IN REHAB:
REBUILDING UNIVERSITY OF FLORIDA'S UNDERGROUND INFRASTRUCTURE

PRESENTED BY

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UNIVERSITY OF FLORIDA AT A GLANCE

TOP 10
Public University

50K+
Students

75%
Live on-campus

The state's oldest university, traces its beginnings to 1853. Today, the university has **more than 55,000 students** and **16 colleges**. UF has a **2,000-acre campus** and **more than 1,000 buildings** on the main campus.

EXISTING CONDITIONS

MECHANICAL MANHOLE: MH-3D3-9

SYSTEM CONDITION

Date of Entry:	3/7/2017	Job Team:	JML, ALS, VGB, JM
Access Cover Condition:	Good	Access Cover Urgency:	N/A
Manhole Condition:	Cracks: ☑	Spalling: ☑	Exposed Rebar: ☐
Neck Condition:	Good	Ladder Condition:	Good
Excessive Surface Temperature? ☑		Notes:	140 deg F
Water Present? ☐		Obsv./ Perm Depth:	0"/18"
Piping Leaks? ☐		Source:	Manway lids and MH-3D3-13
Debris? ☑		Debris Notes:	Broken insulation, dirt, and sand
Pipe Hangers Cond.:	Good	Pipe Hangers Urgency:	N/A
Pipe Anchors Condition:	Poor	Pipe Anchors Urgency:	Immediate

CONDITION PHOTOS

Rusted and Broken Anchor Plate on 6" 70S

Looking South

Looking North

#	Service Type	Pipe Size (NPS	Pipe	Valve	Insulation			Ins. Jacket			Expansion Joint			Trap			Urg.
						Cond.	Urg.	Type	Cond.	Urg.	Type	Cond.	Urg.	Type	Size (in)		
1	70S	10				Poor	1	AL	Poor	1	None	None	N/A	None	N/A		2
2	PC	4				Poor	1	AL	Poor	1	None	None	N/A	None	N/A		2
3	70S	8				Poor	1	AL	Poor	1	SJ	Good	N/A	BiM	3/4		2
4	PC	4				Poor	1	AL	Poor	1	SJ	Good	N/A	None	N/A		2
5	70S	6				Poor	1	AL	Poor	1	SJ	Poor	1	BiM	3/4		2
6	70S	8				Poor	1	AL	Poor	1	None	None	N/A	None	N/A		N/A
7	PC	6				Poor	1	AL	Poor	1	None	None	N/A	None	N/A		N/A
8	70S	6				Poor	1	None	None	1	None	None	N/A	None	N/A		N/A
9	70C	3/4				Poor	1	N/A	None	1	None	None	N/A	None	N/A		N/A

NOTES / COMMENTS / CONCERNS

General:	This manhole serves as a branch isolation point with normal service from MH-3D3-12 to the south with branches east to MH-3D3-13 and north to MH-3D3-8. This manhole also serves as a low point for traps and accommodates thermal expansion from the north in the steam and condensate systems. This is the western portion of a joint manhole with MH-3D3-13. This manhole is very hot. There are no base anchors on any of the expansion joints and the 6" 70S anchor has failed.
Piping:	6" 70S XJ is leaking steam on its north side.
Exp. Joints:	There are three packed, slip joints with no base anchors. The 6" 70S XJ is leaking no north side. Anchor plate on 6" 70S XJ has heaved off concrete base. XJs look very compressed with not much room for expansion. Anchor failure in adjacent manhole.

UTILITIES INFRASTRUCTURE ASSESSMENT

UF UNIVERSITY of FLORIDA

RMF Engineering
Reliability. Efficiency. Integrity.

Issue Date:	Mechanical Manhole:
3/12/2018	MH-3D3-9

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CAPITAL PLANNING MAPPING

Legend

Steam MH Capital Planning Map

Manhole (Water Intrusion)

0.5

Manhole (Excess Heat)

1

Manhole (Mechanical Issues)

2

Manhole (Structural Issues)

