

Appendix E
I&E (Radiographic Testing)



August 17, 2012

Mr. Rick Wohlfarth, P.E.
Nutting Engineers of Florida, Inc.
1310 Neptune Drive
Boynton Beach, FL 33426

**Re: Concrete Radiographic Examination &
Ground Penetrating Radar Investigation
Glynn Archer School
1300 White Street
Key West, FL**

Engineering & Inspections Unlimited, Inc. performed non-destructive testing inspections, Ir 192 radiography, Cobalt 60 radiography and Ground Penetrating Radar Scans (GPR). Inspections were performed on Wednesday, August 8, 2012 through Saturday, August 11, 2012 at the Glynn Archer School at 1300 White Street, Key West, FL. The purpose of these inspections is to locate and identify the reinforcing steel in walls and columns and established their spacing in selected areas. Areas inspected were predetermined by Andy Chan, P.E. of Yolles and conveyed to us by Rick Wolfarth, P.E. from Nutting Engineering. Mike Flattery from CH2M Hill was our site contact.

W 100 – Auditorium, First Floor, South Side

A 24” wide x 48” high area was scanned on the southeast side of column 100. The GPR scans showed no steel. A 14” x 17” radiograph was taken in the middle of the area at a height of 38.5” from the floor to the top of the film. No steel was found in the radiograph.

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W 100 – Auditorium, First Floor, South Side

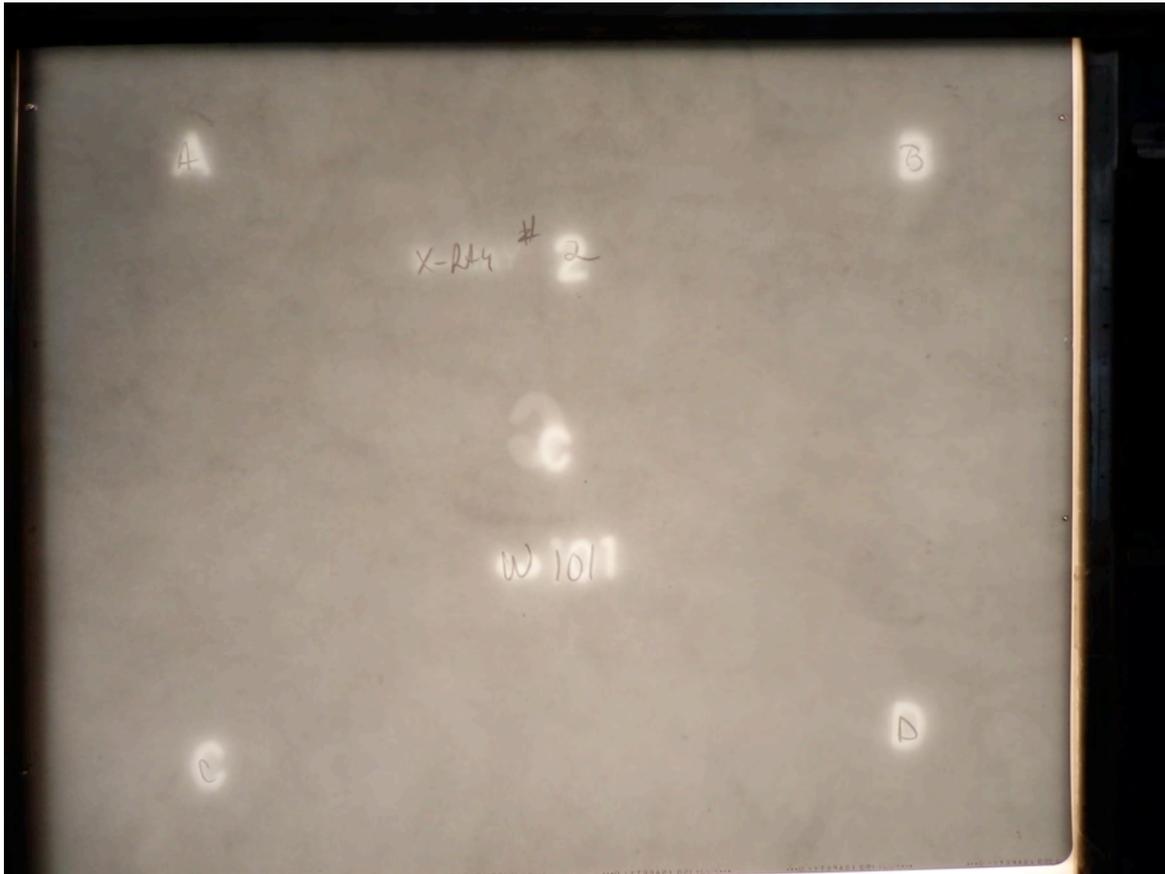
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W101 – Auditorium, First Floor, South Side

A 24” wide x 48” high area was scanned on the southwest side of column 100. The GPR scans showed no steel. A 14” x 17” radiograph was taken in the middle of the area at a height of 47” from the floor to the top of the film. No steel was found in the radiograph.



