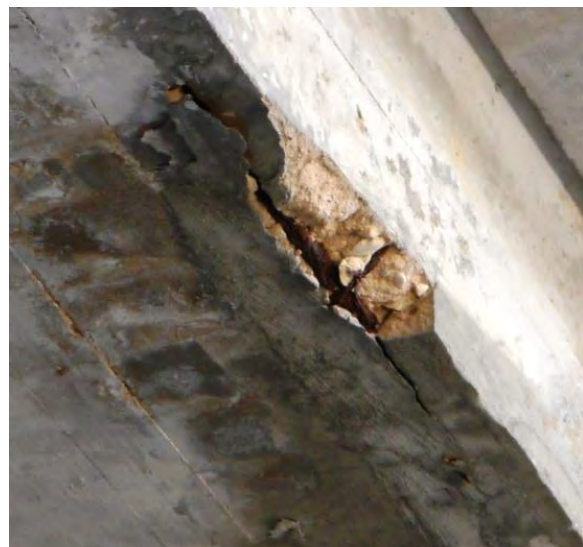
- **East & West Concrete Stadium (BLDG 280K & 280L):** The concrete structures were visually examined for surface defects. The columns and beams were generally in good condition although cracking, spalling and exposed/corroded reinforcement was observed in many areas under the stepped deck framing. Much of the damage appears to be from water intrusion through the deck causing the reinforcement to corrode and expand and the concrete to crack and spall.

A low suspended beam on the south side of the west stands has insufficient concrete cover and consequently has exposed/corroded reinforcement under and on the side of the beam.

Several damaged areas had been repaired previously and the repair patch had since cracked, spalled and/or fallen off. This would also be consistent with water intrusion through the deck.



Previously repaired east stadium deck area crack-cracked with exposed/corroded reinforcement



West stadium deck soffit spalling with exposed/corroded reinforcement



Repair patch at west stadium beam cracked with exposed/corroded reinforcement



East stadium honeycombing and exposed/corroded reinforcement

- East & West Stadium Aluminum Seats (BLDG 280K & 280L):** The aluminum seats and steel supports at the east stadium were generally in very good condition. One steel support was observed with mild corrosion. No other significant defects in the seats were observed in the east stadium.

At the west stadium seating, a majority of the WT supports used to connect the aluminum bench seats to the stepped concrete deck were installed too low. As a result, an additional clip angle was welded to the top of the WT supports to raise the bench seats to the correct elevations. These angles appear to be painted rather than hot-dipped galvanized like the WT sections. Mild to moderate corrosion is present in all clip angles. In addition, many angles were poorly welded and have completely separated from the WT supports.



Typical bleacher support condition at the east stadium seats



Additional clip angle installed on west stadium seats (compare to support condition at east stadium as shown on the left)



West stadium clip angle was poorly welded and has detached from the WT support



Mild corrosion on steel seat support

Conclusions

- **East & West Press Boxes:** Both the east and west press boxes are in distress and appear to be tilting laterally towards the field. Building movement in the east-west direction has failed the perpendicular hand rail connections and horizontally displaced the top of the press boxes. The east-west movement is likely because the east-west lateral bracing is not directly connected to the rigid concrete stadium structure and as a result the press boxes are not sufficiently braced against lateral movement. As detailed, forces from the roof diaphragm carry through the upper level diagonal braces and are transferred to the top of the steel pipe column. There are no diagonal braces present at the lower level, so the steel pipes are expected to carry all lateral loads to the supporting stadium concrete. Whether or not the steel pipes have enough capacity to carry the lateral loads without failing, they clearly do not provide the stiffness needed to prevent lateral movement. The base connection of the steel pipe columns could not be found so it is not clear whether the steel pipes have any flexural capacity to transfer any lateral loads to the supporting concrete. Note that the failed handrail connections are not intended to perform as part of the lateral system. Additionally, the diagonal wind braces at the ends of the press boxes may have been removed or cut out to install A/C units, and it is not clear that any additional bracing was added to replace the removed/cut original braces. **The lack of adequate bracing is concerning and needs to be addressed quickly.**
- **Scoreboard:** The scoreboard has a large surface area that can attract large lateral forces from wind loading. These large lateral forces create flexural stresses in the columns and as a result the columns have small flexural cracks. These cracks are not severe and do not pose a structural safety concern.
- **East & West Concrete Stadium:** Most of the spalling, cracking and exposed reinforcement in the stadium deck soffit and beams is a result of water infiltration and insufficient concrete cover. The water intrusion through the deck must be remediated before any concrete repairs will be effective.
- **Stadium Aluminum Seats:** Corrosion has occurred at clip angles and welded areas. Separation of the aluminum bench seats from the WT supports has occurred where the WT supports were not installed at elevations consistent with the others within the same row.