2

Steam Meter

Condensate Piping

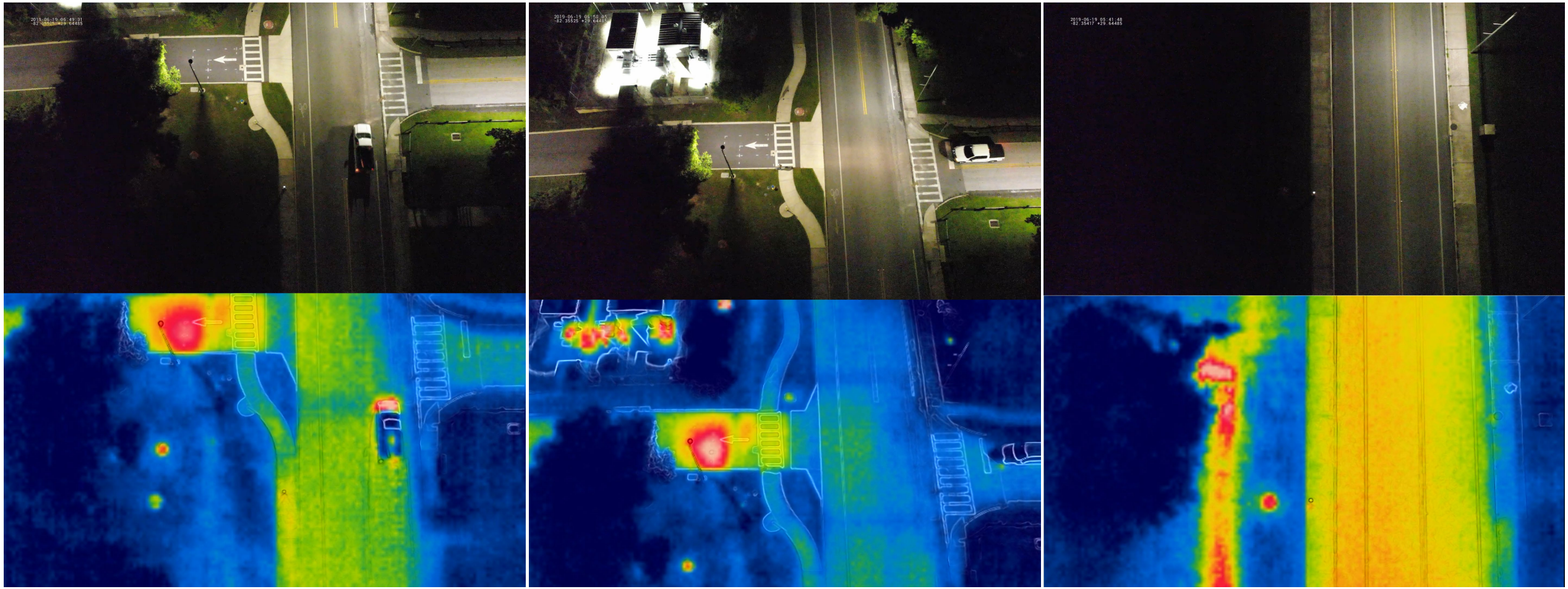
Steam Piping

Abandoned Piping

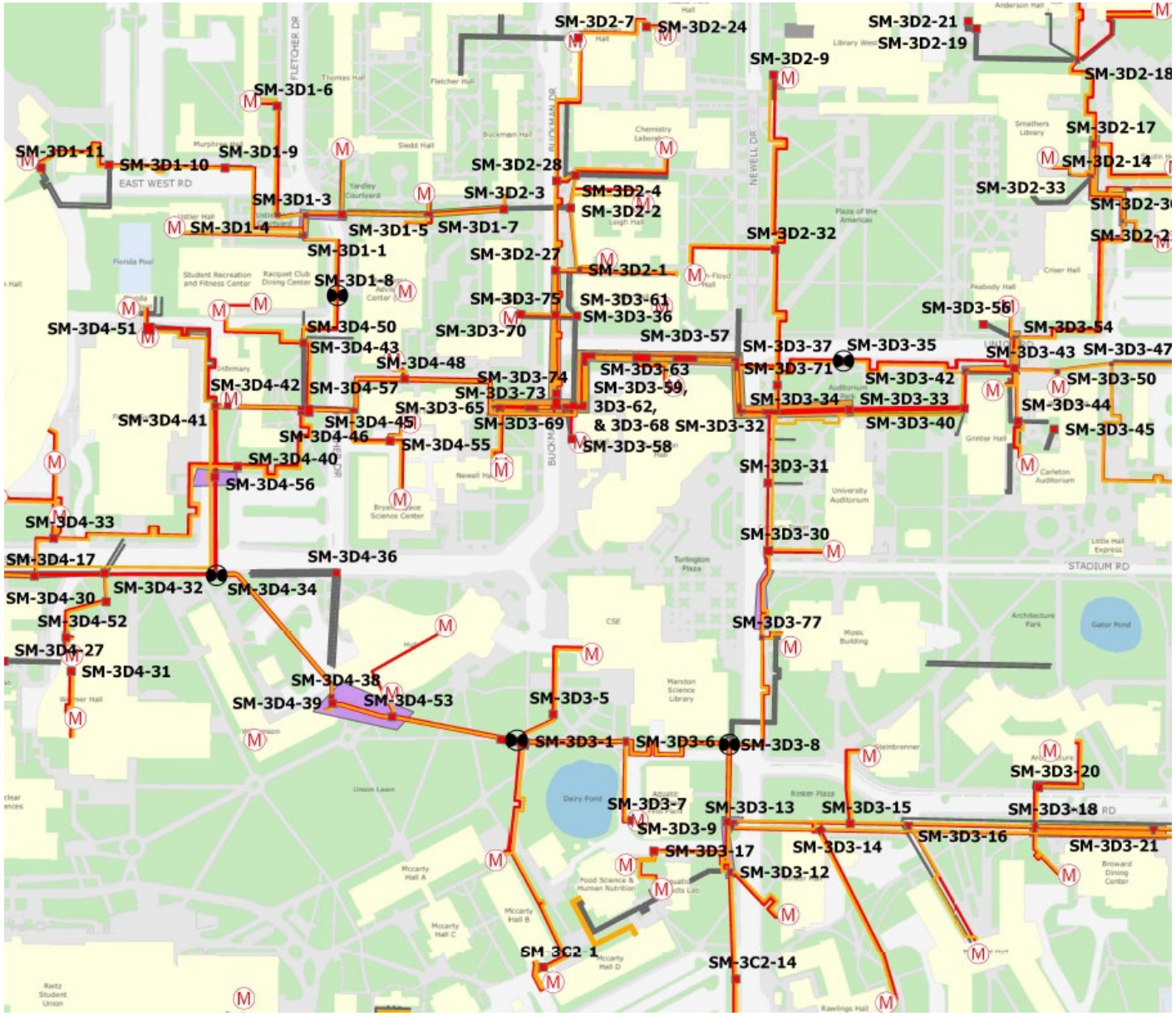
Underground Enclosure

Manhole temp

THERMAL IMAGE MAPPING PROCESS

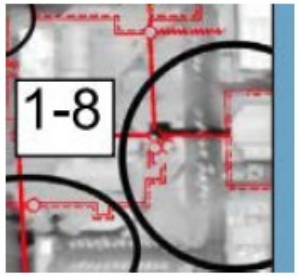