W101 – Auditorium, First Floor, South Side – X-Ray # 2

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W102 – Auditorium, First Floor, North Side

A 24” wide x 48” high area was scanned on the west side of column 101. The GPR scans showed indications both vertical and horizontal. A 14” x 17” radiograph was taken at the intersecting points of the GPR indications at a height of 32” from the floor to the top of the film. No steel was found in the radiograph.



W 102 – Auditorium – First Floor – North Side – X-Ray # 5

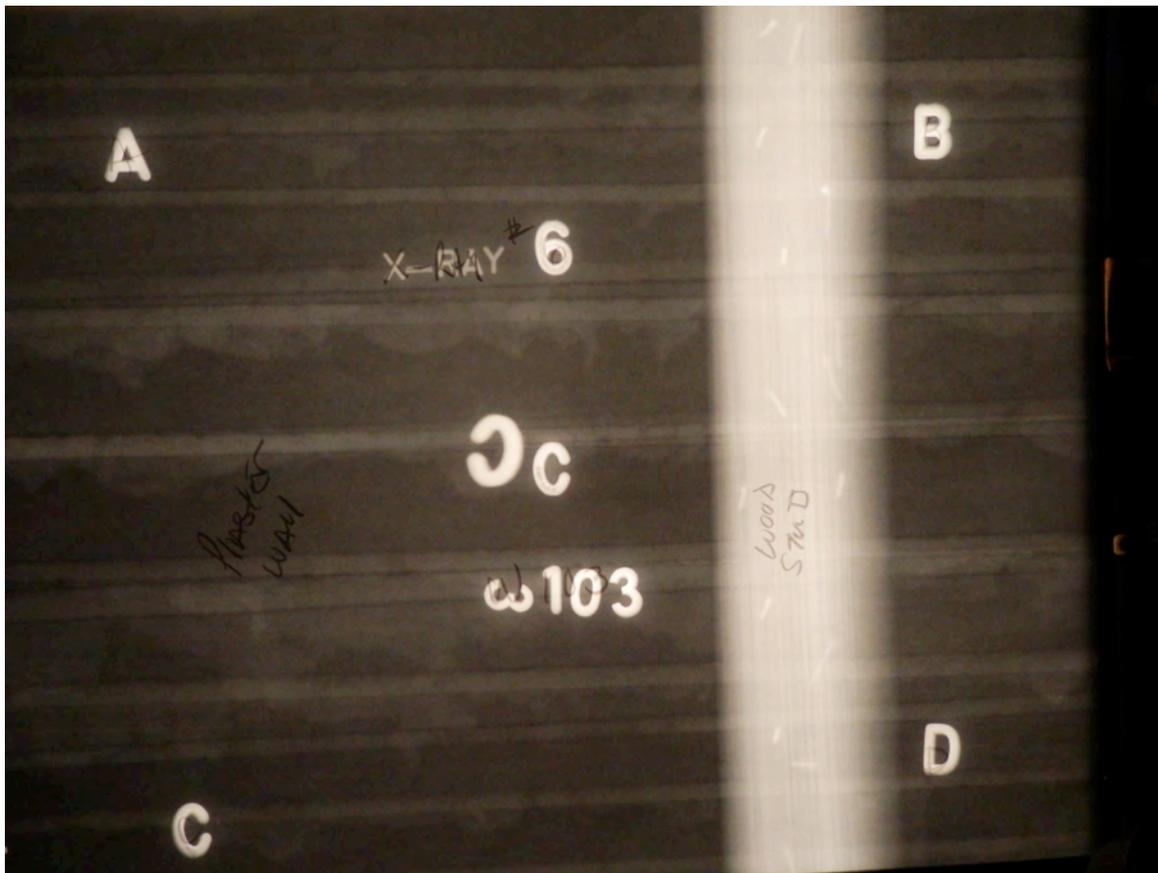
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W103 – Auditorium, First Floor, North Side

A 24" wide x 48" high area was scanned on the east side of column 101. The GPR scans showed indications both vertical and horizontal. A 14" x 17" radiograph was taken at the intersecting points of the GPR indications at a height of 44" from the floor to the top of the film. The radiograph showed the wall to be made of wood lathing and plaster. The radiograph confirmed that the GPR indications were a pattern of nail heads.



