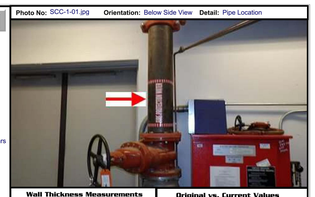
## Test Location No: 1

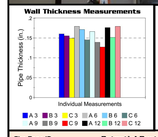
Photo No: SCC-1-01.jpg Orientation: Below Side View Detail: Pipe Location

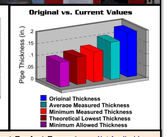


### Piping Technicalities

**Location -** Health Science Building 1st Floor Fire Pump Room: Fire sprinkler main supply line, to fire pump. Test points located 1-24 in. above main isolation valve.

**Pipe Service:** Fire Sprinkler
**Placed In Service:** September 1, 2000
**Date Source:** Building Construction
**Date Of Test:** August 9, 2023
**In Service:** 23.0 years **Corrosion Period:** 23.0 years
**Test Site ID:** 1-FS-8-01 **Field No:** 1
**Nominal Pipe Size:** 8 in. **Actual:** 8.625 in.
**Material:** Carbon Steel
**Stress Value:** 12,800 psi
**Manufacturer:** Unknown
**Schedule / Type:** Schedule 10
**Construction:** Grooved-Rolled
**Flow:** Supply To Pumps
**Pipe Orientation:** Vertical
**Pressure:** 70 psi **Temperature:** 75 °F
**Test Pattern:** Random Points
**Depth Allowance:** 0.000 in.
**External Pit Depth:** 0.000 in.
**Abnormal Condition:** None Observed
**Drawing / Reference No:** n/a
**UT Technician:** William P. Duncan III




### Base Statistical Calculations

**Reported Wall Thickness: 0.188 in.**
**ASTM Wall Thickness: 0.188 in.**
At Spec: Yes Underspec: Overspec:
**Barlow Calculated Minimum: 0.044 in.**
**Default Minimum Wall: 0.105 in.**
**Minimum Allowable Thickness: 0.105 in.**
**Minimum Value Based On:** Default Value
**High To Low Range:** 0.052 in.
**Proximity To Threads Or Groove Cut:** Not Applicable
**Standard Deviation:** 0.017
**Pitting Index:** 19.66 High Pitting Activity

Fire Zone ID: **Potential Rust Product Present** Not Applicable
Rust Generated:
Wall Loss Along Bottom: Percent Blockage:
Rust Assessment:

Prior Location No: **Comparison - Past to Present** Not Applicable
Prior Test Date: Prior I.D.: Years Between Tests:
Prior Average Thickness:
Prior Minimum Thickness:
Prior Avg. Corrosion Rate:
Prior Max. Corrosion Rate:
Average Loss Over
Maximum Loss Over
Avg. Rate Between Dates:
Max. Rate Between Dates:

| Average Based Scenario | Minimum Based Scenario | Theoretical Based Scenario |
|---|---|---|
| **Average Wall Thickness: 0.158 in.** | **Minimum Wall Thickness: 0.127 in.** | **Theoretically Lowest Thickness: 0.116 in.** |
| Average Pipe Loss: 0.030 in. | Maximum Pipe Loss: 0.061 in. | Theoretical Pipe Loss: 0.072 in. |
| Average Corrosion Rate: 1.3 mpy | Maximum Corrosion Rate: 2.7 mpy | Theoretical Corrosion Rate: 3.1 mpy |
| Percent of Allowable Loss: 36.0 % | Percent of Allowable Loss: 73.5 % | Percent of Allowable Loss: 86.4 % |
| Average Pipe Life: 40.7 years | Minimum Pipe Life: 8.3 years | Lowest Theoretical Life: 3.6 years |
| Estimated Retirement: **April 2064** | Estimated Retirement: **November 2031** | Estimated Retirement: **March 2027** |

Condition Gauge

**Testing Indicates: Pipe Is Approaching Retirement**

**Overall Assessment:** We measure higher than normal corrosion and pitting activity at this example, which is not unusual for pump related fire pipe having more flow and oxygen content. We estimate some service life available but still show the pipe approaching retirement.

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## Test Location No: 4

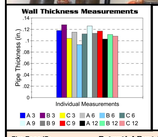
Photo No: SCC-1-08.jpg Orientation: Below Side View Detail: Pipe Location

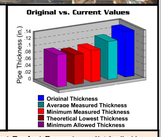


### Piping Technicalities

**Location -** Health Science Building 1st Floor Fire Pump Room: Fire sprinkler FDC connection. Test points located between valve and elbow.

**Pipe Service:** Fire Sprinkler
**Placed In Service:** September 1, 2000
**Date Source:** Building Construction
**Date Of Test:** August 9, 2023
**In Service:** 23.0 years **Corrosion Period:** 23.0 years
**Test Site ID:** 1-FS-6-06 **Field No:** 6
**Nominal Pipe Size:** 6 in. **Actual:** 6.625 in.
**Material:** Carbon Steel
**Stress Value:** 12,800 psi
**Manufacturer:** Unknown
**Schedule / Type:** Schedule 10
**Construction:** Grooved-Rolled
**Flow:** Supply To Building
**Pipe Orientation:** Horizontal
**Pressure:** 70 psi **Temperature:** 75 °F
**Test Pattern:** Random Points
**Depth Allowance:** 0.000 in.
**External Pit Depth:** 0.000 in.
**Abnormal Condition:** None Observed
**Drawing / Reference No:** n/a
**UT Technician:** William P. Duncan III




### Base Statistical Calculations

**Reported Wall Thickness: 0.134 in.**
**ASTM Wall Thickness: 0.134 in.**
At Spec: Yes Underspec: Overspec:
**Barlow Calculated Minimum: 0.038 in.**
**Default Minimum Wall: 0.095 in.**
**Minimum Allowable Thickness: 0.095 in.**
**Minimum Value Based On:** Default Value
**High To Low Range:** 0.035 in.
**Proximity To Threads Or Groove Cut:** Not Applicable
**Standard Deviation:** 0.010
**Pitting Index:** 17.21 High Pitting Activity

Fire Zone ID: **Potential Rust Product Present** Not Applicable
Rust Generated:
Wall Loss Along Bottom: Percent Blockage:
Rust Assessment:

Prior Location No: **Comparison - Past to Present** Not Applicable
Prior Test Date: Prior I.D.: Years Between Tests:
Prior Average Thickness:
Prior Minimum Thickness:
Prior Avg. Corrosion Rate:
Prior Max. Corrosion Rate:
Average Loss Over
Maximum Loss Over
Avg. Rate Between Dates:
Max. Rate Between Dates:

| Average Based Scenario | Minimum Based Scenario | Theoretical Based Scenario |
|---|---|---|
| **Average Wall Thickness: 0.112 in.** | **Minimum Wall Thickness: 0.093 in.** | **Theoretically Lowest Thickness: 0.088 in.** |
| Average Pipe Loss: 0.022 in. | Maximum Pipe Loss: 0.041 in. | Theoretical Pipe Loss: 0.046 in. |
| Average Corrosion Rate: 0.9 mpy | Maximum Corrosion Rate: 1.8 mpy | Theoretical Corrosion Rate: 2.0 mpy |
| Percent of Allowable Loss: 55.6 % | Percent of Allowable Loss: 100.0 % | Percent of Allowable Loss: 100.0 % |
| Average Pipe Life: 18.4 years | Minimum Pipe Life: 0.0 years | Lowest Theoretical Life: 0.0 years |
| Estimated Retirement: **December 2041** | Estimated Retirement: **August 2023** | Estimated Retirement: **August 2023** |

Condition Gauge

**Testing Indicates: Pipe Replacement Indicated**

**Overall Assessment:** We produce dramatically different results for this fire department connection, which is extremely common since the pipe is typically partially filled. Lowest wall thickness has reached below minimum standards. High pitting and low thickness measurements suggest that no further reliable service life is available.

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## Test Location No: 13

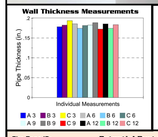
Photo No: SCC-1-88.jpg Orientation: Side View Detail: Pipe Location

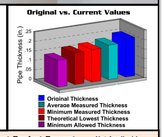


### Piping Technicalities

**Location -** Health Science Building 1st Floor Stair 1: Fire sprinkler hose connection. Test points located between wall and valve.

**Pipe Service:** Fire Sprinkler
**Placed In Service:** September 1, 2000
**Date Source:** Building Construction
**Date Of Test:** August 9, 2023
**In Service:** 23.0 years **Corrosion Period:** 23.0 years
**Test Site ID:** 3-FS-2-12-S1 **Field No:** 51
**Nominal Pipe Size:** 2-1/2 in. **Actual:** 2.875 in.
**Material:** Carbon Steel
**Stress Value:** 12,800 psi
**Manufacturer:** Unknown
**Schedule / Type:** Schedule 40
**Construction:** Threaded
**Flow:** Supply To Building
**Pipe Orientation:** Horizontal
**Pressure:** 155 psi **Temperature:** 75 °F
**Test Pattern:** Random Points
**Depth Allowance:** 0.105 in.
**External Pit Depth:** 0.000 in.
**Abnormal Condition:** Thread Leak
**Drawing / Reference No:** n/a
**UT Technician:** William P. Duncan III




### Base Statistical Calculations

**Reported Wall Thickness: 0.203 in.**
**ASTM Wall Thickness: 0.203 in.**
At Spec: Yes Underspec: Overspec:
**Barlow Calculated Minimum: 0.142 in.**
**Default Minimum Wall:**
**Minimum Allowable Thickness: 0.142 in.**
**Minimum Value Based On:** Barlow
**High To Low Range:** 0.021 in.
**Proximity To Threads Or Groove Cut:** 0.067 in.
**Standard Deviation:** 0.006
**Pitting Index:** 5.19 Low Pitting Activity

Fire Zone ID: **Potential Rust Product Present** Not Applicable
Rust Generated:
Wall Loss Along Bottom: Percent Blockage:
Rust Assessment:

Prior Location No: **Comparison - Past to Present** Not Applicable
Prior Test Date: Prior I.D.: Years Between Tests:
Prior Average Thickness:
Prior Minimum Thickness:
Prior Avg. Corrosion Rate:
Prior Max. Corrosion Rate:
Average Loss Over
Maximum Loss Over
Avg. Rate Between Dates:
Max. Rate Between Dates:

| Average Based Scenario | Minimum Based Scenario | Theoretical Based Scenario |
|---|---|---|
| **Average Wall Thickness: 0.181 in.** | **Minimum Wall Thickness: 0.172 in.** | **Theoretically Lowest Thickness: 0.166 in.** |
| Average Pipe Loss: 0.022 in. | Maximum Pipe Loss: 0.031 in. | Theoretical Pipe Loss: 0.037 in. |
| Average Corrosion Rate: 0.9 mpy | Maximum Corrosion Rate: 1.4 mpy | Theoretical Corrosion Rate: 1.6 mpy |
| Percent of Allowable Loss: 35.2 % | Percent of Allowable Loss: 50.5 % | Percent of Allowable Loss: 60.2 % |
| Average Pipe Life: 42.3 years | Minimum Pipe Life: 22.5 years | Lowest Theoretical Life: 15.1 years |
| Estimated Retirement: **November 2065** | Estimated Retirement: **January 2046** | Estimated Retirement: **September 2038** |

Condition Gauge

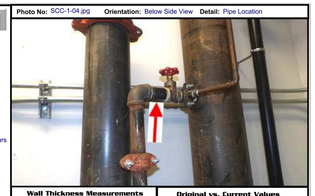
**Testing Indicates: Pipe Replacement Is Mandatory** **A Leak Currently Exists**

**Overall Assessment:** Testing at this smaller threaded hose connection identifies schedule 40 pipe. We observed signs of water damage to the wall below, and rust at the threads which suggests that some installation deficiency has resulted in a thread leak. Based on our wall thickness readings alone, very long service life remains.