THERMAL HOT SPOT MAPPING

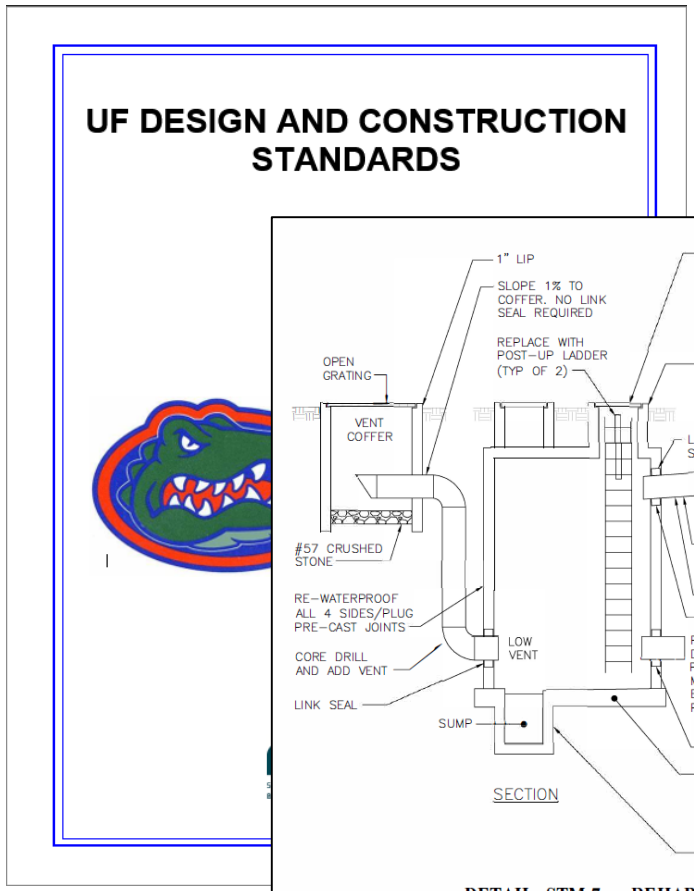


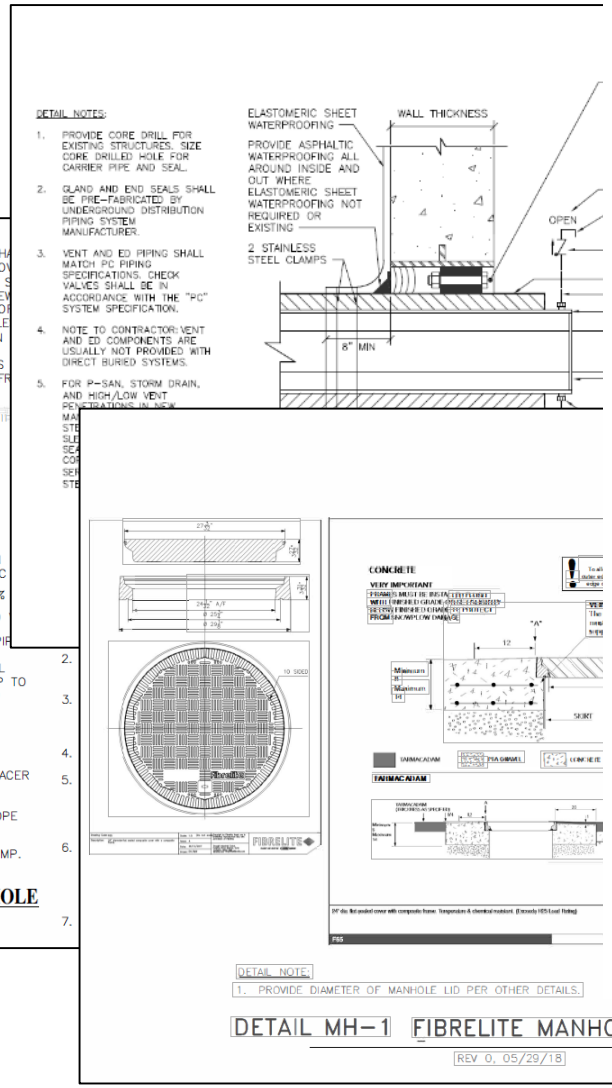
- Spot
- Manhole
- Steam Meter
- Condensate Piping
- Steam Piping
- Abandoned Piping
- Hot Spot Run
- Hot Spot Cluster