W 103 – Auditorium, First Floor – North Side – East Side Column 101 X-Ray # 6

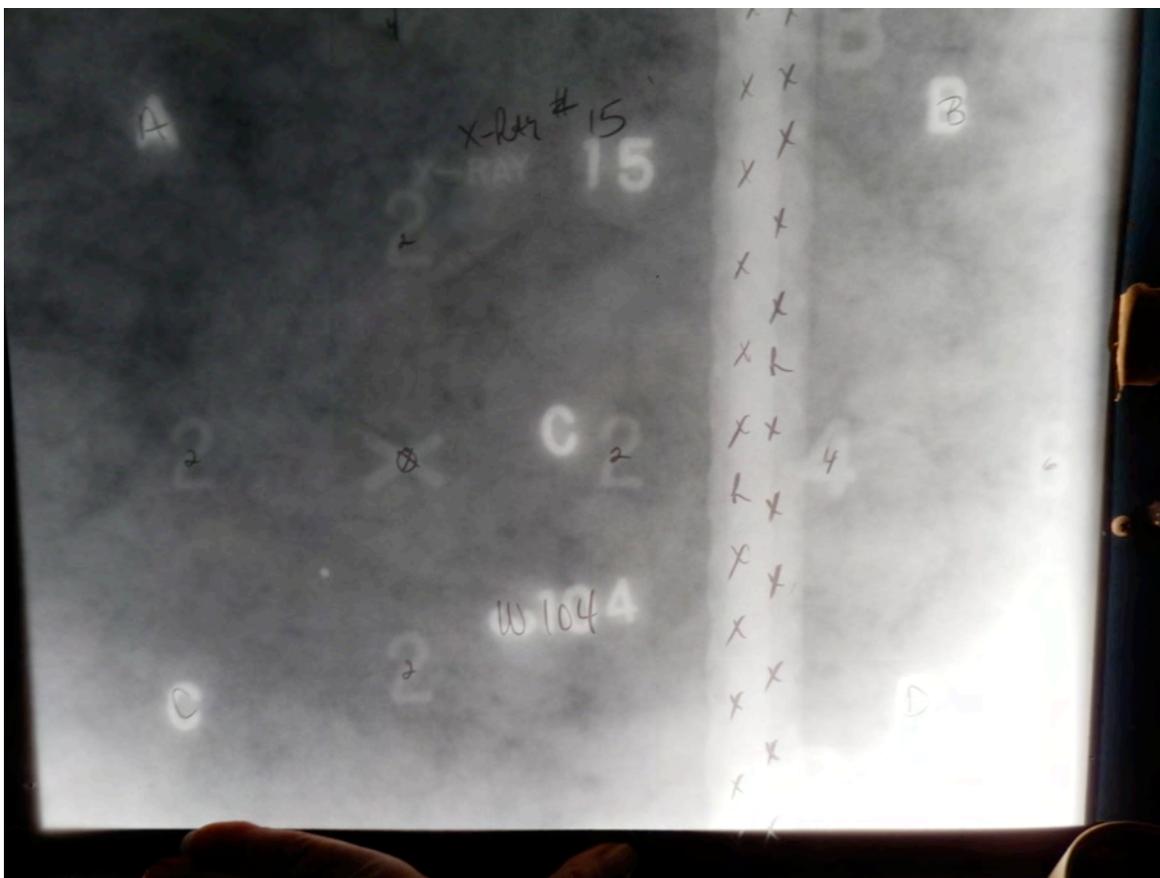
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W 104 R – A - Wing, First Floor, Northeast Corner

This area was shifted to the opposite corner due to obstructions.
A 2' high x 3' wide area was scanned southeast wall. The GPR scans showed two overlapping vertical bars at an approximate depth of 6". A 14" x 17" radiograph was taken at a height of 40" from the floor to the top of the film. The bars are deformed rebar and are estimated at 15/16" in diameter.



W 104 R – A - Wing, First Floor, Northeast Corner – X-Ray # 15

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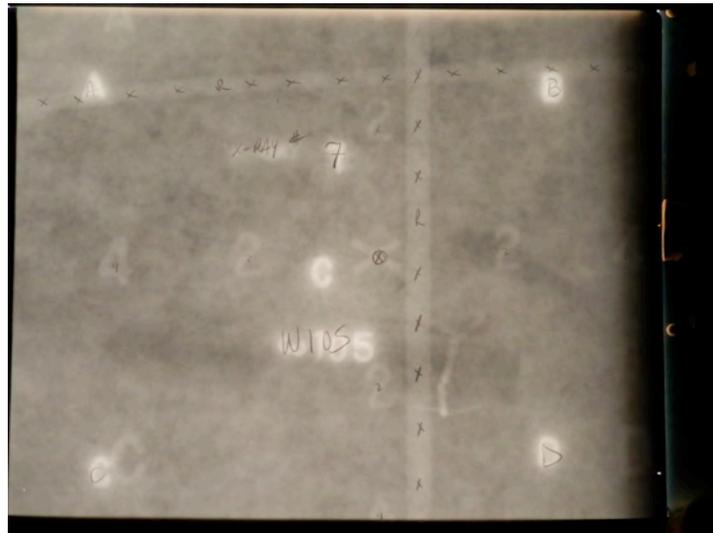
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W 105 – B - Wing, First Floor, Southeast Corner

A L-shaped area of 17" high x 4' wide x 38" high was scanned. The GPR scans showed two vertical bars spaced at 26" and one horizontal bar bisecting the bar closest to the corner. These bars were at an approximate depth of 6" to 8". A 14" x 17" radiograph was taken at the bisect. The bars are deformed rebar. The vertical bar is estimated 1/4" in diameter. The horizontal bar is estimated at 1/2" in diameter.

A 2' wide x 4' high area was scanned. The GPR scans showed one vertical and one horizontal bar at an approximate depth of 6" to 8". A 14" x 17" radiograph was taken at the bisect. The bars are deformed rebar. The vertical bar is estimated 1/4" in diameter. The horizontal bar is estimated at 1/2" in diameter.