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## Test Location No: 35

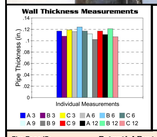
Photo No: SCC-1-04.jpg Orientation: Below Side View Detail: Pipe Location

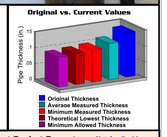


### Piping Technicalities

**Location -** Health Science Building 1st Floor Fire Pump Room: Fire sprinkler jockey pump line. Test points located between valve and elbow.

**Pipe Service:** Fire Sprinkler
**Placed In Service:** September 1, 2000
**Date Source:** Building Construction
**Date Of Test:** August 9, 2023
**In Service:** 23.0 years **Corrosion Period:** 23.0 years
**Test Site ID:** 1-FS-1-14-04 **Field No:** 4
**Nominal Pipe Size:** 1-1/4 in. **Actual:** 1.660 in.
**Material:** Carbon Steel
**Stress Value:** 12,800 psi
**Manufacturer:** Unknown
**Schedule / Type:** Schedule 40
**Construction:** Threaded
**Flow:** Make-Up
**Pipe Orientation:** Horizontal
**Pressure:** 70 psi **Temperature:** 75 °F
**Test Pattern:** Random Points
**Depth Allowance:** 0.073 in.
**External Pit Depth:** 0.000 in.
**Abnormal Condition:** Thread Leak
**Drawing / Reference No:** n/a
**UT Technician:** William P. Duncan III




### Base Statistical Calculations

**Reported Wall Thickness: 0.140 in.**
**ASTM Wall Thickness: 0.140 in.**
At Spec: Yes Underspec: Overspec:
**Barlow Calculated Minimum: 0.094 in.**
**Default Minimum Wall: 0.095 in.**
**Minimum Allowable Thickness: 0.095 in.**
**Minimum Value Based On:** Defined Minimum
**High To Low Range:** 0.022 in.
**Proximity To Threads Or Groove Cut:** 0.029 in.
**Standard Deviation:** 0.006
**Pitting Index:** 10.72 Mild Pitting Activity

Fire Zone ID: **Potential Rust Product Present** Not Applicable
Rust Generated:
Wall Loss Along Bottom: Percent Blockage:
Rust Assessment:

Prior Location No: **Comparison - Past to Present** Not Applicable
Prior Test Date: Prior I.D.: Years Between Tests:
Prior Average Thickness:
Prior Minimum Thickness:
Prior Avg. Corrosion Rate:
Prior Max. Corrosion Rate:
Average Loss Over
Maximum Loss Over
Avg. Rate Between Dates:
Max. Rate Between Dates:

| Average Based Scenario | Minimum Based Scenario | Theoretical Based Scenario |
|---|---|---|
| **Average Wall Thickness: 0.114 in.** | **Minimum Wall Thickness: 0.102 in.** | **Theoretically Lowest Thickness: 0.098 in.** |
| Average Pipe Loss: 0.026 in. | Maximum Pipe Loss: 0.038 in. | Theoretical Pipe Loss: 0.042 in. |
| Average Corrosion Rate: 1.1 mpy | Maximum Corrosion Rate: 1.7 mpy | Theoretical Corrosion Rate: 1.8 mpy |
| Percent of Allowable Loss: 57.2 % | Percent of Allowable Loss: 84.4 % | Percent of Allowable Loss: 92.6 % |
| Average Pipe Life: 17.2 years | Minimum Pipe Life: 4.2 years | Lowest Theoretical Life: 1.8 years |
| Estimated Retirement: **September 2040** | Estimated Retirement: **October 2027** | Estimated Retirement: **June 2025** |

Condition Gauge

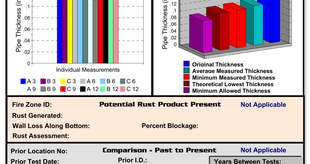
**Testing Indicates: Pipe Replacement Is Mandatory** **A Leak Currently Exists**

**Overall Assessment:** Testing at this jockey pump line produces still good results. A higher movement of water often deteriorates this smaller threaded pipe ahead of all other examples. A thread leak at the joint defines its replacement as mandatory.

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## Test Location No: 38

Photo No: SCC-1-43.jpg Orientation: Side View Detail: Pipe Location / Condition



### Piping Technicalities

**Location -** Health Science Building 1st Floor Classroom 118: Fire sprinkler branch line to sprinkler head. Test points located between elbows.

**Pipe Service:** Fire Sprinkler
**Placed In Service:** September 1, 2000
**Date Source:** Building Construction
**Date Of Test:** August 9, 2023
**In Service:** 23.0 years **Corrosion Period:** 23.0 years
**Test Site ID:** 1-FS-1-35 **Field No:** 35
**Nominal Pipe Size:** 1 in. **Actual:** 1.315 in.
**Material:** Carbon Steel
**Stress Value:** 12,800 psi
**Manufacturer:** Unknown
**Schedule / Type:** Schedule 40
**Construction:** Threaded
**Flow:** Supply To Building
**Pipe Orientation:** Horizontal
**Pressure:** 155 psi **Temperature:** 75 °F
**Test Pattern:** Random Points
**Depth Allowance:** 0.073 in.
**External Pit Depth:** 0.000 in.
**Abnormal Condition:** Nearby Thread Leak
**Drawing / Reference No:** n/a
**UT Technician:** William P. Duncan III







### Base Statistical Calculations

**Reported Wall Thickness: 0.133 in.**
**ASTM Wall Thickness: 0.133 in.**
At Spec: Yes Underspec: Overspec:
**Barlow Calculated Minimum: 0.098 in.**
**Default Minimum Wall: 0.095 in.**
**Minimum Allowable Thickness: 0.095 in.**
**Minimum Value Based On:** Defined Minimum
**High To Low Range:** 0.010 in.
**Proximity To Threads Or Groove Cut:** 0.039 in.
**Standard Deviation:** 0.003
**Pitting Index:** 4.41 Very Low Pitting Activity

Fire Zone ID: **Potential Rust Product Present** Not Applicable
Rust Generated:
Wall Loss Along Bottom: Percent Blockage:
Rust Assessment:

Prior Location No: **Comparison - Past to Present** Not Applicable
Prior Test Date: Prior I.D.: Years Between Tests:
Prior Average Thickness:
Prior Minimum Thickness:
Prior Avg. Corrosion Rate:
Prior Max. Corrosion Rate:
Average Loss Over
Maximum Loss Over
Avg. Rate Between Dates:
Max. Rate Between Dates:

| Average Based Scenario | Minimum Based Scenario | Theoretical Based Scenario |
|---|---|---|
| **Average Wall Thickness: 0.117 in.** | **Minimum Wall Thickness: 0.112 in.** | **Theoretically Lowest Thickness: 0.109 in.** |
| Average Pipe Loss: 0.016 in. | Maximum Pipe Loss: 0.021 in. | Theoretical Pipe Loss: 0.024 in. |
| Average Corrosion Rate: 0.7 mpy | Maximum Corrosion Rate: 0.9 mpy | Theoretical Corrosion Rate: 1.0 mpy |
| Percent of Allowable Loss: 41.7 % | Percent of Allowable Loss: 55.3 % | Percent of Allowable Loss: 62.1 % |
| Average Pipe Life: 32.1 years | Minimum Pipe Life: 18.6 years | Lowest Theoretical Life: 14.0 years |
| Estimated Retirement: **September 2055** | Estimated Retirement: **March 2042** | Estimated Retirement: **August 2037** |

Condition Gauge

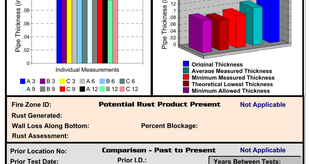
**Testing Indicates: Pipe Replacement Is Mandatory** **A Leak Currently Exists**

**Overall Assessment:** Testing at this portion of the pipe length produces good results in terms of remaining wall thickness, but also identifies a nearby leak at a threaded connection. A thread leak at this branch line defines pipe replacement as mandatory.

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## Test Location No: 39

Photo No: SCC-1-35.jpg Orientation: Below Side View Detail: Pipe Location



### Piping Technicalities

**Location -** Health Science Building 1st Floor Community Room 115: Fire sprinkler branch line to sprinkler head, in front of storage room 114. Test points located between elbows, 1st 9 measurements at random, last 3 at weld seam.

**Pipe Service:** Fire Sprinkler
**Placed In Service:** September 1, 2000
**Date Source:** Building Construction
**Date Of Test:** August 9, 2023
**In Service:** 23.0 years **Corrosion Period:** 23.0 years
**Test Site ID:** 1-FS-1-27 **Field No:** 27
**Nominal Pipe Size:** 1 in. **Actual:** 1.315 in.
**Material:** Carbon Steel
**Stress Value:** 12,800 psi
**Manufacturer:** Unknown
**Schedule / Type:** Schedule 40
**Construction:** Threaded
**Flow:** Supply To Building
**Pipe Orientation:** Horizontal
**Pressure:** 155 psi **Temperature:** 75 °F
**Test Pattern:** Random Points
**Depth Allowance:** 0.073 in.
**External Pit Depth:** 0.000 in.
**Abnormal Condition:** None Observed
**Drawing / Reference No:** n/a
**UT Technician:** William P. Duncan III







### Base Statistical Calculations

**Reported Wall Thickness: 0.133 in.**
**ASTM Wall Thickness: 0.133 in.**
At Spec: Yes Underspec: Overspec:
**Barlow Calculated Minimum: 0.098 in.**
**Default Minimum Wall: 0.095 in.**
**Minimum Allowable Thickness: 0.095 in.**
**Minimum Value Based On:** Defined Minimum
**High To Low Range:** 0.023 in.
**Proximity To Threads Or Groove Cut:** 0.022 in.
**Standard Deviation:** 0.009
**Pitting Index:** 14.09 Moderate Pitting Activity

Fire Zone ID: **Potential Rust Product Present** Not Applicable
Rust Generated:
Wall Loss Along Bottom: Percent Blockage:
Rust Assessment:

Prior Location No: **Comparison - Past to Present** Not Applicable
Prior Test Date: Prior I.D.: Years Between Tests:
Prior Average Thickness:
Prior Minimum Thickness:
Prior Avg. Corrosion Rate:
Prior Max. Corrosion Rate:
Average Loss Over
Maximum Loss Over
Avg. Rate Between Dates:
Max. Rate Between Dates:

| Average Based Scenario | Minimum Based Scenario | Theoretical Based Scenario |
|---|---|---|
| **Average Wall Thickness: 0.111 in.** | **Minimum Wall Thickness: 0.095 in.** | **Theoretically Lowest Thickness: 0.088 in.** |
| Average Pipe Loss: 0.022 in. | Maximum Pipe Loss: 0.038 in. | Theoretical Pipe Loss: 0.045 in. |
| Average Corrosion Rate: 1.0 mpy | Maximum Corrosion Rate: 1.7 mpy | Theoretical Corrosion Rate: 2.0 mpy |
| Percent of Allowable Loss: 59.0 % | Percent of Allowable Loss: 100.0 % | Percent of Allowable Loss: 100.0 % |
| Average Pipe Life: 16.0 years | Minimum Pipe Life: 0.0 years | Lowest Theoretical Life: 0.0 years |
| Estimated Retirement: **July 2039** | Estimated Retirement: **August 2023** | Estimated Retirement: **August 2023** |

Condition Gauge

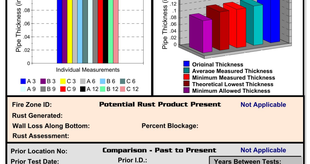
**Testing Indicates: Pipe Replacement Indicated**

**Overall Assessment:** Low wall thickness measurements at this pipe section were specifically identified along the ERW weld seam. Wall loss may be due to an incomplete weld seam, or higher localized corrosion at the seam itself. Low thickness measurements at the weld seam suggest that no further reliable service life is available. Pipe wall exists 22 mils from the thread cut.