Images added at each hot spot for clarity



UNIVERSITY OF FLORIDA STEAM STANDARDS





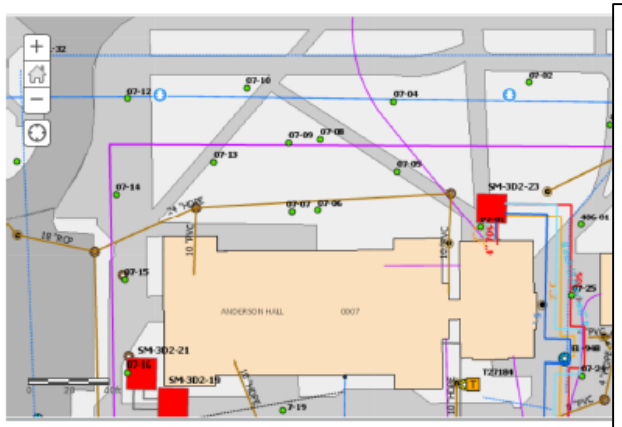
VALVE CHART UNIVERSITY OF FLORIDA

VALVE STYLE	VALVE SYMBOL	VALVE SIZE (NPS)	VALVE SPECIFICATION
GATE	150GATE_S_1	2 Inches and Smaller	Class 150 gate valve, screwed ends, cast bronze body and bonnet, bronze stem, union bonnet, solid disc gate, inside screw, rising stem; disc and renewable seat ring of 13 percent chromium stainless steel, body and bonnet material to conform to ASTM B 61 or B 62. The valve shall conform to MSS SP-80, Class 150-B62, Type 2. Manufacturer shall be Apollo, Nibco, Powell, or Stockham.
	300GATE_S_1	2 Inches and Smaller	Class 300 gate valve, screwed ends, cast bronze body and bonnet, bronze stem, union bonnet, solid disc gate, inside screw, rising stem; disc and renewable seat ring of 13 percent chromium stainless steel, body and bonnet material to conform to ASTM B 61 or B 62. The valve shall conform to MSS SP-80, Class 300-B62, Type 2. Manufacturer shall be Apollo, Nibco, Powell, or Stockham.
	800GATE_S_1	2 Inches and Smaller	Class 600 or 800 gate valve, forged or cast carbon steel body and bonnet, screwed ends; 13 percent chromium stainless steel seat rings, disc and stem; bolted or union bonnet, solid wedge disc, renewable or integral stellite or cobalt based alloy hard faced seat rings, outside screw and yoke, rising stem, body and bonnet materials to conform to ASTM A 105 or A 216, Grade WCB. Working pressure and temperature ratings shall comply with ANSI B16.34 (Standard Class). Manufacturer shall be Bonney Forge, Powell, Sharpe, Velan, or Vogt.
	150GATE_F_1	2-1/2 Inches and Larger	Class 150 steel gate valve, flanged ends, bolted flanged bonnet, outside screw and yoke, rising stem, flexible or solid wedge disc, renewable seat rings and disc. Materials shall be: Body and bonnet, ASTM A 216, Grade WCB or A105; stem, 13 percent chromium stainless steel; disc face and seat rings 13 percent chromium stainless steel or a combination of 13 percent chromium stainless steel and nickel-copper, stellite or a combination of stellite and 13 percent chromium stainless steel as recommended by its manufacturer for steam service. Face to face dimension shall conform to ANSI B16.10. Flanges shall be faced and drilled to ANSI B16.5. Working pressure and temperature ratings shall comply with ANSI B16.34 (Standard Class). Where noted on the Contract Drawings provide an enclosed gear operator. Manufacturer shall be Crane, Nibco, Powell, Sharpe, or Velan.
	300GATE_F_1	2-1/2 Inches and Larger	Class 300 steel gate valve, flanged ends, bolted flanged bonnet, outside screw and yoke, rising stem, flexible or solid wedge disc, renewable seat rings. Materials shall be: Body and bonnet, ASTM A 216, Grade WCB or A105; stem, 13 percent chromium stainless steel; disc face and seat rings 13 percent chromium stainless steel and nickel-copper, stellite or a combination of stellite and 13 percent chromium stainless steel as recommended by its manufacturer for steam service. Face to face dimension shall conform to ANSI B16.10. Flanges shall be faced and drilled to ANSI B16.5. Working pressure and temperature ratings shall comply with ANSI B16.34 (Standard Class). Manufacturer shall be Crane, Nibco, Powell, Sharpe, or Velan.
GLOBE	150GLOBE_S_1	2 Inches and Smaller	Class 150 globe valve, screwed ends, cast bronze body and bonnet, bronze stem, union bonnet, plug or semi-plug type disc, inside screw, rising stem; disc and renewable seat ring of 13 percent chromium stainless steel, body and bonnet material to conform to ASTM B 61 or B 62. The valve shall conform to MSS SP-80, Class 150-B62, Type 2. Manufacturer shall be Apollo, Nibco, Powell, or Stockham.
	300GLOBE_S_1	2 Inches and Smaller	Class 300 globe valve, screwed ends, cast bronze body and bonnet, bronze stem, union bonnet, plug or semi-plug type disc, inside screw, rising stem; disc and renewable seat ring of 13 percent chromium stainless steel, body and bonnet material to conform to ASTM B 61 or B 62. The valve shall conform to MSS SP-80, Class 300-B62, Type 2. Manufacturer shall be Apollo, Nibco, Powell, or Stockham.
	800GLOBE_S_1	2 Inches and Smaller	Class 600 or 800 globe valve, forged or cast carbon steel body and bonnet, screwed ends, 13 percent chromium stainless steel disc and stem; stellite seat ring; bolted bonnet, plug or semi-plug type disc, renewable or integral hard faced seat ring, outside screw and yoke, rising stem, body and bonnet material to conform to A 105 or A 216, Grade WCB. Working pressure and temperature ratings shall comply with ANSI B16.34 (Standard Class). Manufacturer shall be Bonney Forge, Powell, Sharpe, Velan, or Vogt.
	150GLOBE_F_1	2-1/2 Inches and Larger	Class 150 steel globe valve, flanged ends, bolted flanged bonnet, outside screw and yoke, rising stem, plug or semi-plug type disc, renewable seat rings and disc. Materials shall be: Body and bonnet, ASTM A 216, Grade WCB or A105; stem, 13 percent chromium stainless steel; seat ring, 13 percent chromium stainless steel or 13 percent chromium stainless steel faced. Face to face dimension shall conform to ANSI B16.10. Flanges shall be faced and drilled to ANSI B16.5. Working pressure and temperature ratings shall comply with ANSI B16.34 (Standard Class). Manufacturer shall be Crane, Nibco, Powell, Sharpe, or Velan.
CHECK	150CHECK_S_1	2 Inches and Smaller	Class 150 horizontal swing check valve, cast bronze body and cover, screwed ends, bronze disc, screwed cover, integral seat, body and cover material to conform to ASTM B 61 or B 62. The valve shall conform to MSS SP-80, Class 150-B62, Type 3. Manufacturer shall be Apollo, Nibco, Powell, or Stockham.