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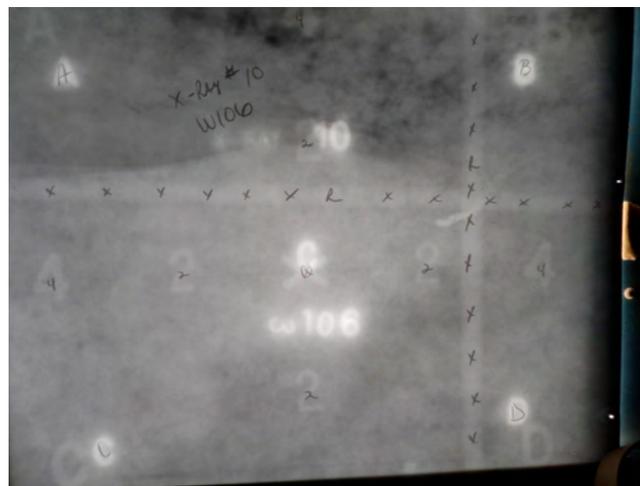
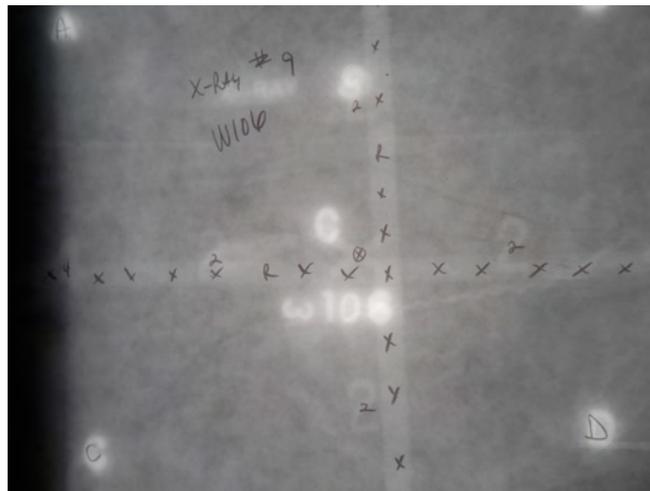
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W 106 R – B - Wing, First Floor, Southeast Corner

This area was shifted from room 104 to room 109 due to obstructions.

A area of 36" high x 30" wide was scanned on the southeast wall of the corner. The GPR scans showed one vertical and one horizontal bar. These bars were at an approximate depth of 4" to 8". A 14" x 17" radiograph was taken at the bisect. The bars are deformed rebar. The vertical bar is estimated $\frac{1}{2}$ " in diameter. The horizontal bar is estimated at $\frac{5}{16}$ " in diameter.

A 2' wide x 4' high area was scanned on the northwest wall of the corner. The GPR scans showed one vertical and one horizontal bar at an approximate depth of 8" to 9". A 14" x 17" radiograph was taken at the bisect. The bars are deformed rebar. The vertical bar is estimated at $\frac{1}{2}$ " in diameter. The horizontal bar is estimated $\frac{5}{16}$ " diameter.



W 106 R – B - Wing, First Floor, Southeast Corner – X-Rays # 8 & # 10

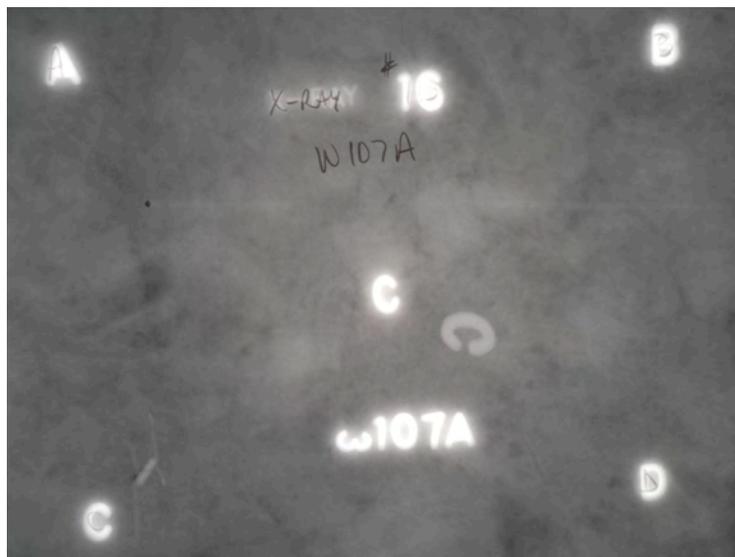
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W 107 Auditorium, First Floor, West Side, Backstage

A 5' high x 9' wide area was scanned. The GPR scans showed indications. Two 14" x 17" radiographs were taken at a height of 70" and 65" from the floor to the top of the film. The radiographs showed no steel bars, one radiograph shows exterior conduit.