House Park Athletic Facility – Summary of Structural Repair Recommendations

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

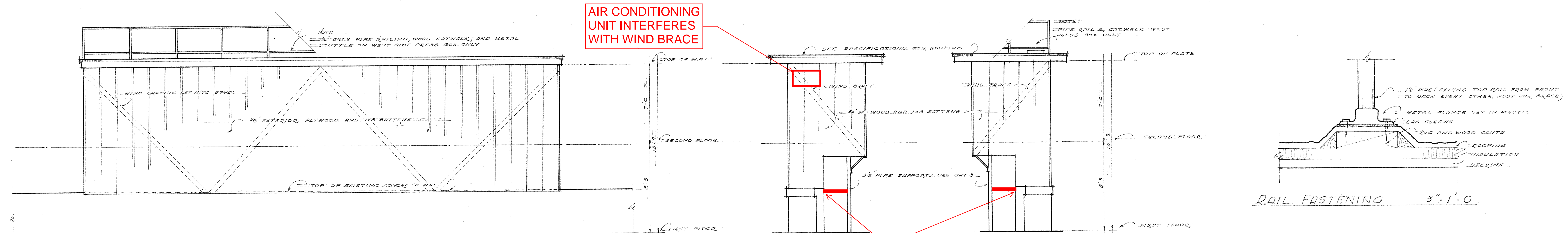
House Park Athletic Facility Structural Repair Recommendations

Below are the recommendations for additional investigative work needed to understand the issue and/or the corrective measures needed to repair the observed damage:

1. **East & West Press Boxes:** Both press box structures need to be realigned to their original plumb position and lateral bracing needs to be added at both floor levels to prevent any future lateral movement.
2. **Scoreboard:** Exposed rusted reinforcement should be cleaned and the surrounding concrete should be patched to prevent further corrosion. Cracks in the concrete columns should be sealed to prevent water infiltration and monitored periodically for further degradation.
3. **East & West Concrete Stadium:** The top surface of the concrete deck should be coated with a flexible waterproofing membrane to prevent water intrusion through the deck. Exposed rusted reinforcement should be cleaned, and the surrounding damaged concrete should be repaired to prevent further corrosion. Larger cracks should be filled via epoxy injection.
4. **East & West Stadium Aluminum Seats:** Corroded supports at the east and west stadium aluminum seats should be cleaned and painted to prevent further rust from occurring. Clip angles that have separated from the WT supports should be re-welded.

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.