	300CHECK_S_1	2 Inches and Smaller	Class 300 horizontal swing check valve, cast bronze body and cover, screwed ends, bronze disc, screwed cover, integral seat, body and cover material to conform to ASTM B 61 or B 62. The valve shall conform to MSS SP-80, Class 300-B62, Type 3. Manufacturer shall be Apollo, Nibco, Powell, or Stockham.
	800CHECK_S_1	2 Inches and Smaller	Class 600 or 800 horizontal or vertical swing check valve; forged carbon steel body; screwed ends; 13 percent chromium stainless steel disc; renewable or integral stellite seat ring; body material to conform to ASTM A 105. Working pressure and temperature ratings shall comply with ANSI B16.34 (Standard Class). Manufacturer shall be Bonney Forge, Powell, Sharpe, Velan, or Vogt.
	150CHECK_F_1	2-1/2 Inches and Larger	Class 150 steel horizontal swing check valve, flanged ends, bolted flanged cover and renewable seat ring. Body material shall conform to ASTM A 216, Grade WCB or A 105. Disc or disc seating face and the seat ring shall be 13 percent chromium stainless steel. Face to face dimension shall conform to ANSI B16.10. Flange shall be faced and drilled to ANSI B16.5. Working pressure and temperature ratings shall comply with ANSI B16.34 (Standard Class). Manufacturer shall be Crane, Nibco, Powell, Sharpe, or Velan.
BALL	250BALL_S_1	2-1/2 Inches and Smaller	Rated for 250 pound saturated steam service, carbon steel body with 316 stainless steel ball and stem, reinforced teflon seats and seals which are rated for 250 pound saturated steam service with flashing service. Valve shall have threaded ends. Valve shall have standard bore size. Valve shall have one piece body. Valve shall have blow-out proof stem design and shall have zinc plated carbon steel lever with vinyl grip. Valve lever shall have design so that lock-out can easily occur. Manufacturer shall be Apollo, McCanna, or Sharpe.
BUTTERFLY	150BUTTER_F_1	3 Inches and Larger	Triple or quadruple offset butterfly style, rotary valve, Class 150, carbon steel body conforming to ASTM A216, Type WCB. For applications where an existing valve is not being replaced in kind, provide a lug body style. For applications where an existing valve is being replaced in kind and the work must be done quickly to avoid a prolonged outage, provide a long pattern double flanged body valve with the laying length face-to-face in conformance with ANSI B16.10. Consult with FS for each application. The disk movement relative to the shaft rotation shall be double offset design. Shaft shall be blow-out proof, 17-4 PH stainless, and single piece construction. Seats shall be replaceable and bolted to the valve body. Seats shall be stellite or similar hard surfaced metal. Seats shall be resilient, non-flexing laminate metal seal composite of stainless steel and graphite retained such that centering movement is permitted. Retainer screws, disk, and plate shall be stainless steel. The hardened bearing with bearing seal shall be retained in the body. The shaft seal shall be graphite with multiple stud packing gland follower for adjustability. Valve and valve seat shall be designed and rated for water and steam service at pressure and differential pressures to Class 150 ANSI B16.34 (Standard Class) for bi-directional shut-off (zero leakage) dead-end service. Position indicator for sizes 2-1/2 through 24 inches. Provide right angle gear operator with loose steel hand wheel or chain wheel attachment for remote "tee" handle operation as shown on drawings. Valve actuator shall be provided with self-locking gears. Provide stem housing to allow for minimum of 3 inches insulation. Valve shall be designed and manufactured in accordance with API 607, Fourth Edition. The Owner stocks Bray Controls Tri Lok triple offset butterfly valves. Provide these valves. Quadax quadruple offset valves will be considered as well as Velan Torqseal triple offset valves.
	300BUTTER_F_1	3 Inches and Larger	Triple or quadruple offset butterfly style, rotary valve, Class 300, carbon steel body conforming to ASTM A216, Type WCB. For applications where an existing valve is not being replaced in kind, provide a lug body style. For applications where an existing valve is being replaced in kind and the work must be done quickly to avoid a prolonged outage, provide a long pattern double flanged body valve with the laying length face-to-face in conformance with ANSI B16.10. Consult with FS for each application. The disk movement relative to the shaft rotation shall be double offset design. Shaft shall be blow-out proof, 17-4 PH stainless, and single piece construction. Seats shall be replaceable and bolted to the valve body. Seats shall be stellite or similar hard surfaced metal. Seats shall be resilient, non-flexing laminate metal seal composite of stainless steel and graphite retained such that centering movement is permitted. Retainer screws, disk, and plate shall be stainless steel. The hardened bearing with bearing seal shall be retained in the body. The shaft seal shall be graphite with multiple stud packing gland follower for adjustability. Valve and valve seat shall be designed and rated for water and steam service at pressure and differential pressures to Class 300 ANSI B16.34 (Standard Class) for bi-directional shut-off (zero leakage) dead-end service. Position indicator for sizes 2-1/2 through 24 inches. Provide right angle gear operator with loose steel hand wheel or chain wheel attachment for remote "tee" handle operation as shown on drawings. Valve actuator shall be provided with self-locking gears. Provide stem housing to allow for minimum of 3 inches insulation. Valve shall be designed and manufactured in accordance with API 607, Fourth Edition. The Owner stocks Bray Controls Tri Lok triple offset butterfly valves. Provide these valves. Quadax quadruple offset valves will be considered as well as Velan Torqseal triple offset valves.