107 Auditorium, First Floor, West Side, Backstage – X-Rays # 4 & # 16

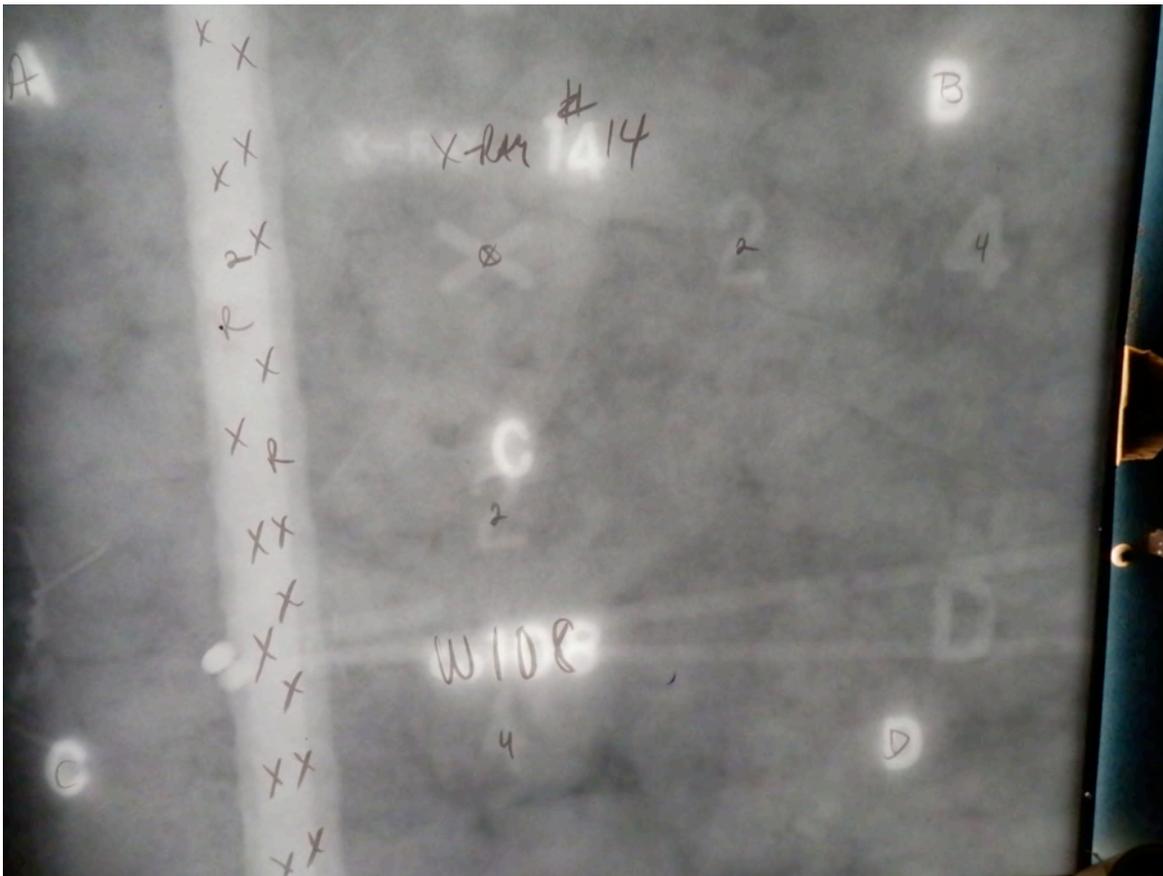
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W 108 A - Wing, First Floor, Northwest Corner

A L-shaped area 6' wide x 18" high and 4' high x 3' wide were scanned on the southwest wall. The GPR scans showed three vertical indications at an approximate depth of 6" and spacing at 7". A 14" x 17" radiograph was taken at a height of 34" from the floor to the top of the film. The radiograph shows two overlapping deformed rebar, estimated at 3/4" in diameter.



W 108 A - Wing, First Floor, Northwest Corner – X-Ray # 14

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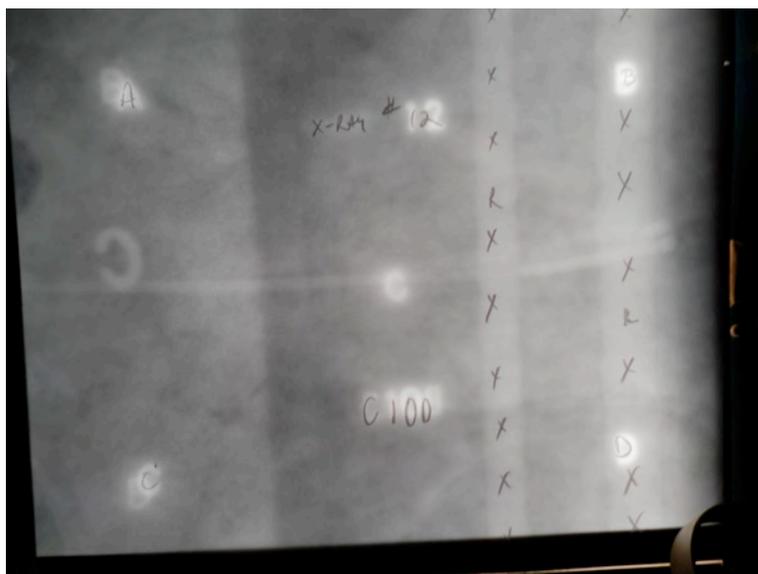
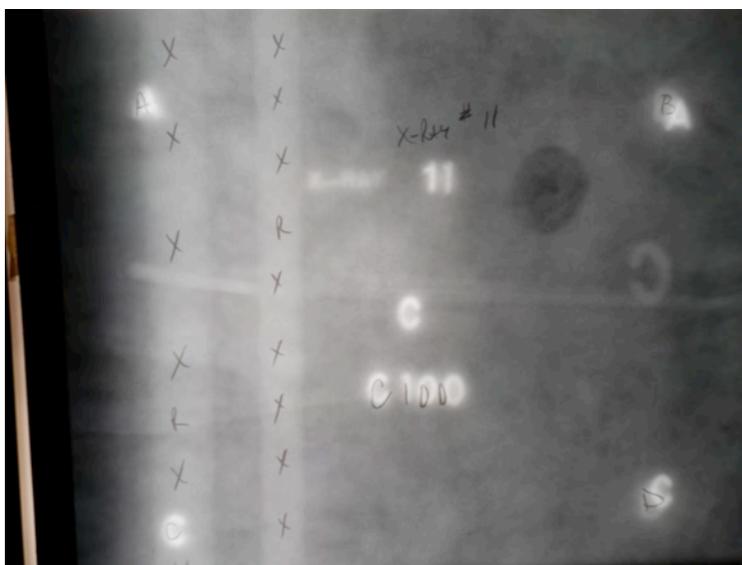
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C 100 Auditorium, First Floor, South Side

