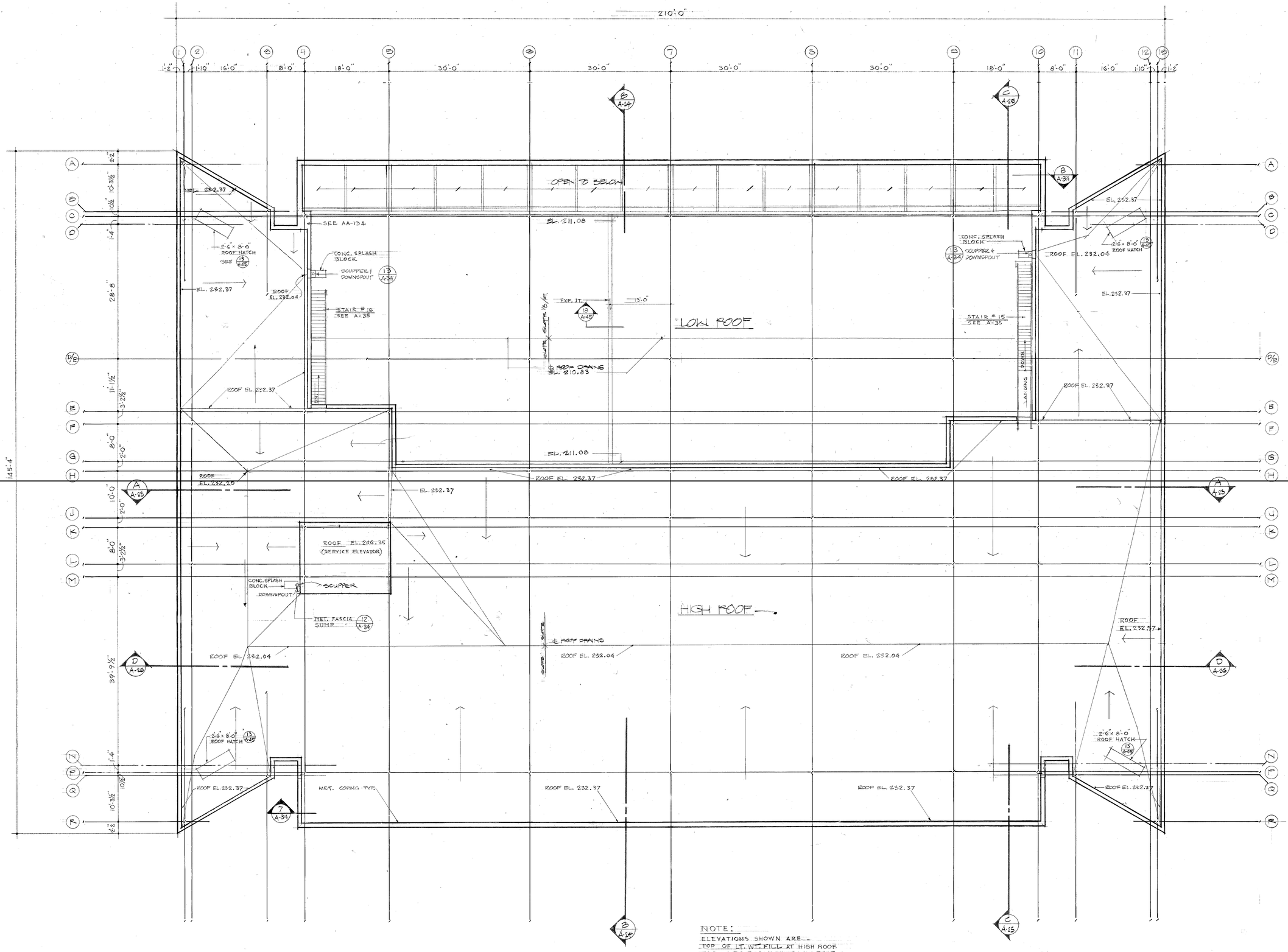
School of Medicine – Medical School Teaching Facility (MSTF) Documents:

- A-9 Roof Plan- North;
- A-19 North Elevation;
- A-20 South Elevation;
- A-21 East Elevation;
- A-22 West Elevation; and
- Infrared Roof Inspection dated 7/23/2019



ROOF PLAN

SCALE: 1/8" = 1'-0"

97-011.01 ROOF REPLACEMENT 7-31-96

GAUDREAU INC. ARCHITECTS
330 N. CHARLES STREET BALTIMORE, MARYLAND 21201
FAISANT ASSOC., INC. — STRUCTURAL ENGR.
ALBERT B. GIPE & ASSOC., INC — MECHANICAL ENGR.