NOTES: 1. REFER TO THE PIPING INDEX TO DETERMINE WHICH PIPE SYSTEMS GET WHICH VALVES.

UNIVERSITY OF FLORIDA "TEAR OFF" PROJECTS

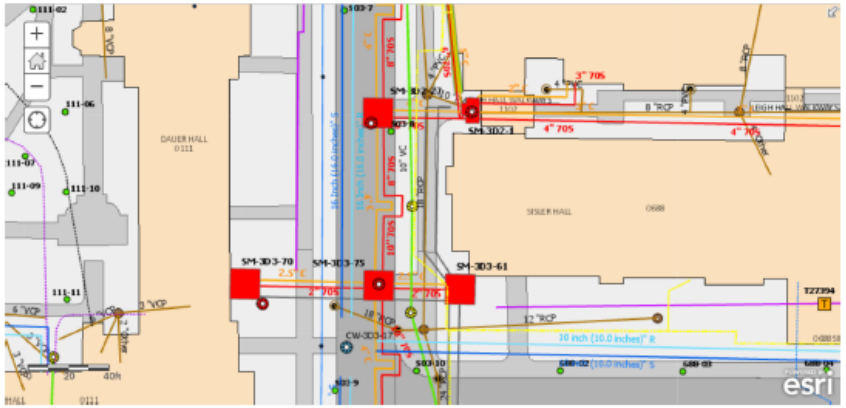
MH-3D2-23 – NORTH OF ANDERSON HALL



SCOPE OF WORK

- Provide insulation blankets on all major isolation valves.
- Provide drain and warm-up at the 4" 70S valve.
- Replace all pressure gauges.
- Seal pipe penetrations that are leaking ground water into manhole.
- Insulate 70S and Steam trap piping that are currently un-insulated.
- Vent the manhole.
- Install steam driven sump pump and drainage.
- Provide a rubber gasket for the manways to make them watertight.
- Provide a ladder extension for safe access into manhole.
- Replace rusted trap station and other affected piping after resolving

MH-3D3-75 - DAUER HALL



SCOPE OF WORK

- Perform a thermal stress analysis to evaluate the effects of thermal expansion in this manhole.
- Seal the manhole structure at the precast concrete seams and the base of the manhole.
- Test the water filling the manhole to determine if it is groundwater.
- Patch the cracks in the ceiling and remove built-up mineral deposits.
- Seal all pipe penetrations.
- Provide a sump pump for the manhole.
- Provide a full-size drip-leg for the existing steam trap station.
- Provide sparge pipes/flash arrestors to the pumped condensate piping.
- Provide warm-ups at the steam isolation valves.
- Re-insulate the 10" 70S, 4" PC, and steam trap piping.
- Provide insulation blankets for all isolation valves.
- Replace the simple supports on the steam trap piping.
- Replace both of the ladders.
- Provide proper venting for the manhole.
- Remove debris from the manhole.
- Provide rubber gaskets for the manway lids to make the lids watertight.