A 4' high x 2'-1" wide area was scanned. The GPR scans showed vertical and horizontal indications. Two 14" x 17" radiographs were taken across the width of the column, at a height of 66.5" from the floor to the top of the film. The radiographs show two vertical, deformed rebar, at an approximate 6" depth and approximately 5" in from each side of the column. The diameter of the rebar is estimated at 1" in diameter.

The one horizontal indication is at a depth of approximately 6" at a height of 17" from the floor.



C 100 Auditorium, First Floor, South Side – X-Rays # 11 & 12

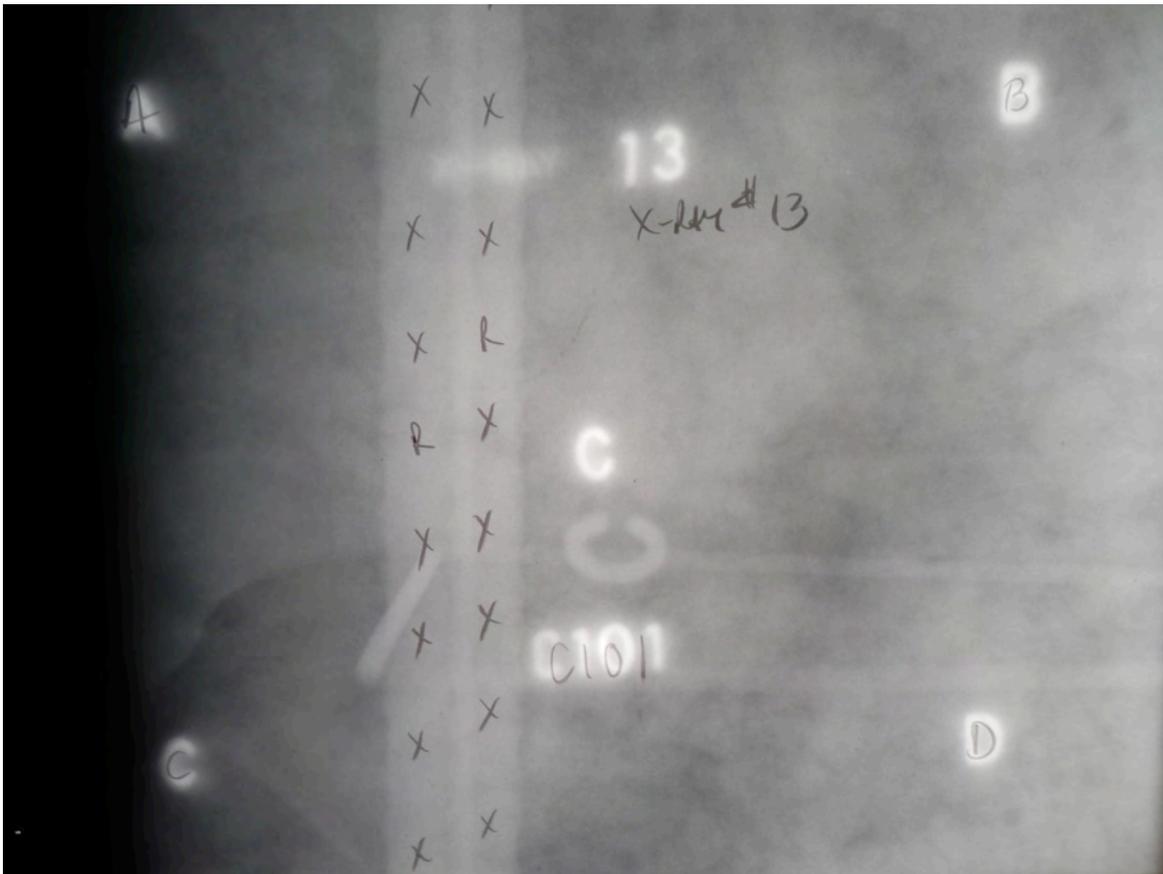
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C 101 Auditorium, First Floor, North Side

A 4' high x 2' wide area was scanned. The GPR scans showed a vertical indication. Two 14" x 17" radiographs were taken across the width of the column, at a height of 48" from the floor to the top of the film. The radiographs show two vertical, deformed rebar, at an approximate 6" depth. These rebar are side by side and approximately 5" in from the west side of the column. The diameter of the rebar is estimated at 1" in diameter.