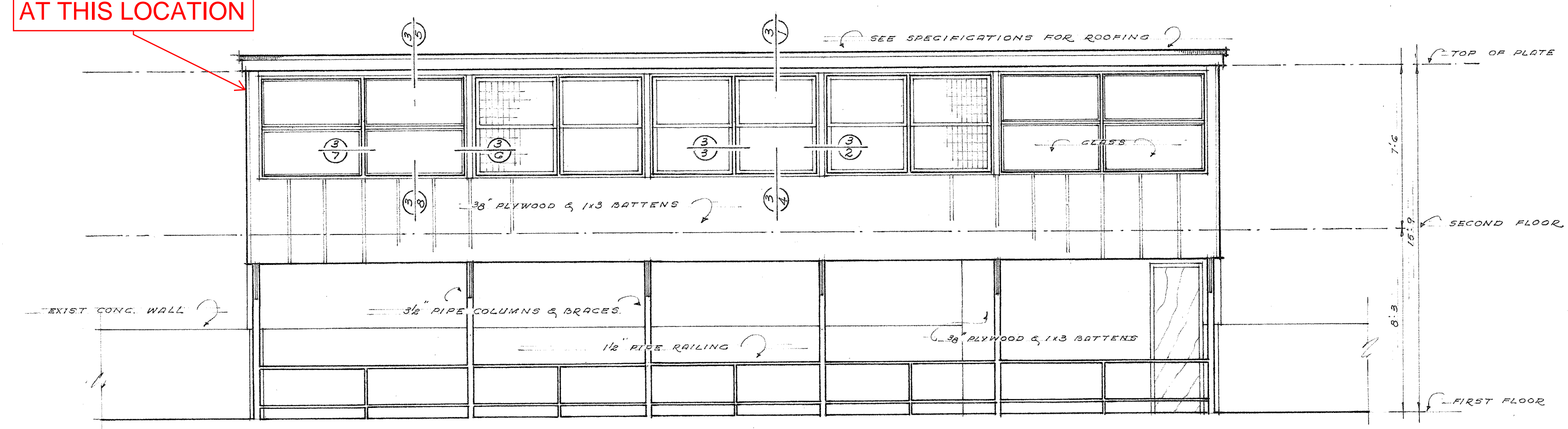
TYPICAL REAR & SIDE ELEVATIONS OF EAST AND WEST SIDE PRESS BOX

SCALE 1/4" = 1'-0"