CHANCELLOR
UNIVERSITY OF MARYLAND
AT BALTIMORE

DEPARTMENT OF GENERAL SERVICES
OFFICE OF DESIGN & CONSTRUCTION
APPROVED
PRINCIPAL ENG. | PROJECT ARCH. | PRINCIPAL ARCH.
S.A. | M.E.
DATE 2/21/96

REVISIONS
NO DATE

UNIVERSITY OF MARYLAND AT BALTIMORE
MEDICAL SCHOOL TEACHING FACILITY
BALTIMORE MARYLAND

A-9
OF: 48
DATE - JAN. 25, 1974
JOB NO.- UB-723

BRUNING 44-142 20274

FILE 19 - DWG. No. 1510 839/UB-723/A-9

ROOF
ROOF HIGH PT. EL. 232.67

MECHANICAL LEVEL
EL. 210.83

9TH LEVEL
EL. 196.33

8TH LEVEL
EL. 183.0

7TH LEVEL
EL. 169.66

6TH LEVEL
EL. 156.33

5TH LEVEL
EL. 143.0

4TH LEVEL
EL. 129.66

3RD LEVEL
EL. 116.33

2ND LEVEL
EL. 103.0

PED. LEVEL
EL. 83.0

T.W. EL. 68.03'
GROUND LEVEL
EL. 68.0
BALTIMORE & PINE ST. EL. 62.7'

BASEMENT
EL. 48.0

9'-6½"
14'-0"
13'-4"
13'-4"
13'-4"
13'-4"
13'-4"
13'-4"
20'-0"
15'-0"
20'-0"
185'-1½"

TOP OF COPING
WELL LEVEL
EL. 221.0
MECH. LEVEL
10'-1½"
10'-8"

C.J.
TYP.: CONTINUE JOINT UP TO BM. ABOVE (BEYOND)
FACE BRICK
SOLDIER COURSE
SKYLIGHT
GUTTER
BRICK WALL
PLANTERS (TYP.)
SLOPE 1:1
SLOPE 1%
PLANTERS, SEE SHT. A-3
2 REMOV. CONC. PANELS | SEE STORE
FUTURE GRADE SEE C-1
FREMONT & BALTIMORE EL. 66.5'
CONTROL JOINTS 20'-0" O.C.
11'-7"

KEY PLAN
SCALE: 1" = 600'-0"

NORTH ELEVATION
SCALE 1/8" = 1'-0"

97-011.01 ROOF REPLACEMENT 7-31-96

GAUDREAU INC. ARCHITECTS
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FAISANT ASSOC., INC. — STRUCTURAL ENGR.
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PRINCIPAL ENG. | PROJECT ARCH. | PROJECT ENG. | PROJECT ARCH.
DATE 2/28/74

REVISIONS
NO | DATE

UNIVERSITY OF MARYLAND AT BALTIMORE
MEDICAL SCHOOL TEACHING FACILITY
BALTIMORE 839 MARYLAND

A-19
OF: 48
DATE – JAN. 29, 1974
JOB NO.– UB–723

Fac. 19 - Dwg. No. 1520 839 UB-723

BRUNING 44-142 20274

SOUTH ELEVATION

SCALE: 1/8"=1'-0"