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## Test Location No: 40

Photo No: SCC-1-30.jpg Orientation: Below Side View Detail: Pipe Location / Condition



### Piping Technicalities

**Location -** Health Science Building 1st Floor Community Room 115: Fire sprinkler branch line to sprinkler head, in seating area. Test points located between elbows.

**Pipe Service:** Fire Sprinkler
**Placed In Service:** September 1, 2000
**Date Source:** Building Construction
**Date Of Test:** August 9, 2023
**In Service:** 23.0 years **Corrosion Period:** 23.0 years
**Test Site ID:** 1-FS-1-25 **Field No:** 25
**Nominal Pipe Size:** 1 in. **Actual:** 1.315 in.
**Material:** Carbon Steel
**Stress Value:** 12,800 psi
**Manufacturer:** Unknown
**Schedule / Type:** Schedule 40
**Construction:** Threaded
**Flow:** Supply To Building
**Pipe Orientation:** Horizontal
**Pressure:** 155 psi **Temperature:** 75 °F
**Test Pattern:** Random Points
**Depth Allowance:** 0.073 in.
**External Pit Depth:** 0.000 in.
**Abnormal Condition:** Thread Leak
**Drawing / Reference No:** n/a
**UT Technician:** William P. Duncan III







### Base Statistical Calculations

**Reported Wall Thickness: 0.133 in.**
**ASTM Wall Thickness: 0.133 in.**
At Spec: Yes Underspec: Overspec:
**Barlow Calculated Minimum: 0.098 in.**
**Default Minimum Wall: 0.095 in.**
**Minimum Allowable Thickness: 0.095 in.**
**Minimum Value Based On:** Defined Minimum
**High To Low Range:** 0.004 in.
**Proximity To Threads Or Groove Cut:** 0.041 in.
**Standard Deviation:** 0.001
**Pitting Index:** 2.01 Insignificant Pitting Activity

Fire Zone ID: **Potential Rust Product Present** Not Applicable
Rust Generated:
Wall Loss Along Bottom: Percent Blockage:
Rust Assessment:

Prior Location No: **Comparison - Past to Present** Not Applicable
Prior Test Date: Prior I.D.: Years Between Tests:
Prior Average Thickness:
Prior Minimum Thickness:
Prior Avg. Corrosion Rate:
Prior Max. Corrosion Rate:
Average Loss Over
Maximum Loss Over
Avg. Rate Between Dates:
Max. Rate Between Dates:

| Average Based Scenario | Minimum Based Scenario | Theoretical Based Scenario |
|---|---|---|
| **Average Wall Thickness: 0.116 in.** | **Minimum Wall Thickness: 0.114 in.** | **Theoretically Lowest Thickness: 0.114 in.** |
| Average Pipe Loss: 0.017 in. | Maximum Pipe Loss: 0.019 in. | Theoretical Pipe Loss: 0.019 in. |
| Average Corrosion Rate: 0.7 mpy | Maximum Corrosion Rate: 0.8 mpy | Theoretical Corrosion Rate: 0.8 mpy |
| Percent of Allowable Loss: 43.9 % | Percent of Allowable Loss: 50.0 % | Percent of Allowable Loss: 50.9 % |
| Average Pipe Life: 29.4 years | Minimum Pipe Life: 23.0 years | Lowest Theoretical Life: 22.1 years |
| Estimated Retirement: **December 2052** | Estimated Retirement: **July 2046** | Estimated Retirement: **September 2045** |

Condition Gauge

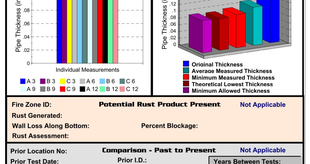
**Testing Indicates: Pipe Replacement Is Mandatory** **A Leak Currently Exists**

**Overall Assessment:** Based on wall thickness readings alone, we still estimate long service life remaining. However, a thread leak at this pipe section defines its replacement as mandatory.

August 24, 2023 Page 86

## Test Location No: 43

Photo No: SCC-1-37.jpg Orientation: Below Side View Detail: Pipe Location



### Piping Technicalities

**Location -** Health Science Building 1st Floor Conference Room 117: Fire sprinkler branch line to sprinkler head. Test points located between elbows, 1st 9 measurements at random, last 3 at weld seam.

**Pipe Service:** Fire Sprinkler
**Placed In Service:** September 1, 2000
**Date Source:** Building Construction
**Date Of Test:** August 9, 2023
**In Service:** 23.0 years **Corrosion Period:** 23.0 years
**Test Site ID:** 1-FS-1-29 **Field No:** 29
**Nominal Pipe Size:** 1 in. **Actual:** 1.315 in.
**Material:** Carbon Steel
**Stress Value:** 12,800 psi
**Manufacturer:** Unknown
**Schedule / Type:** Schedule 40
**Construction:** Threaded
**Flow:** Supply To Building
**Pipe Orientation:** Horizontal
**Pressure:** 155 psi **Temperature:** 75 °F
**Test Pattern:** Random Points
**Depth Allowance:** 0.073 in.
**External Pit Depth:** 0.000 in.
**Abnormal Condition:** None Observed
**Drawing / Reference No:** n/a
**UT Technician:** William P. Duncan III







### Base Statistical Calculations

**Reported Wall Thickness: 0.133 in.**
**ASTM Wall Thickness: 0.133 in.**
At Spec: Yes Underspec: Overspec:
**Barlow Calculated Minimum: 0.098 in.**
**Default Minimum Wall: 0.095 in.**
**Minimum Allowable Thickness: 0.095 in.**
**Minimum Value Based On:** Defined Minimum
**High To Low Range:** 0.022 in.
**Proximity To Threads Or Groove Cut:** 0.025 in.
**Standard Deviation:** 0.007
**Pitting Index:** 12.82 Moderate Pitting Activity

Fire Zone ID: **Potential Rust Product Present** Not Applicable
Rust Generated:
Wall Loss Along Bottom: Percent Blockage:
Rust Assessment:

Prior Location No: **Comparison - Past to Present** Not Applicable
Prior Test Date: Prior I.D.: Years Between Tests:
Prior Average Thickness:
Prior Minimum Thickness:
Prior Avg. Corrosion Rate:
Prior Max. Corrosion Rate:
Average Loss Over
Maximum Loss Over
Avg. Rate Between Dates:
Max. Rate Between Dates:

| Average Based Scenario | Minimum Based Scenario | Theoretical Based Scenario |
|---|---|---|
| **Average Wall Thickness: 0.112 in.** | **Minimum Wall Thickness: 0.098 in.** | **Theoretically Lowest Thickness: 0.094 in.** |
| Average Pipe Loss: 0.021 in. | Maximum Pipe Loss: 0.035 in. | Theoretical Pipe Loss: 0.039 in. |
| Average Corrosion Rate: 0.9 mpy | Maximum Corrosion Rate: 1.5 mpy | Theoretical Corrosion Rate: 1.7 mpy |
| Percent of Allowable Loss: 54.2 % | Percent of Allowable Loss: 92.1 % | Percent of Allowable Loss: 100.0 % |
| Average Pipe Life: 19.4 years | Minimum Pipe Life: 2.0 years | Lowest Theoretical Life: 0.0 years |
| Estimated Retirement: **January 2043** | Estimated Retirement: **July 2025** | Estimated Retirement: **August 2023** |

Condition Gauge

**Testing Indicates: Pipe Is Approaching Retirement**

**Overall Assessment:** Testing at this location again identified much lower wall thickness along the ERW weld seam. Wall loss may be due to an incomplete weld seam, or higher localized corrosion at the seam itself. We can estimate that limited and less reliable service life remains. Pipe wall exists 25 mils from the thread cut.

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## SCOPE OF WORK:

THE SCOPE OF THIS PROJECT IS TO REPLACE THE CORRODED SPRINKLER PIPING IN THE HEALTH SCIENCE BUILDING.
THE PIPING WAS SCANNED UTILIZING ULTRASONIC TESTING DEVICES TO DETERMINE THE AMOUNT OF CORROSION IN VARIOUS SEGMENTS OF THE PIPING SYSTEM.
THE SCAN RESULTS ARE INCLUDED ON THESE DRAWINGS FOR THE SECTIONS OF PIPING THAT WAS IDENTIFIED AS NEEDING TO BE REPLACED. SOME OF THE SCANS ARE OF THE SMALL DIAMETER PIPING AT THE ARM-OVERS TO THE SPRINKLER HEADS. THE SCOPE SHALL INCLUDE REPLACING ALL THE ARM-OVERS AND EXISTING SPRINKLER HEADS WITH NEW FLEXIBLE SPRINKLER HEADS.

1 / FP1 FIRE PROTECTION PIPE REPLACEMENT INFORMATION
NTS


CONSULTANT LOGO
MADDOX ENGINEERING INC
Ph: 864-334-1875
P.O. Box 26296
Greenville, SC 29616
420 IA The Parkway
Greer, SC 29650


SEALS

SCC-RE-BID HSB Fire Sprinkler Modifications

SPARTANBURG COMMUNITY COLLEGE
HEALTH SCIENCE BUILDING
107 COMMUNITY COLLEGE DRIVE
SPARTANBURG, SC 29303

SHEET ISSUE:

| NO | DATE | DESCRIPTION | BY |
|---|---|---|---|
| 0 | 02-26-2024 | ISSUED FOR BIDS | WEM |
| 1 | 07-17-2024 | RE-ISSUED FOR BIDS | WEM |

NOT FOR CONSTRUCTION
FOR PRICING ONLY

RE-ISSUED FOR BIDS 07-17-2024

PRINCIPAL IN CHARGE: WEM
PROJECT ARCHITECT: --
DRAWN BY: ARL

SHEET TITLE:

# FIRE PROTECTION PIPE REPLACEMENT INFORMATION

SHEET NO. FP1
PROJ. NO. 023034

## Test Location No: 45

Photo No: SCC-1-11.jpg Orientation: Below Side View Detail: Pipe Location

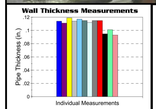


### Piping Technicalities

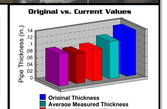
**Location -** Health Science Building 1st Floor Hallway: Fire sprinkler branch line to sprinkler head, in front of Stair 1. Test points located 1-2 ft. above bottom elbow, 1st 9 measurements at random, last 3 at weld seam.