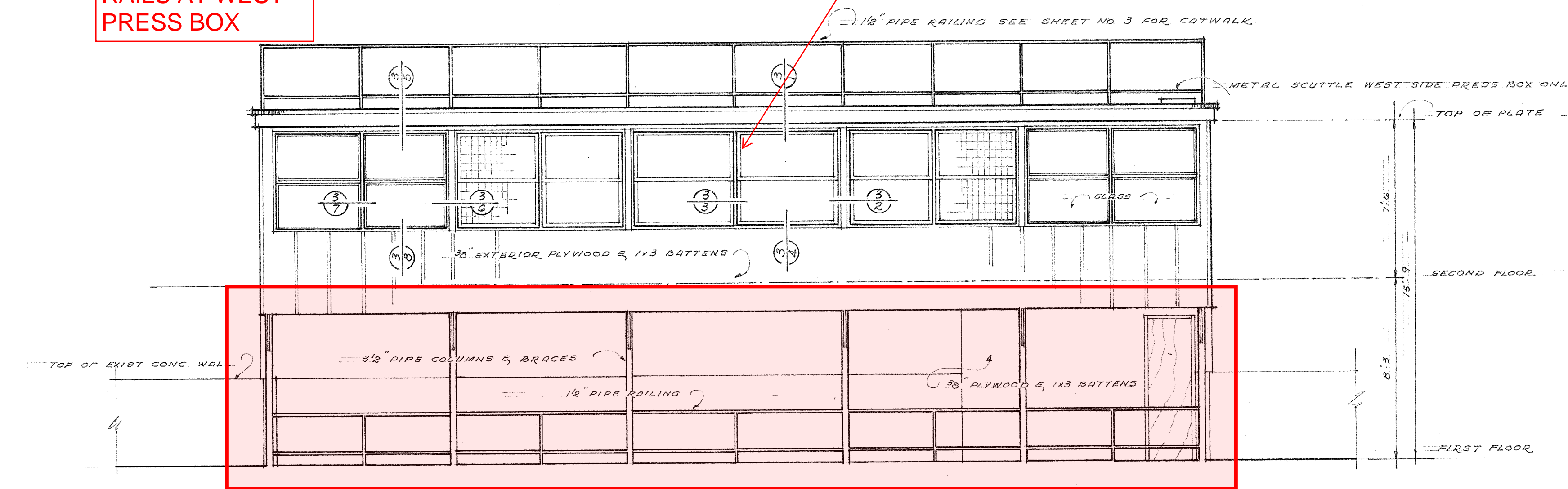
AIR CONDITIONING UNIT INTERFERES WITH WIND BRACE AT THIS LOCATION

DETACHED HAND RAILS AT WEST PRESS BOX

SLOPED WALL MEASUREMENT LOCATION

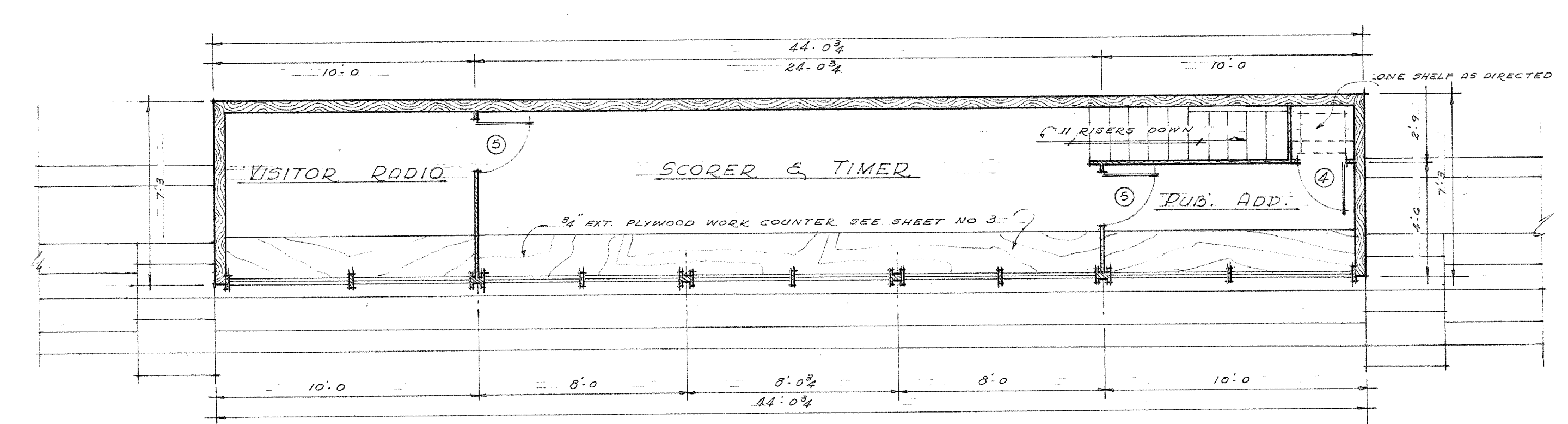


FRONT ELEVATION EAST SIDE PRESS BOX 1/4" = 1'-0"

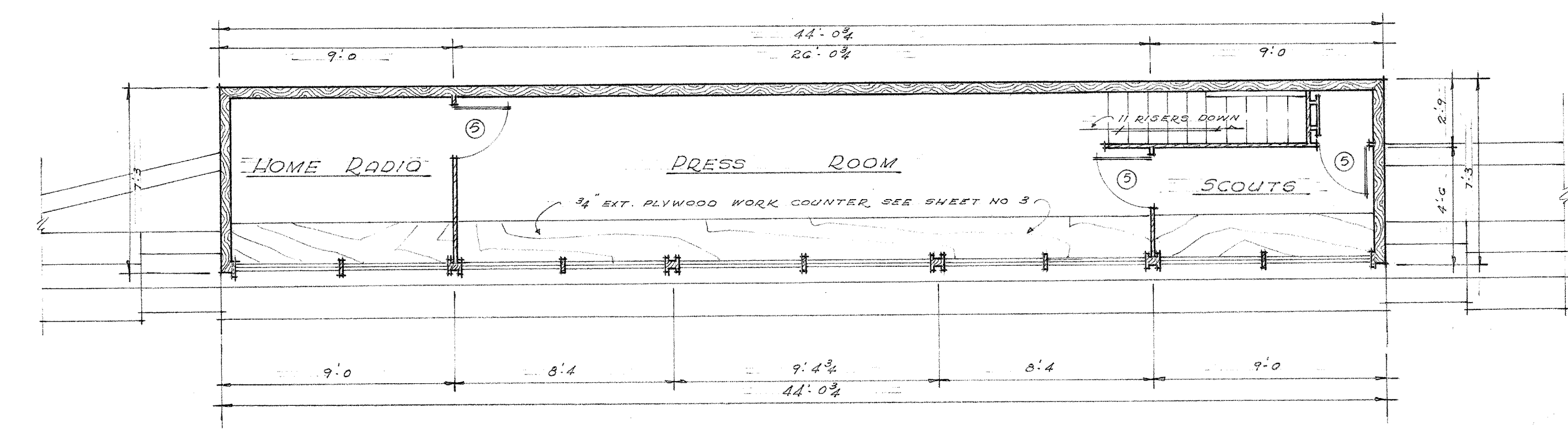


FRONT ELEVATION WEST SIDE PRESS BOX 1/4" = 1'-0"