C 101 Auditorium, First Floor, North Side – X-Ray # 13

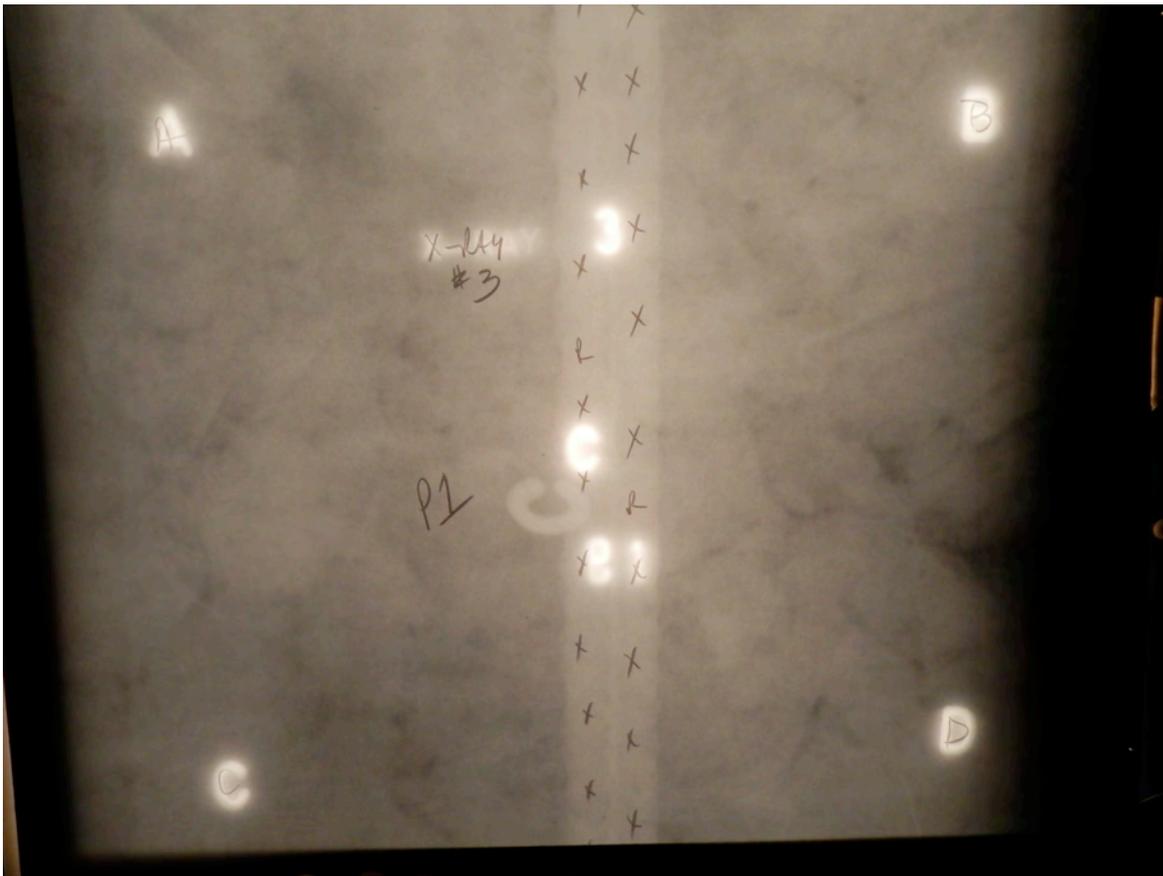
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P 1 Auditorium, First Floor, South Side, Between Windows

A 4' high x 2' wide area was scanned. The GPR scans showed two vertical indications. Two 14" x 17" radiographs were taken across the width of the column, at a height of 58" from the floor to the top of the film. The radiographs show two vertical, deformed rebar, at an approximate 3" depth. These rebar are side by side and are on center. The diameter of the rebar is estimated at 1/2" in diameter.