**Pipe Service:** Fire Sprinkler
**Placed In Service:** September 1, 2000
**Date Source:** Building Construction
**Date Of Test:** August 9, 2023
**In Service:** 23.0 years **Corrosion Period:** 23.0 years
**Test Site ID:** 1-FS-1-11 **Field No:** 11
**Nominal Pipe Size:** 1 in. **Actual:** 1.315 in.
**Material:** Carbon Steel
**Stress Value:** 12,800 psi
**Manufacturer:** Unknown
**Schedule / Type:** Schedule 40
**Construction:** Threaded
**Flow:** Supply To Building
**Pipe Orientation:** Vertical
**Pressure:** 155 psi **Temperature:** 75 °F
**Test Pattern:** Random Points
**Depth Allowance:** 0.073 in.
**External Pit Depth:** 0.000 in.
**Abnormal Condition:** None Observed
**Drawing / Reference No:** n/a
**UT Technician:** William P. Duncan III

Wall Thickness Measurements




Original vs. Current Values




### Base Statistical Calculations

**Reported Wall Thickness: 0.133 in.**
**ASTM Wall Thickness: 0.133 in.**
At Spec: Yes Underspec: Overspec:
**Barlow Calculated Minimum: 0.098 in.**
**Default Minimum Wall: 0.095 in.**
**Minimum Allowable Thickness: 0.095 in.**
**Minimum Value Based On:** Defined Minimum
**High To Low Range:** 0.026 in.
**Proximity To Threads Or Groove Cut:** 0.020 in.
**Standard Deviation:** 0.009
**Pitting Index:** 15.52 High Pitting Activity

Fire Zone ID: **Potential Rust Product Present** Not Applicable
Rust Generated:
Wall Loss Along Bottom: Percent Blockage:
Rust Assessment:

Prior Location No: **Comparison - Past to Present** Not Applicable
Prior Test Date: Prior I.D.:
Prior Average Thickness:
Prior Minimum Thickness:
Prior Avg. Corrosion Rate:
Prior Max. Corrosion Rate:

Years Between Tests:
Average Loss Over
Maximum Loss Over
Avg. Rate Between Dates:
Max. Rate Between Dates:

| Average Based Scenario | Minimum Based Scenario | Theoretical Based Scenario |
|---|---|---|
| **Average Wall Thickness: 0.110 in.** | **Minimum Wall Thickness: 0.093 in.** | **Theoretically Lowest Thickness: 0.088 in.** |
| Average Pipe Loss: 0.023 in. | Maximum Pipe Loss: 0.040 in. | Theoretical Pipe Loss: 0.045 in. |
| Average Corrosion Rate: 1.0 mpy | Maximum Corrosion Rate: 1.7 mpy | Theoretical Corrosion Rate: 1.9 mpy |
| Percent of Allowable Loss: 60.3 % | Percent of Allowable Loss: 100.0 % | Percent of Allowable Loss: 100.0 % |
| Average Pipe Life: 15.1 years | Minimum Pipe Life: 0.0 years | Lowest Theoretical Life: 0.0 years |
| Estimated Retirement: **September 2038** | Estimated Retirement: **August 2023** | Estimated Retirement: **August 2023** |

Condition Gauge

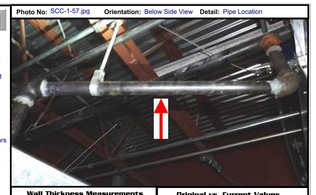
**Testing Indicates:** Pipe Replacement Indicated

**Overall Assessment:** We continue to identify lower wall thickness along the ERW weld seam at multiple pipe sections. Wall loss may be due to an incomplete weld seam, or higher localized corrosion at the seam itself. High pitting and low thickness measurements suggest that no further reliable service life is available. Pipe wall exists 20 mils from the thread cut.



## Test Location No: 47

Photo No: SCC-1-57.jpg Orientation: Below Side View Detail: Pipe Location

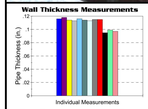


### Piping Technicalities

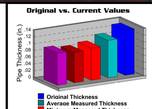
**Location -** Health Science Building 2nd Floor Classroom 221: Fire sprinkler branch line to sprinkler head, near A/C unit. Test points located between elbows, 1st 9 measurements at random, last 3 at weld seam.

**Pipe Service:** Fire Sprinkler
**Placed In Service:** September 1, 2000
**Date Source:** Building Construction
**Date Of Test:** August 9, 2023
**In Service:** 23.0 years **Corrosion Period:** 23.0 years
**Test Site ID:** 2-FS-1-39 **Field No:** 39
**Nominal Pipe Size:** 1 in. **Actual:** 1.315 in.
**Material:** Carbon Steel
**Stress Value:** 12,800 psi
**Manufacturer:** Unknown
**Schedule / Type:** Schedule 40
**Construction:** Threaded
**Flow:** Supply To Building
**Pipe Orientation:** Horizontal
**Pressure:** 150 psi **Temperature:** 75 °F
**Test Pattern:** Random Points
**Depth Allowance:** 0.073 in.
**External Pit Depth:** 0.000 in.
**Abnormal Condition:** None Observed
**Drawing / Reference No:** n/a
**UT Technician:** William P. Duncan III

Wall Thickness Measurements




Original vs. Current Values




### Base Statistical Calculations

**Reported Wall Thickness: 0.133 in.**
**ASTM Wall Thickness: 0.133 in.**
At Spec: Yes Underspec: Overspec:
**Barlow Calculated Minimum: 0.098 in.**
**Default Minimum Wall: 0.095 in.**
**Minimum Allowable Thickness: 0.095 in.**
**Minimum Value Based On:** Defined Minimum
**High To Low Range:** 0.023 in.
**Proximity To Threads Or Groove Cut:** 0.022 in.
**Standard Deviation:** 0.008
**Pitting Index:** 13.96 Moderate Pitting Activity

Fire Zone ID: **Potential Rust Product Present** Not Applicable
Rust Generated:
Wall Loss Along Bottom: Percent Blockage:
Rust Assessment:

Prior Location No: **Comparison - Past to Present** Not Applicable
Prior Test Date: Prior I.D.:
Prior Average Thickness:
Prior Minimum Thickness:
Prior Avg. Corrosion Rate:
Prior Max. Corrosion Rate:

Years Between Tests:
Average Loss Over
Maximum Loss Over
Avg. Rate Between Dates:
Max. Rate Between Dates:

| Average Based Scenario | Minimum Based Scenario | Theoretical Based Scenario |
|---|---|---|
| **Average Wall Thickness: 0.110 in.** | **Minimum Wall Thickness: 0.095 in.** | **Theoretically Lowest Thickness: 0.090 in.** |
| Average Pipe Loss: 0.023 in. | Maximum Pipe Loss: 0.038 in. | Theoretical Pipe Loss: 0.043 in. |
| Average Corrosion Rate: 1.0 mpy | Maximum Corrosion Rate: 1.7 mpy | Theoretical Corrosion Rate: 1.9 mpy |
| Percent of Allowable Loss: 59.4 % | Percent of Allowable Loss: 100.0 % | Percent of Allowable Loss: 100.0 % |
| Average Pipe Life: 15.7 years | Minimum Pipe Life: 0.0 years | Lowest Theoretical Life: 0.0 years |
| Estimated Retirement: **April 2039** | Estimated Retirement: **August 2023** | Estimated Retirement: **August 2023** |

Condition Gauge

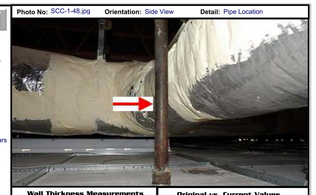
**Testing Indicates:** Pipe Replacement Indicated

**Overall Assessment:** Here we show another pipe section where we suspect an incomplete ERW weld seam exists . High pitting and low thickness measurements suggest that no further reliable service life is available. Pipe wall exists 22 mils from the thread cut.



## Test Location No: 49

Photo No: SCC-1-48.jpg Orientation: Side View Detail: Pipe Location

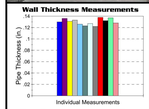


### Piping Technicalities

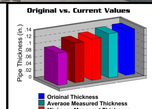
**Location -** Health Science Building 2nd Floor Classroom 224: Fire sprinkler branch line to sprinkler head. Test points located 1-12 in. above sprinkler head.

**Pipe Service:** Fire Sprinkler
**Placed In Service:** September 1, 2000
**Date Source:** Building Construction
**Date Of Test:** August 9, 2023
**In Service:** 23.0 years **Corrosion Period:** 23.0 years
**Test Site ID:** 2-FS-1-37 **Field No:** 37
**Nominal Pipe Size:** 1 in. **Actual:** 1.315 in.
**Material:** Carbon Steel
**Stress Value:** 12,800 psi
**Manufacturer:** Unknown
**Schedule / Type:** Schedule 40
**Construction:** Threaded
**Flow:** Supply To Building
**Pipe Orientation:** Vertical
**Pressure:** 150 psi **Temperature:** 75 °F
**Test Pattern:** Random Points
**Depth Allowance:** 0.073 in.
**External Pit Depth:** 0.000 in.
**Abnormal Condition:** Nearby Thread Leak
**Drawing / Reference No:** n/a
**UT Technician:** William P. Duncan III

Wall Thickness Measurements




Original vs. Current Values




### Base Statistical Calculations

**Reported Wall Thickness: 0.133 in.**
**ASTM Wall Thickness: 0.133 in.**
At Spec: Yes Underspec: Overspec:
**Barlow Calculated Minimum: 0.098 in.**
**Default Minimum Wall: 0.095 in.**
**Minimum Allowable Thickness: 0.095 in.**
**Minimum Value Based On:** Defined Minimum
**High To Low Range:** 0.016 in.
**Proximity To Threads Or Groove Cut:** 0.049 in.
**Standard Deviation:** 0.005
**Pitting Index:** 6.33 Low Pitting Activity

Fire Zone ID: **Potential Rust Product Present** Not Applicable
Rust Generated:
Wall Loss Along Bottom: Percent Blockage:
Rust Assessment:

Prior Location No: **Comparison - Past to Present** Not Applicable
Prior Test Date: Prior I.D.:
Prior Average Thickness:
Prior Minimum Thickness:
Prior Avg. Corrosion Rate:
Prior Max. Corrosion Rate:

Years Between Tests:
Average Loss Over
Maximum Loss Over
Avg. Rate Between Dates:
Max. Rate Between Dates:

| Average Based Scenario | Minimum Based Scenario | Theoretical Based Scenario |
|---|---|---|
| **Average Wall Thickness: 0.130 in.** | **Minimum Wall Thickness: 0.122 in.** | **Theoretically Lowest Thickness: 0.117 in.** |
| Average Pipe Loss: 0.003 in. | Maximum Pipe Loss: 0.011 in. | Theoretical Pipe Loss: 0.016 in. |
| Average Corrosion Rate: 0.1 mpy | Maximum Corrosion Rate: 0.5 mpy | Theoretical Corrosion Rate: 0.7 mpy |
| Percent of Allowable Loss: 7.2 % | Percent of Allowable Loss: 28.9 % | Percent of Allowable Loss: 41.8 % |
| Average Pipe Life: 125.0 years | Minimum Pipe Life: 56.3 years | Lowest Theoretical Life: 31.9 years |
| Estimated Retirement: **July 2148** | Estimated Retirement: **November 2079** | Estimated Retirement: **June 2055** |

Condition Gauge

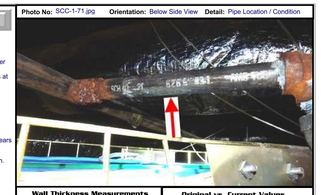
**Testing Indicates:** Pipe Replacement Is Mandatory **A Leak Currently Exists**

**Overall Assessment:** Although we measure high and uniform wall thickness at this pipe section itself, the fact that a nearby joint is now leaking defines the need for replacement.