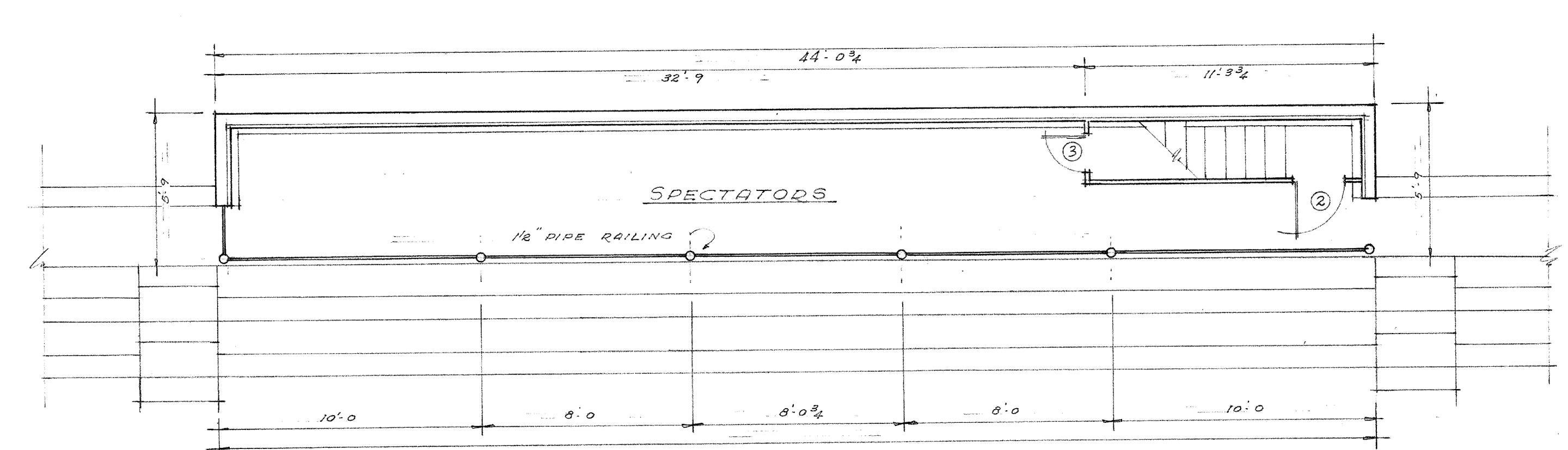
TILTED PIPE COLUMNS



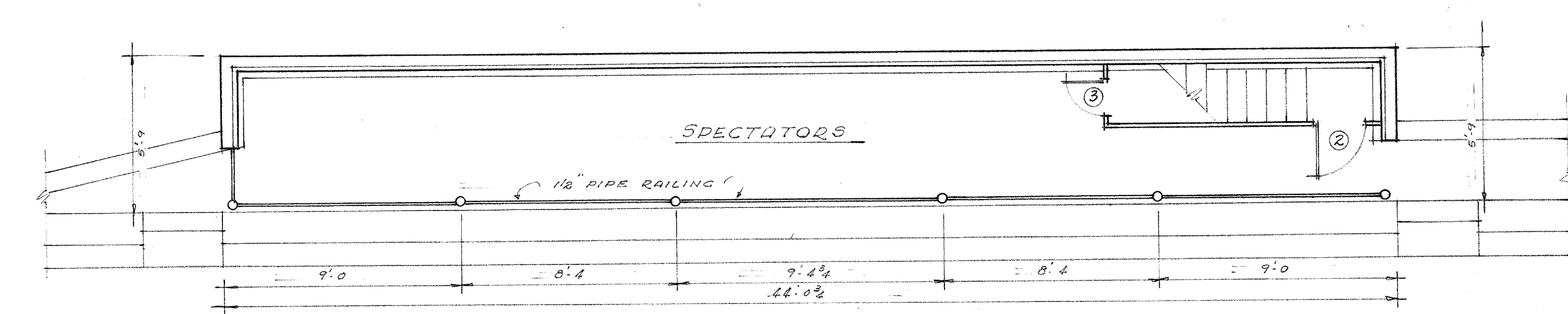
SECOND FLOOR EAST SIDE PRESS BOX 1/4" = 1'-0"



SECOND FLOOR WEST SIDE PRESS BOX 1/4" = 1'-0"



FIRST FLOOR EAST SIDE PRESS BOX 1/4" = 1'-0"



FIRST FLOOR WEST SIDE PRESS BOX 1/4" = 1'-0"

PRESS BOXES	
HOUSE PARK IMPROVEMENTS FOR AUSTIN INDEPENDENT SCHOOL DISTRICT	
DIVISION OF SCHOOL PLANT 701 EAST 11TH AUSTIN, TEXAS	
DRWN. BY	CH. BY
DATE	
SHEET 52 OF 5	