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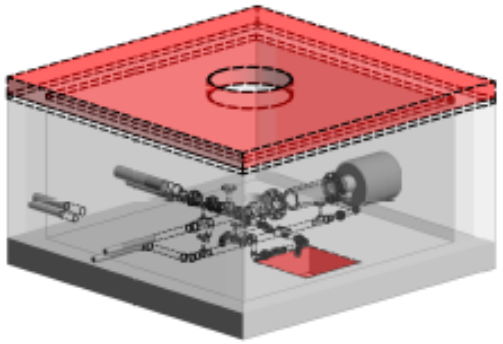
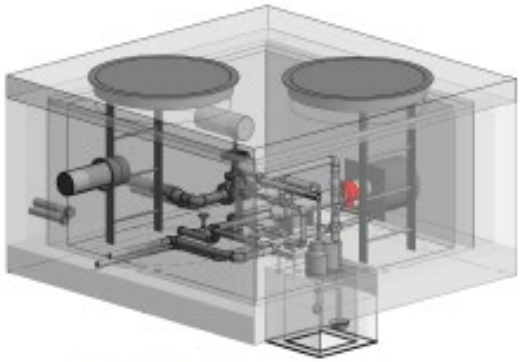
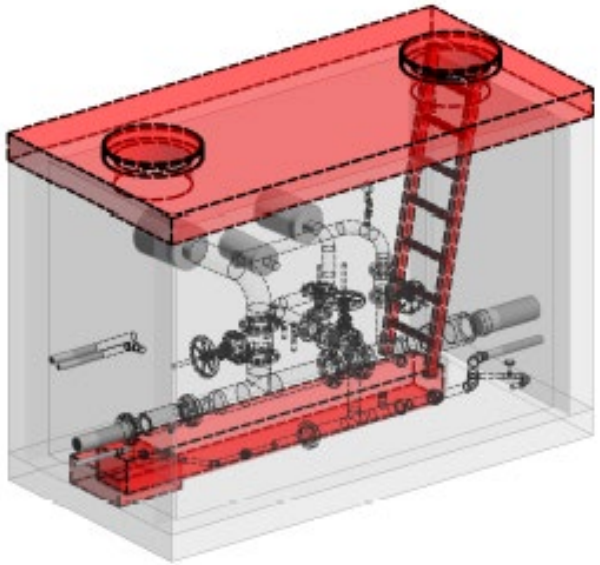
TYPICAL MANHOLE RECONSTRUCTION



MH-3D4-3 - ISOMETRIC VIEW - DEMOLITION
SCALE:



MH-3D4-3 - ISOMETRIC VIEW - NEW WORK
SCALE:



MH-3D4-5 - ISOMETRIC VIEW - DEMOLITION
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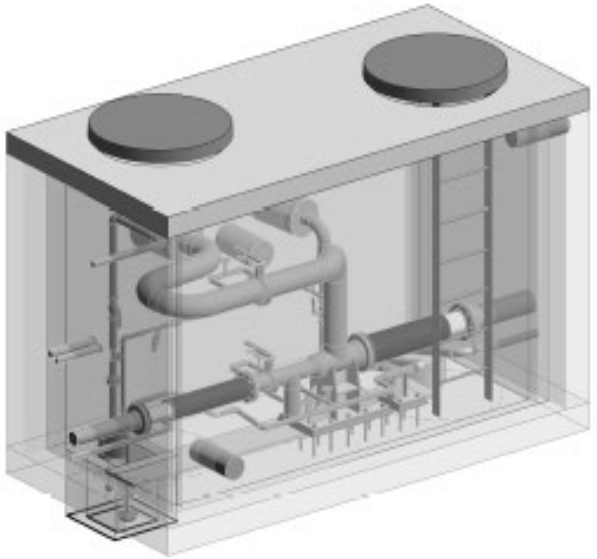
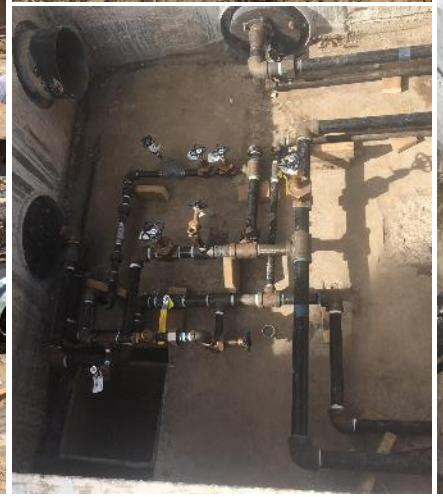
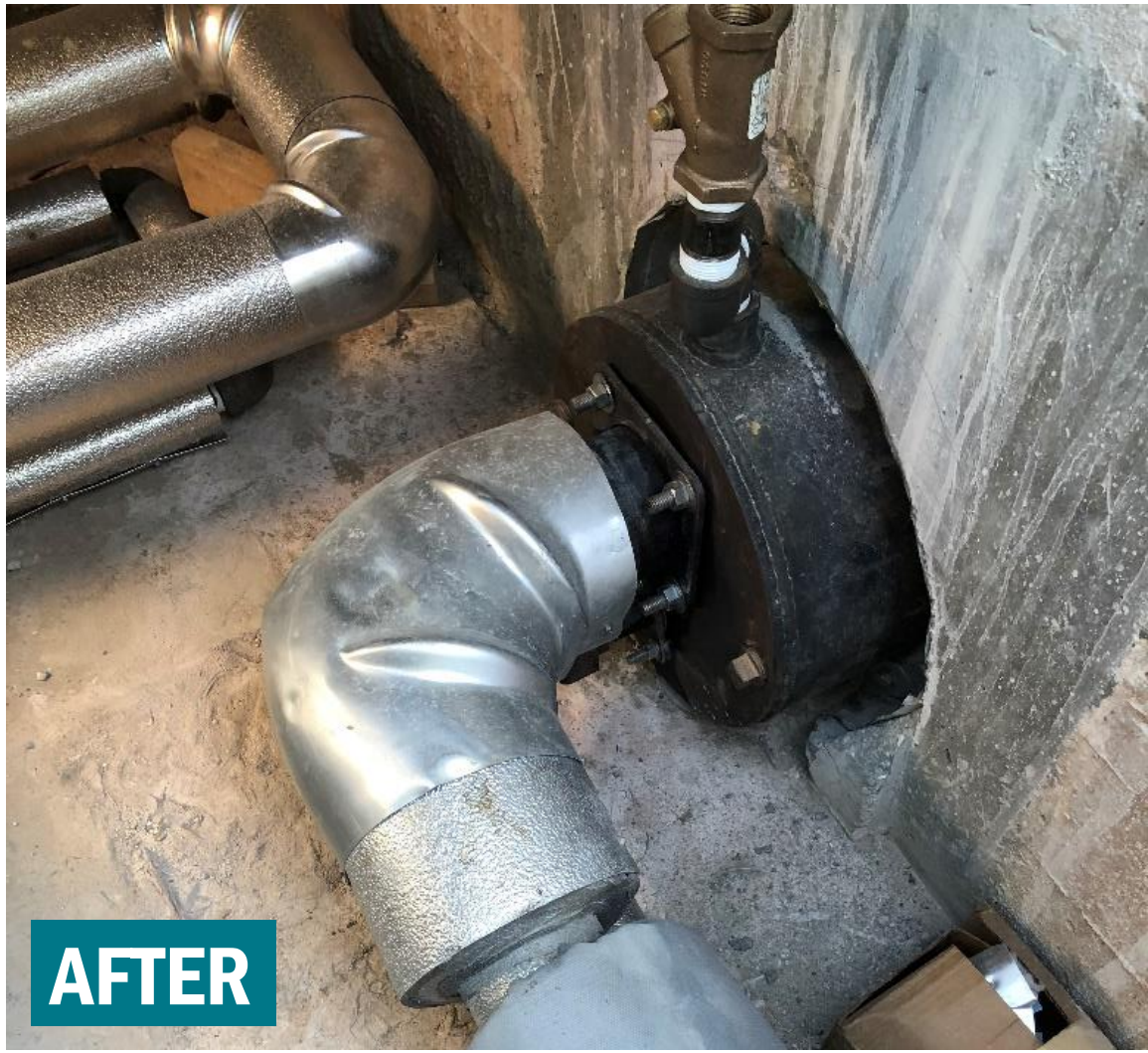


MH-3D4-5 - ISOMETRIC VIEW - NEW WORK
SCALE:

UNIVERSITY OF FLORIDA COMPLETED VAULT REPAIRS



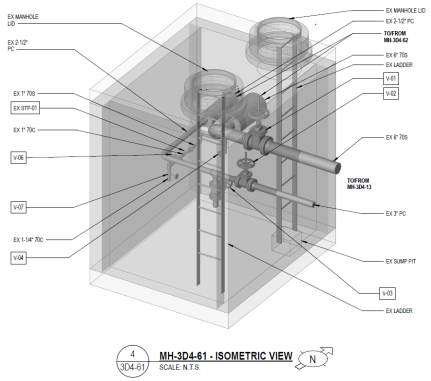
UNIVERSITY OF FLORIDA COMPLETED VAULT REPAIRS



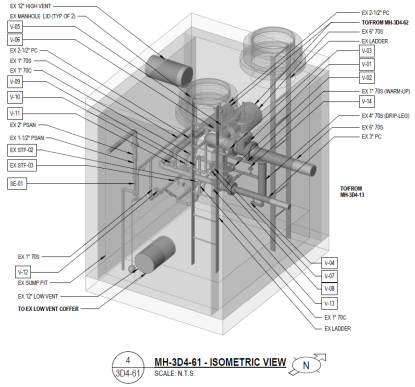
UNIVERSITY OF FLORIDA COMPLETED VAULT REPAIRS

DOCUMENTED RESULTS

EXISTING



NEW



QUESTIONS?