## Test Location No: 50

Photo No: SCC-1-71.jpg Orientation: Below Side View Detail: Pipe Location / Condition

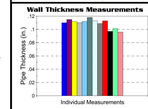


### Piping Technicalities

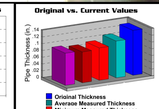
**Location -** Health Science Building 3rd Floor Classroom 314: Fire sprinkler branch line to sprinkler head, near professors desk. Test points located between threadolet and elbow, 1st 9 measurements at random, last 3 at weld seam.

**Pipe Service:** Fire Sprinkler
**Placed In Service:** September 1, 2000
**Date Source:** Building Construction
**Date Of Test:** August 9, 2023
**In Service:** 23.0 years **Corrosion Period:** 23.0 years
**Test Site ID:** 3-FS-1-46 **Field No:** 46
**Nominal Pipe Size:** 1 in. **Actual:** 1.315 in.
**Material:** Carbon Steel
**Stress Value:** 12,800 psi
**Manufacturer:** Unknown
**Schedule / Type:** Schedule 40
**Construction:** Threaded
**Flow:** Supply To Building
**Pipe Orientation:** Horizontal
**Pressure:** 145 psi **Temperature:** 75 °F
**Test Pattern:** Random Points
**Depth Allowance:** 0.073 in.
**External Pit Depth:** 0.000 in.
**Abnormal Condition:** Thread Leak
**Drawing / Reference No:** n/a
**UT Technician:** William P. Duncan III

Wall Thickness Measurements




Original vs. Current Values




### Base Statistical Calculations

**Reported Wall Thickness: 0.133 in.**
**ASTM Wall Thickness: 0.133 in.**
At Spec: Yes Underspec: Overspec:
**Barlow Calculated Minimum: 0.097 in.**
**Default Minimum Wall: 0.095 in.**
**Minimum Allowable Thickness: 0.095 in.**
**Minimum Value Based On:** Defined Minimum
**High To Low Range:** 0.022 in.
**Proximity To Threads Or Groove Cut:** 0.023 in.
**Standard Deviation:** 0.007
**Pitting Index:** 11.79 Moderate Pitting Activity

Fire Zone ID: **Potential Rust Product Present** Not Applicable
Rust Generated:
Wall Loss Along Bottom: Percent Blockage:
Rust Assessment:

Prior Location No: **Comparison - Past to Present** Not Applicable
Prior Test Date: Prior I.D.:
Prior Average Thickness:
Prior Minimum Thickness:
Prior Avg. Corrosion Rate:
Prior Max. Corrosion Rate:

Years Between Tests:
Average Loss Over
Maximum Loss Over
Avg. Rate Between Dates:
Max. Rate Between Dates:

| Average Based Scenario | Minimum Based Scenario | Theoretical Based Scenario |
|---|---|---|
| **Average Wall Thickness: 0.109 in.** | **Minimum Wall Thickness: 0.096 in.** | **Theoretically Lowest Thickness: 0.091 in.** |
| Average Pipe Loss: 0.024 in. | Maximum Pipe Loss: 0.037 in. | Theoretical Pipe Loss: 0.042 in. |
| Average Corrosion Rate: 1.1 mpy | Maximum Corrosion Rate: 1.6 mpy | Theoretical Corrosion Rate: 1.8 mpy |
| Percent of Allowable Loss: 63.6 % | Percent of Allowable Loss: 97.4 % | Percent of Allowable Loss: 100.0 % |
| Average Pipe Life: 13.1 years | Minimum Pipe Life: 0.6 years | Lowest Theoretical Life: 0.0 years |
| Estimated Retirement: **September 2036** | Estimated Retirement: **March 2024** | Estimated Retirement: **August 2023** |

Condition Gauge

**Testing Indicates:** Pipe Replacement Is Mandatory **A Leak Currently Exists**

**Overall Assessment:** Testing at this location identifies a thread leak at a pipe section where we also suspect the ERW weld seam is incomplete. This location is an ideal candidate for failure analysis. A thread leak at this pipe section defines its replacement as mandatory.



## Test Location No: 51

Photo No: SCC-1-81.jpg Orientation: Side View Detail: Pipe Location / Condition

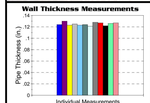


### Piping Technicalities

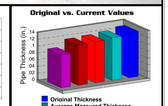
**Location -** Health Science Building 3rd Floor Classroom 314: Fire sprinkler branch line to sprinkler head. Test points located between elbow and sprinkler head.

**Pipe Service:** Fire Sprinkler
**Placed In Service:** September 1, 2000
**Date Source:** Building Construction
**Date Of Test:** August 9, 2023
**In Service:** 23.0 years **Corrosion Period:** 23.0 years
**Test Site ID:** 3-FS-1-50 **Field No:** 50
**Nominal Pipe Size:** 1 in. **Actual:** 1.315 in.
**Material:** Carbon Steel
**Stress Value:** 12,800 psi
**Manufacturer:** Unknown
**Schedule / Type:** Schedule 40
**Construction:** Threaded
**Flow:** Supply To Building
**Pipe Orientation:** Vertical
**Pressure:** 145 psi **Temperature:** 75 °F
**Test Pattern:** Random Points
**Depth Allowance:** 0.073 in.
**External Pit Depth:** 0.000 in.
**Abnormal Condition:** Thread Leak
**Drawing / Reference No:** n/a
**UT Technician:** William P. Duncan III

Wall Thickness Measurements




Original vs. Current Values




### Base Statistical Calculations

**Reported Wall Thickness: 0.133 in.**
**ASTM Wall Thickness: 0.133 in.**
At Spec: Yes Underspec: Overspec:
**Barlow Calculated Minimum: 0.097 in.**
**Default Minimum Wall: 0.095 in.**
**Minimum Allowable Thickness: 0.097 in.**
**Minimum Value Based On:** Barlow
**High To Low Range:** 0.009 in.
**Proximity To Threads Or Groove Cut:** 0.048 in.
**Standard Deviation:** 0.003
**Pitting Index:** 3.20 Insignificant Pitting Activity

Fire Zone ID: **Potential Rust Product Present** Not Applicable
Rust Generated:
Wall Loss Along Bottom: Percent Blockage:
Rust Assessment:

Prior Location No: **Comparison - Past to Present** Not Applicable
Prior Test Date: Prior I.D.:
Prior Average Thickness:
Prior Minimum Thickness:
Prior Avg. Corrosion Rate:
Prior Max. Corrosion Rate:

Years Between Tests:
Average Loss Over
Maximum Loss Over
Avg. Rate Between Dates:
Max. Rate Between Dates:

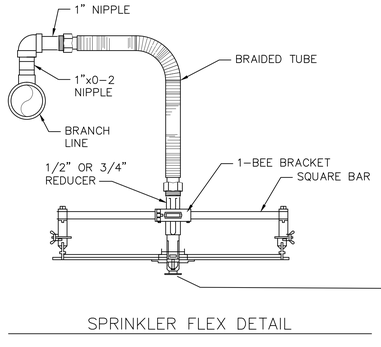
| Average Based Scenario | Minimum Based Scenario | Theoretical Based Scenario |
|---|---|---|
| **Average Wall Thickness: 0.125 in.** | **Minimum Wall Thickness: 0.121 in.** | **Theoretically Lowest Thickness: 0.118 in.** |
| Average Pipe Loss: 0.008 in. | Maximum Pipe Loss: 0.012 in. | Theoretical Pipe Loss: 0.015 in. |
| Average Corrosion Rate: 0.3 mpy | Maximum Corrosion Rate: 0.5 mpy | Theoretical Corrosion Rate: 0.6 mpy |
| Percent of Allowable Loss: 22.4 % | Percent of Allowable Loss: 33.6 % | Percent of Allowable Loss: 41.1 % |
| Average Pipe Life: 79.4 years | Minimum Pipe Life: 45.3 years | Lowest Theoretical Life: 32.9 years |
| Estimated Retirement: **December 2102** | Estimated Retirement: **November 2068** | Estimated Retirement: **July 2056** |

Condition Gauge

**Testing Indicates:** Pipe Replacement Is Mandatory **A Leak Currently Exists**

**Overall Assessment:** Here we show another pipe section where wall thickness readings are high, but a thread leak also exists. Some deficiency with threading, pipe sealant, or fitting-up is suspected. A thread leak at this pipe section defines its replacement as mandatory.






SPRINKLER FLEX DETAIL




1 / FP2 FIRE PROTECTION PIPE REPLACEMENT INFORMATION
NTS
1/8" = 1'-0"

CONSULTANT LOGO
MADDOX ENGINEERING INC
Ph: 864-334-1875
P.O. Box 26296
Greenville, SC 29616
420 IA The Parkway
Greer, SC 29650

SEALS

SCC-RE-BID HSB Fire Sprinkler Modifications
SPARTANBURG COMMUNITY COLLEGE
HEALTH SCIENCE BUILDING
107 COMMUNITY COLLEGE DRIVE
SPARTANBURG, SC 29303

SHEET ISSUE:

| NO | DATE | DESCRIPTION | BY |
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| 1 | 07-17-2024 | RE-ISSUED FOR BIDS | WEM |