P 1 Auditorium, First Floor, South Side, Between Windows – X-Ray # 3

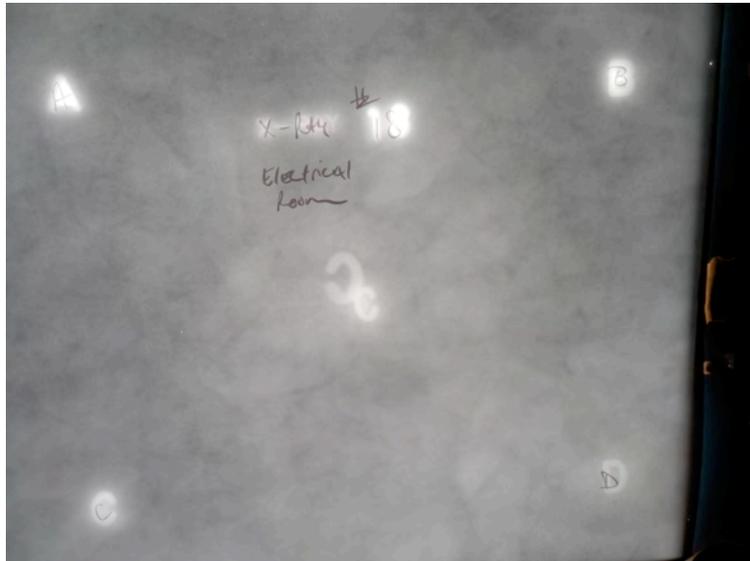
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Electrical Room, West Side of Stage, West Corner

No GPR Scans were performed in the electrical room. As directed by Andy Chan, P.E., two radiographs were taken in the west corner on either wall spaced 12" apart in height. The radiographs showed no steel.



Electrical Room, West Side of Stage, West Corner – X-Ray # 17 & 18

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W 200 – B Wing, Second Floor Southeast Corner

Scans were performed on either wall in the corner; however, without radiographic verification, and considering the amount of junk, i.e., nail heads, crimped wire and other ferrous materials that the scans picked up and radiographs verified, we cannot identify any structural steel on the second floor. Access to the second floor for radiographs was not available.

W 200 – B Wing, Second Floor Southwest Corner

Scans were performed on either wall in the corner; however, without radiographic verification, and considering the amount of junk, i.e., nail heads, crimped wire and other ferrous materials that the scans picked up and radiographs verified, we cannot identify any structural steel on the second floor. Access to the second floor for radiographs was not available.

NOMEN- CLATURE	LOCATION	NDT METHOD & AREA SIZE	X- Ray	Bar Depth	Bar Size	Note
W100	Auditorium - First Floor - South Side	GPR - (24" X 48") X-RAY - 14" X 17"	1	No Steel	N/A	
W101	Auditorium - First Floor - South Side	GPR - (24" X 48") X-RAY - 14" X 17"	2	No Steel	N/A	
W102	Auditorium -First Floor - North Side	GPR - (24" X 48") X-RAY - 14" X 17"	5	No Steel	N/A	
W103	Auditorium - First Floor - North Side	GPR - (24" X 48") X-RAY - 14" X 17"	6	No Steel	N/A	
W104 R	A Wing - First Floor - North East Corner <i>Switched to opposite corner due to obstructions</i>	GPR - (2' X 3') X-RAY - 14" X 17"	15	two vertical bars @ 6" depth	15/16"	slight overlap
W105	B Wing - First Floor - South East Corner	GPR - (17" x 54"") GPR (48' x 24") X-RAY - 14" X 17"	7 SE 8 NW	one vertical bar@ 6" depth one horizontal bar @ 6" depth	1/4" 1/2"	corner - both sides
W106 R	B Wing - First Floor - Southeast Corner <i>Switched from room 104 to room 109 due to obstructions</i>	GPR - (36" x 56") GPR (36" x 30") X-RAY - 14" X 17"	9 SE 10 NW	one vertical @ 4" depth one horizontal @ 8" depth	1/2" 5/16"	corner - both sides
W107	Auditorium - First Floor - West Side	GPR - (10'-0" X 4'-0") X-RAY - 14" X 17"	4 16	No Steel	N/A	exterior conduit on film
W108	A Wing - First Floor - North West Corner <i>There are 2 # W103's, this area renamed W108</i>	GPR - (6' x 18") X-RAY - 14" X 17"	14	two vertical @ 6" depth	3/4"	overlapping
C100	Auditorium - First Floor - South Side	GPR (2'-1" x 4') X-RAY 14" x 17"	11 NE 12 SW	two vertical @6 & 7" depth two vertical @6" & 7" depth	1" 1"	
C101	Auditorium - First Floor - North Side	GPR (2' x 4') X-RAY - 14" X 17"	13 SW NE	two vertical @6 & 7" depth one vertical @6" & 7" depth	1"	
W200	A Wing - Second Floor - South East Corner <i>No access for x-ray</i>	GPR - (10'-0" X 5'-0") X-RAY - 14" X 17"		N/A		
W201	B Wing - Second Floor - South West Corner <i>No access for x-ray</i>	GPR - (10'-0" X 5'-0") X-RAY - 14" X 17"		N/A		
P 1	Auditorium - First Floor - South Side - between windows	GPR (2' x 4') X-RAY 14" x 17"	3	two vertical bars @ 3" depth	1/2"	
Electrical Room	Off of Stage in Auditorium	X-RAY 14" x 17"	17 18	No Steel		

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Engineering & Inspections Unlimited, Inc. appreciates this opportunity to provide your project with Nondestructive Testing Services. Should you have any questions or require additional information, Please contact us direct.

Regards,
Donna Frione

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