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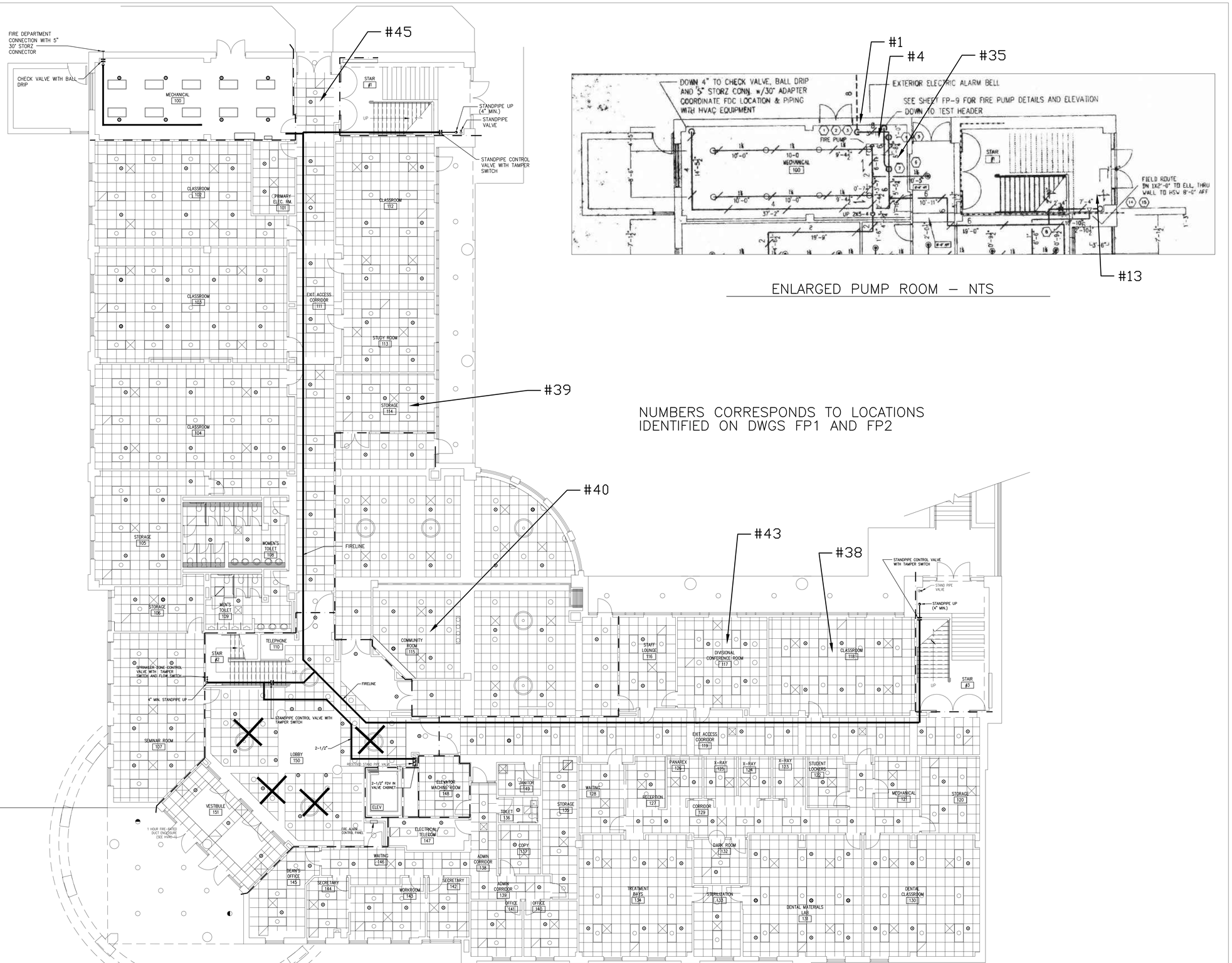
RE-ISSUED FOR BIDS 07-17-2024

PRINCIPAL IN CHARGE: WEM
PROJECT ARCHITECT: --
DRAWN BY: ARL

SHEET TITLE:

# FIRE PROTECTION PIPE REPLACEMENT INFORMATION

SHEET NO. FP2
PROJ. NO. 023034




1 FP3 FIRE PROTECTION PLAN – 1ST FLOOR

1/8" = 1'-0"

0 8' 16' 24' 32'




ENLARGED PUMP ROOM – NTS

NUMBERS CORRESPONDS TO LOCATIONS IDENTIFIED ON DWGS FP1 AND FP2

CONSULTANT LOGO


MADDOX ENGINEERING INC
Ph: 864-334-1875
P.O. Box 26286
Greenville, SC 29616
420 IA The Parkway
Greer, SC 29650


SEALS

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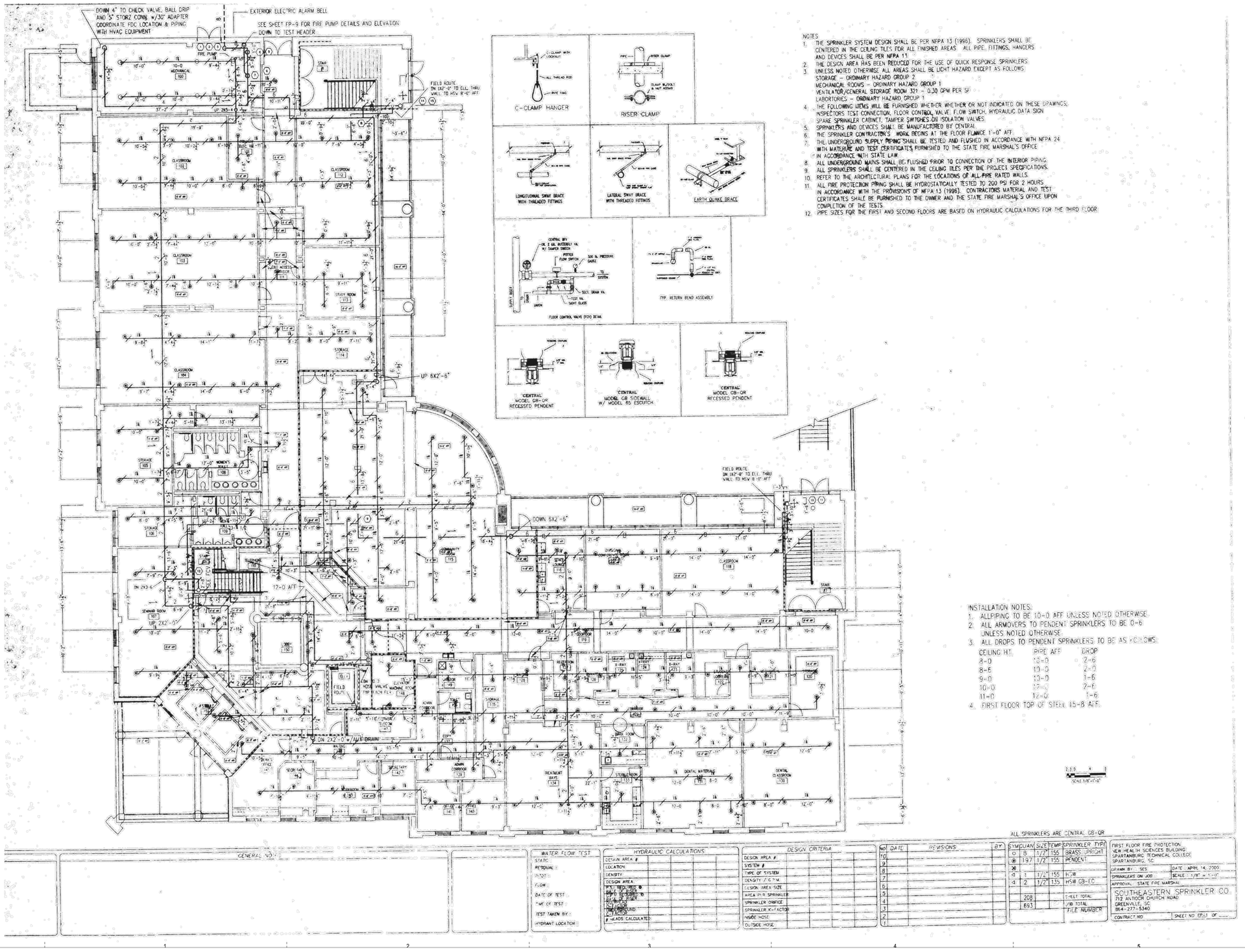
PRINCIPAL IN CHARGE: WEM
PROJECT ARCHITECT: –
DRAWN BY: ARL

SHEET TITLE:

# FIRE PROTECTION PLAN - 1ST FLOOR

SHEET NO. FP3

PROJ. NO. 023034




1 FP3- FIRE PROTECTION PLAN – 1ST FLOOR (ORIGIONAL SPRINKLER PLANS)
NTS

CONSULTANT LOGO

MADDOX ENGINEERING INC.
Ph: 864-334-1875
P.O. Box 26286
Greenville, SC 29616
420 W. Tho Parkway
Greer, SC 29650

SEALS

SCC-RE-BID HSB Fire Sprinkler Modifications

SPARTANBURG COMMUNITY COLLEGE
HEALTH SCIENCE BUILDING

107 COMMUNITY COLLEGE DRIVE
SPARTANBURG, SC 29303

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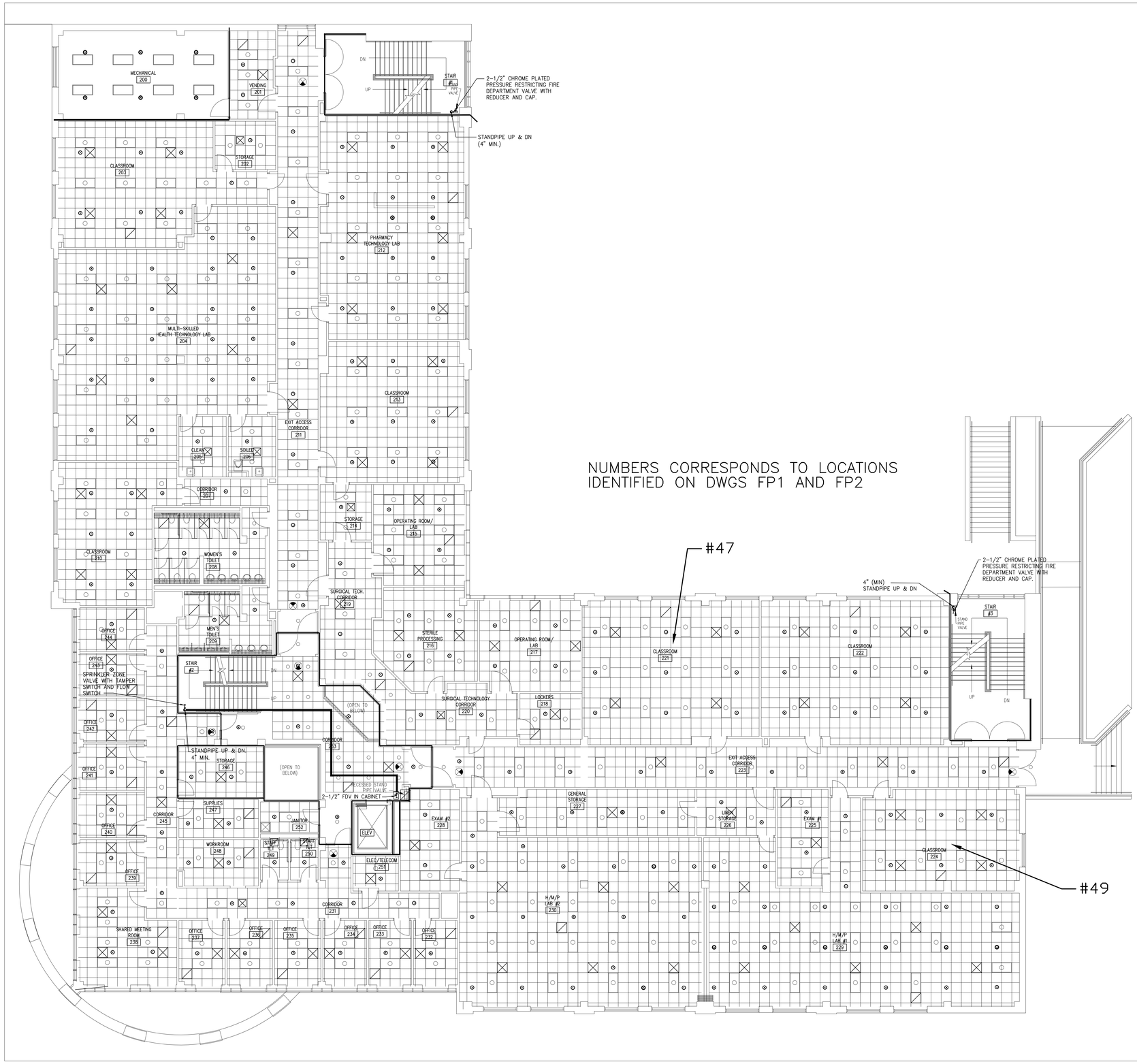
PRINCIPAL IN CHARGE: WEM
PROJECT ARCHITECT: --
DRAWN BY: ARL

SHEET TITLE:

# FIRE PROTECTION PLAN - 1ST FLOOR (ORIGIONAL SPRINKLER PLANS)

SHEET NO. PROJ. NO. 023034

# FP3A




NUMBERS CORRESPONDS TO LOCATIONS IDENTIFIED ON DWGS FP1 AND FP2

1 / FP4 FIRE PROTECTION PLAN – 2ND FLOOR

1/8" = 1'-0"

0 8' 16' 24' 32'

CONSULTANT LOGO


MADDOX ENGINEERING INC.
Ph: 864-334-1875
P.O. Box 26266
Greenville, SC 29616
420 W. The Parkway
Greer, SC 29650


SEALS

SCC-RE-BID HSB Fire Sprinkler Modifications

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HEALTH SCIENCE BUILDING

107 COMMUNITY COLLEGE DRIVE
SPARTANBURG, SC 29303

SHEET ISSUE:

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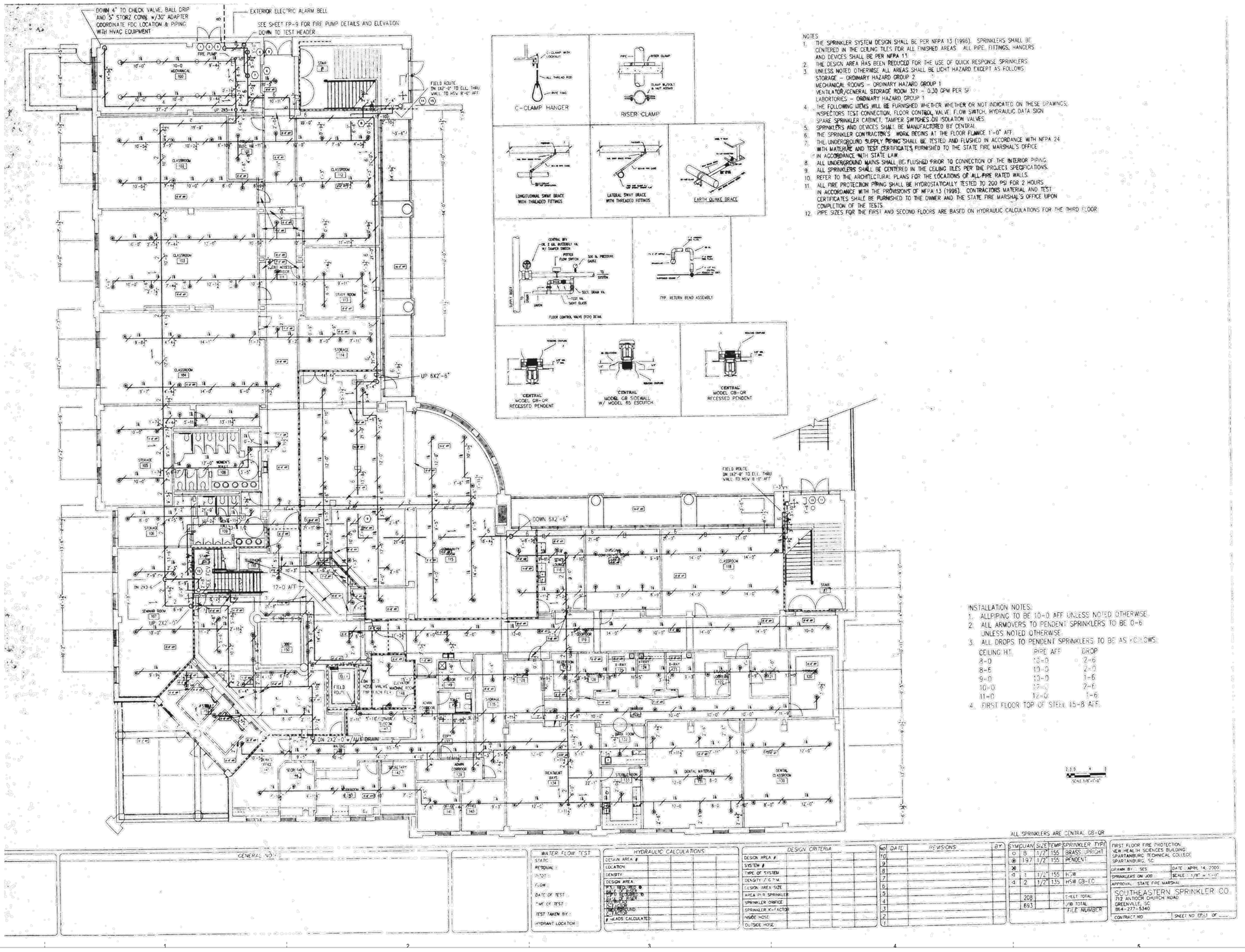
PRINCIPAL IN CHARGE: WEM
PROJECT ARCHITECT: ---
DRAWN BY: ARL

SHEET TITLE:

# FIRE PROTECTION PLAN - 2ND FLOOR

SHEET NO. FP4

PROJ. NO. 023034




1 FP4- FIRE PROTECTION PLAN – 2ND FLOOR (ORIGIONAL SPRINKLER PLANS)
NTS

CONSULTANT LOGO

MADDOX ENGINEERING INC.
Ph: 864-334-1875
P.O. Box 26286
Greenville, SC 29616
420 IA The Parkway
Greer, SC 29650

SEALS

SCC-RE-BID HSB Fire Sprinkler Modifications

SPARTANBURG COMMUNITY COLLEGE
HEALTH SCIENCE BUILDING
107 COMMUNITY COLLEGE DRIVE
SPARTANBURG, SC 29303

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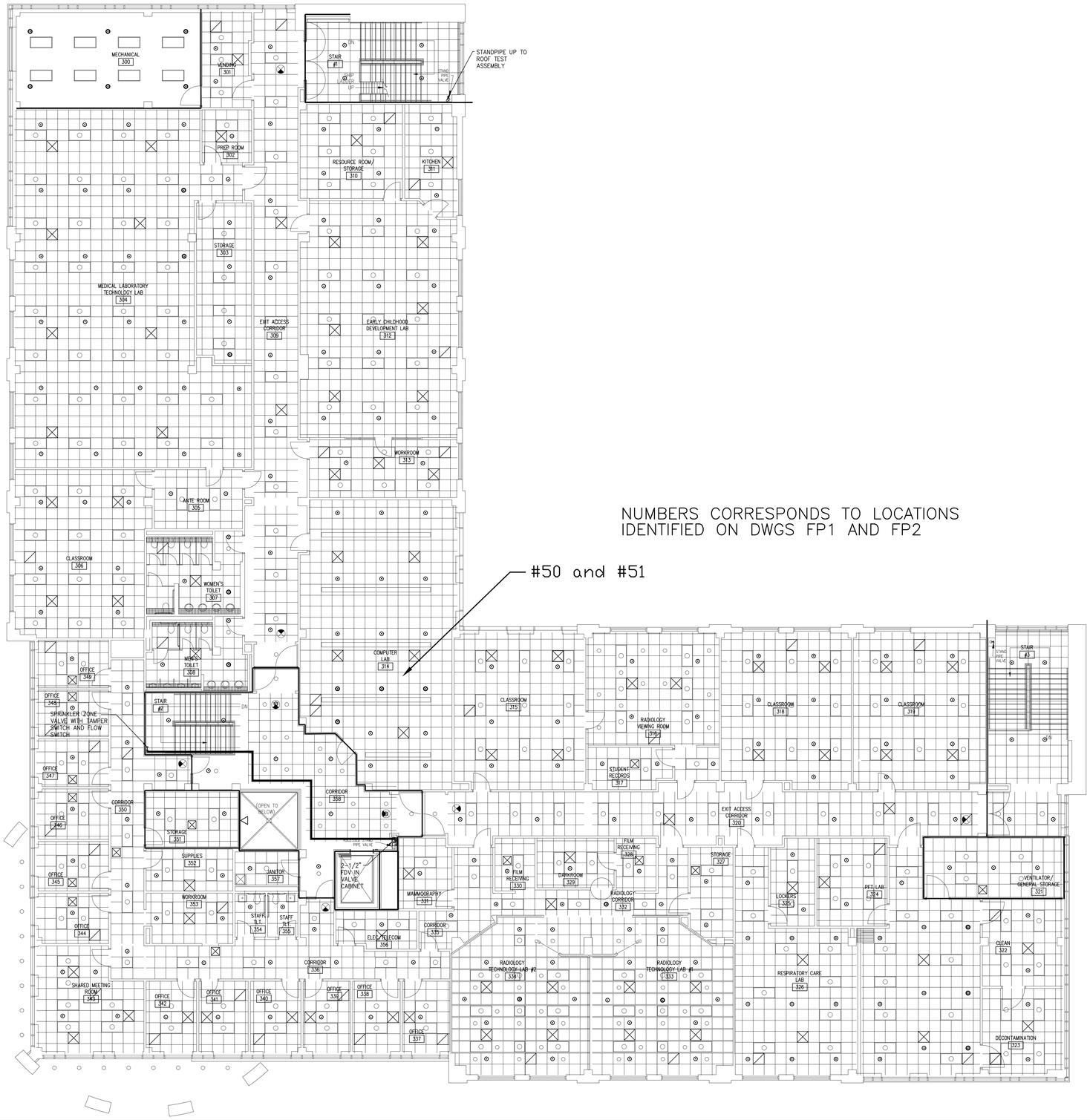
PRINCIPAL IN CHARGE: WEM
PROJECT ARCHITECT: --
DRAWN BY: ARL

SHEET TITLE:

# FIRE PROTECTION PLAN - 2ND FLOOR (ORIGIONAL SPRINKLER PLANS)

SHEET NO. PROJ. NO. 023034

# FP4A




1 FP5 FIRE PROTECTION PLAN – 3RD FLOOR

1/8" = 1'-0"

0 8' 16' 24' 32'

CONSULTANT LOGO

MADDOX ENGINEERING INC.
Ph: 864-334-1875
P.O. Box 28098
Greenville, SC 29616
420 IA The Parkway
Greer, SC 29650

SEALS

SCC-RE-BID HSB Fire Sprinkler Modifications

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HEALTH SCIENCE BUILDING

107 COMMUNITY COLLEGE DRIVE
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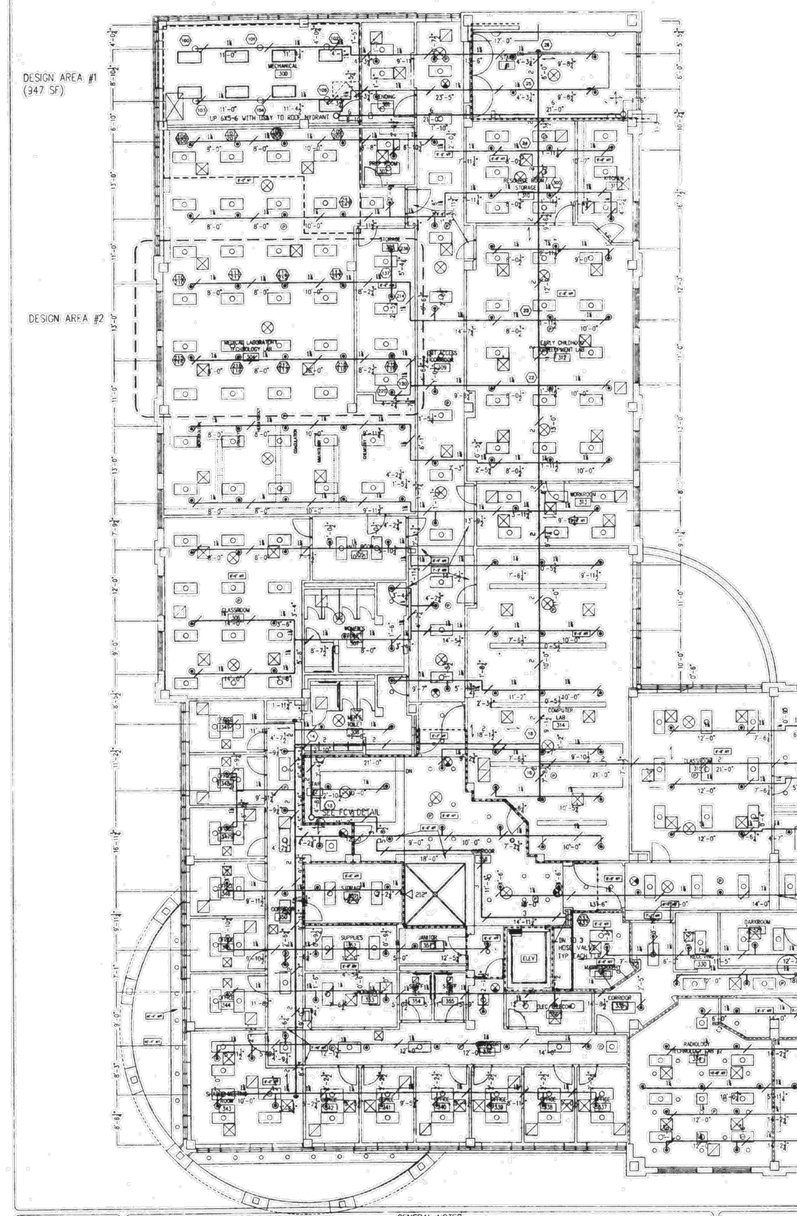
PRINCIPAL IN CHARGE: WEM
PROJECT ARCHITECT: –
DRAWN BY: ARL

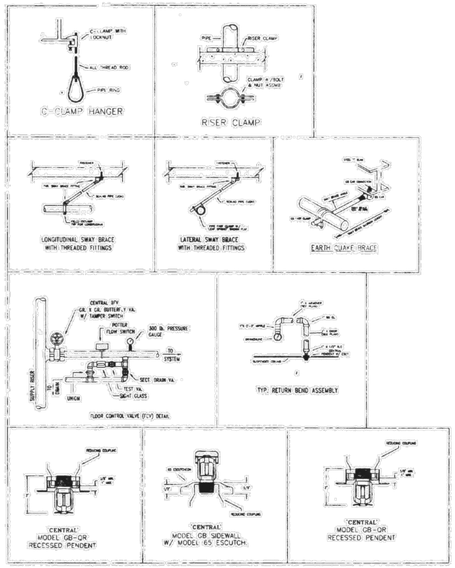
SHEET TITLE:

# FIRE PROTECTION PLAN - 3RD FLOOR

SHEET NO. FP5

PROJ. NO. 023034




NOTES:
1. THE SPRINKLER SYSTEM DESIGN SHALL BE PER NFPA 13 (1996). SPRINKLERS SHALL BE CENTERED IN THE CEILING TILES FOR ALL FINISHED AREAS. ALL PIPE, FITTINGS, HANGERS AND DEVICES SHALL BE PER NFPA 13.
2. THE DESIGN AREA HAS BEEN REDUCED FOR THE USE OF QUICK RESPONSE SPRINKLERS.
3. UNLESS NOTED OTHERWISE ALL AREAS SHALL BE LIGHT HAZARD EXCEPT AS FOLLOWS:
   STORAGE = ORDINARY HAZARD GROUP 2
   MECHANICAL ROOMS = ORDINARY HAZARD GROUP 1
   VENTILATOR/GENERAL STORAGE ROOM 321 = 0.30 GPM PER SF
   LABORTORIES = ORDINARY HAZARD GROUP 1
4. THE FOLLOWING ITEMS WILL BE FURNISHED WHETHER WHETHER OR NOT INDICATED ON THESE DRAWINGS: INSPECTORS TEST CONNECTION, FLOOR CONTROL VALVE, FLOW SWITCH, HYDRAULIC DATA SIGN
   SPARE SPRINKLER CABINETS, TAMPER SWITCHES ON ISOLATION VALVES.
5. SPRINKLERS AND DEVICES SHALL BE MANUFACTURED BY CENTRAL.
6. THE SPRINKLER CONTRACTOR'S WORK BEGINS AT THE FLOOR FLANGE 1'-0" AFF.
7. THE UNDERGROUND SUPPLY PIPING SHALL BE TESTED AND FLUSHED IN ACCORDANCE WITH NFPA 24 WITH MATERIAL AND TEST CERTIFICATES FURNISHED TO THE STATE FIRE MARSHAL'S OFFICE IN ACCORDANCE WITH STATE LAW.
8. ALL UNDERGROUND MAINS SHALL BE FLUSHED PRIOR TO CONNECTION OF THE INTERIOR PIPING.
9. ALL SPRINKLERS SHALL BE CENTERED IN THE CEILING TILES PER THE PROJECT SPECIFICATIONS.
10. REFER TO THE ARCHITECTURAL PLANS FOR THE LOCATIONS OF ALL FIRE RATED WALLS.
11. ALL FIRE PROJECTION PIPING SHALL BE HYDROSTATICALLY TESTED TO 200 PSI FOR 2 HOURS IN ACCORDANCE WITH THE PROVISIONS OF NFPA 13 (1996). CONTRACTORS MATERIAL AND TEST CERTIFICATES SHALL BE FURNISHED TO THE OWNER AND THE STATE FIRE MARSHAL'S OFFICE UPON COMPLETION OF THE TESTS.
12. PIPE SIZES FOR THE FIRST AND SECOND FLOORS ARE BASED ON HYDRAULIC CALCULATIONS FOR THE THIRD FLOOR.

INSTALLATION NOTES:
1. ALL PIPING TO BE 10'-0 AFF UNLESS NOTED OTHERWISE.
2. ALL ARMOVERS TO PENDENT SPRINKLERS TO BE 0'-6" UNLESS NOTED OTHERWISE.
3. ALL DROPS TO PENDENT SPRINKLERS TO BE AS FOLLOWS:

| CEILING HT. | PIPE AFF | DROP |
|---|---|---|
| 8'-0" | 10'-0" | 2'-6" |
| 8'-6" | 10'-0" | 2'-0" |
| 9'-0" | 10'-0" | 1'-6" |
| 10'-0" | 12'-0" | 2'-6" |
| 11'-0" | 12'-0" | 1'-6" |

4. FOURTH FLOOR TOP OF STEEL 14'-8" AFF.

SCALE 1/8"=1'-0"

ALL SPRINKLERS ARE CENTRAL QB-QR

GENERAL NOTES

WATER FLOW TEST

| | |
|---|---|
| STATIC: | 60 PSI |
| RESIDUAL: | 56 PSI |
| PITOT: | 48 PSI |
| FLOW: | 1162 GPM |
| DATE OF TEST: | 8/19/99 |
| TIME OF TEST: | 10:58 AM |
| TEST TAKEN BY: | J. ALLEY (SPARTANBURG WATER DEPT. |
| HYDRANT LOCATION: | 305 |

HYDRAULIC CALCULATIONS

| DESIGN AREA # | 1 | 2 | 3 | 4 |
|---|---|---|---|---|
| HYDRAULIC FILE: | SB103 | SB104 | SB102 | SB105 |
| DENSITY: | 0.15 | 0.15/0.2 | 0.15 | 0.30 |
| DESIGN AREA: | 900 | 900 | 970 | ROOM |
| P.F. TO CURVE "B" | 70.68 | 111.7 | 87.63 | 73.95 |
| P.F. TO HYDRANT @ 250 GPM (SYSTEM DEMAND) | 164.19 | 330.98 | 288.77 | 180.29 |
| P.F. TO HOSE STREAM | 120 | 120 | 120 | 120 |
| K-FACTOR | 140 | 140 | 140 | 140 |
| # HEADS CALCULATED | 10 | 11 | 12 | 3 |

DESIGN CRITERIA

| DESIGN AREA # | 1 | 2 | 3 | 4 |
|---|---|---|---|---|
| HYDRAULIC FILE: | SB103 | SB104 | SB102 | SB105 |
| TYPE OF SYSTEM | WET | WET | WET | WET |
| DENSITY / G.P.M. | 0.15 | 0.15/0.2 | 0.15 | 0.30 |
| DESIGN AREA SIZE | 900 | 900 | 900 | ROOM |
| AREA PER SPRINKLER | 120 | 120 | 120 | 90 |
| SPRINKLER ORIFICE | 1/2" | 1/2" | 1/2" | 1/2" |
| SPRINKLER K-FACTOR | 5.6 | 5.6 | 5.6 | 5.6 |
| INSIDE HOSE | 100 | 100 | 100 | 100 |
| OUTSIDE HOSE | 150 | 150 | 150 | 150 |

| NO | DATE | REVISIONS | BY |
|---|---|---|---|
| 12 | | | |
| 11 | | | |
| 10 | | | |
| 9 | | | |
| 8 | | | |
| 7 | | | |
| 6 | | | |
| 5 | | | |
| 4 | | | |
| 3 | | | |
| 2 | | | |
| 1 | | | |

| SYM | QUAN | SIZE | TEMP | SPRINKLER TYPE |
|---|---|---|---|---|
| O | 6 | 1/2" | 155 | BRASS UPRIGHT |
| ⊗ | 243 | 1/2" | 155 | PENDENT |
| ⊠ | | | | |
| ◁ | 1 | 1/2" | 212° | HSW |
| | | | | |
| | 250 | | | SHEET TOTAL |
| | 693 | | | JOB TOTAL |
| | | | | FILE NUMBER |

THIRD FLOOR FIRE PROTECTION
NEW HEALTH SCIENCES BUILDING
SPARTANBURG TECHNICAL COLLEGE
SPARTANBURG, SC

DRAWN BY: SES — DATE: APRIL 14, 2000
SPRINKLERS ON JOB: — SCALE: 1/8" = 1'-0"
APPROVAL: STATE FIRE MARSHAL

SOUTHEASTERN SPRINKLER CO.
712 ANTIOCH CHURCH ROAD
GREENVILLE, SC
864-277-5340

CONTRACT NO. — SHEET NO FP-5 OF ___

1 FP5- FIRE PROTECTION PLAN – 3RD FLOOR (ORIGIONAL SPRINKLER PLANS)
NTS

CONSULTANT LOGO

MADDOX ENGINEERING INC.
Ph: 864-334-1875
P.O. Box 26286
Greenville, SC 29616
420 IA The Parkway
Greer, SC 29650

SEALS

SCC-RE-BID HSB Fire Sprinkler Modifications

SPARTANBURG COMMUNITY COLLEGE
HEALTH SCIENCE BUILDING

107 COMMUNITY COLLEGE DRIVE
SPARTANBURG, SC 29303

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PROJECT ARCHITECT: —
DRAWN BY: ARL

SHEET TITLE:
FIRE PROTECTION PLAN - 3RD FLOOR (ORIGIONAL SPRINKLER PLANS)

SHEET NO. FP5A

PROJ. NO. 023034