97-011.01 ROOF REPLACEMENT 7-31-96

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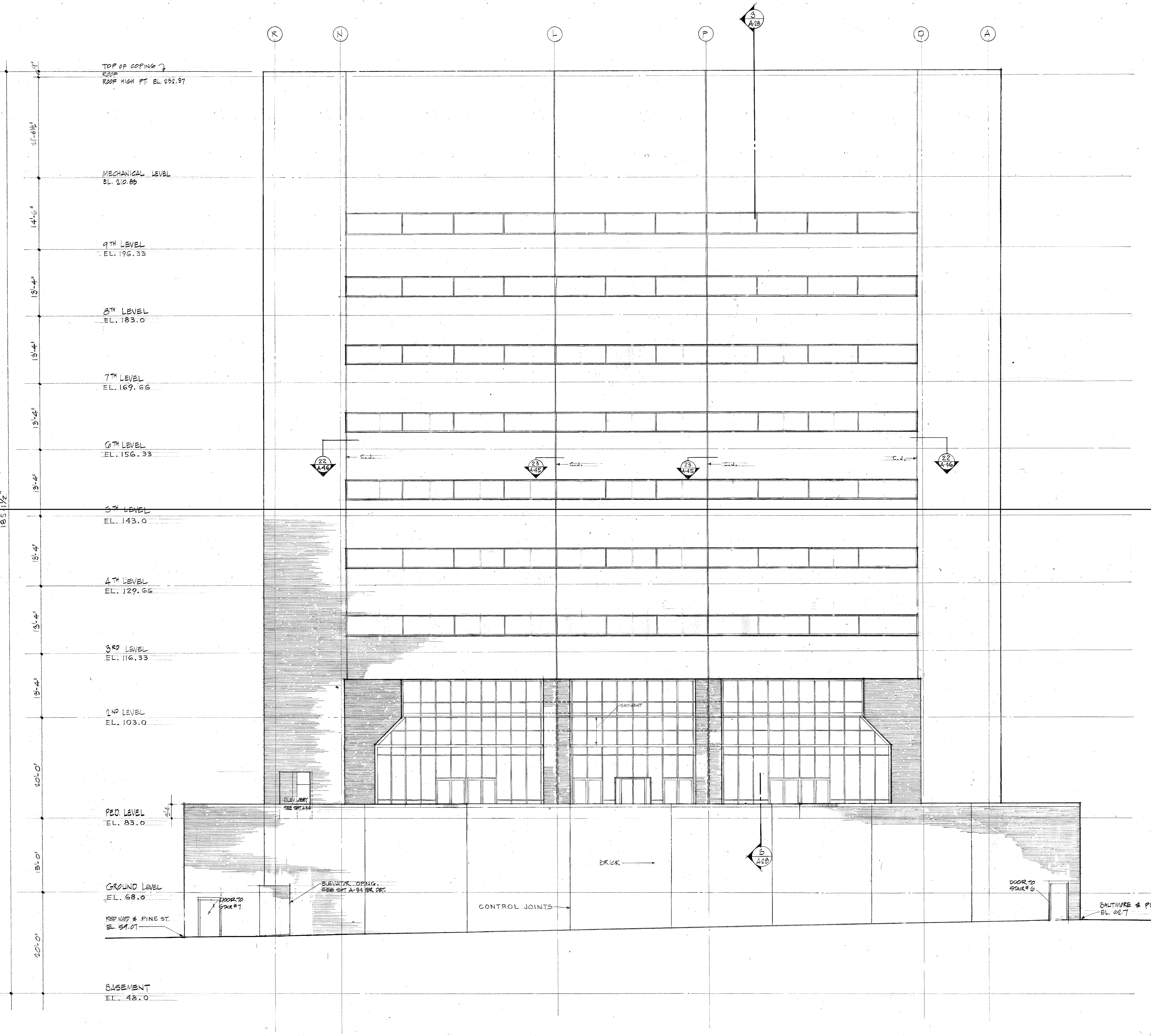
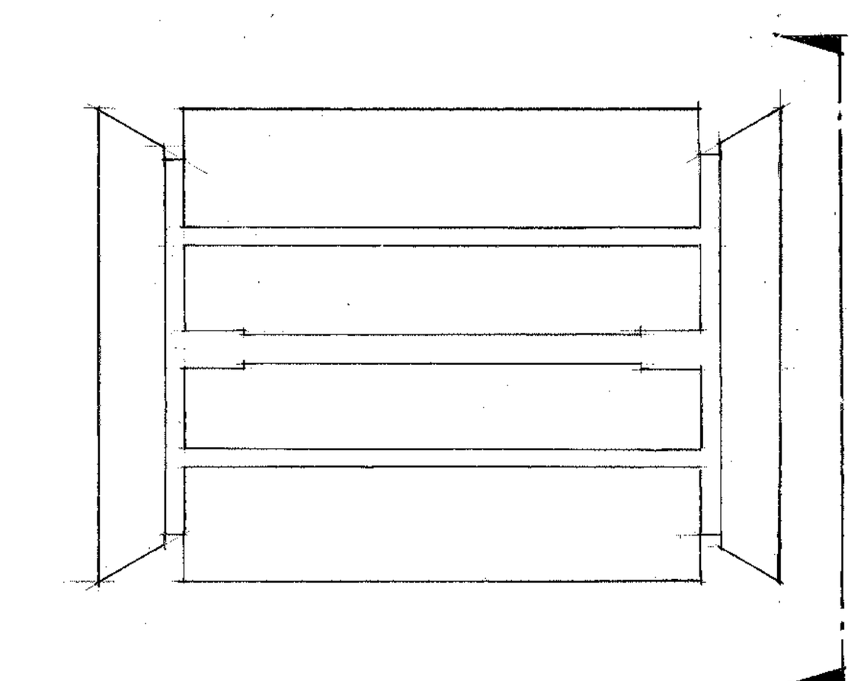
UNIVERSITY OF MARYLAND AT BALTIMORE
MEDICAL SCHOOL TEACHING FACILITY
BALTIMORE MARYLAND

A-20
OF: 48
DATE - JAN. 25, 1974
JOB NO. - UB-723





EAST ELEVATION
SCALE: 1/8" = 1'-0"

97-011.01 ROOF REPLACEMENT 7-31-96

GAUDREAU INC. ARCHITECTS
330 N. CHARLES STREET BALTIMORE, MARYLAND 21201

FAISANT ASSOC., INC. STRUCTURAL ENGR.
ALBERT B. GIPE & ASSOC., INC MECHANICAL ENGR.

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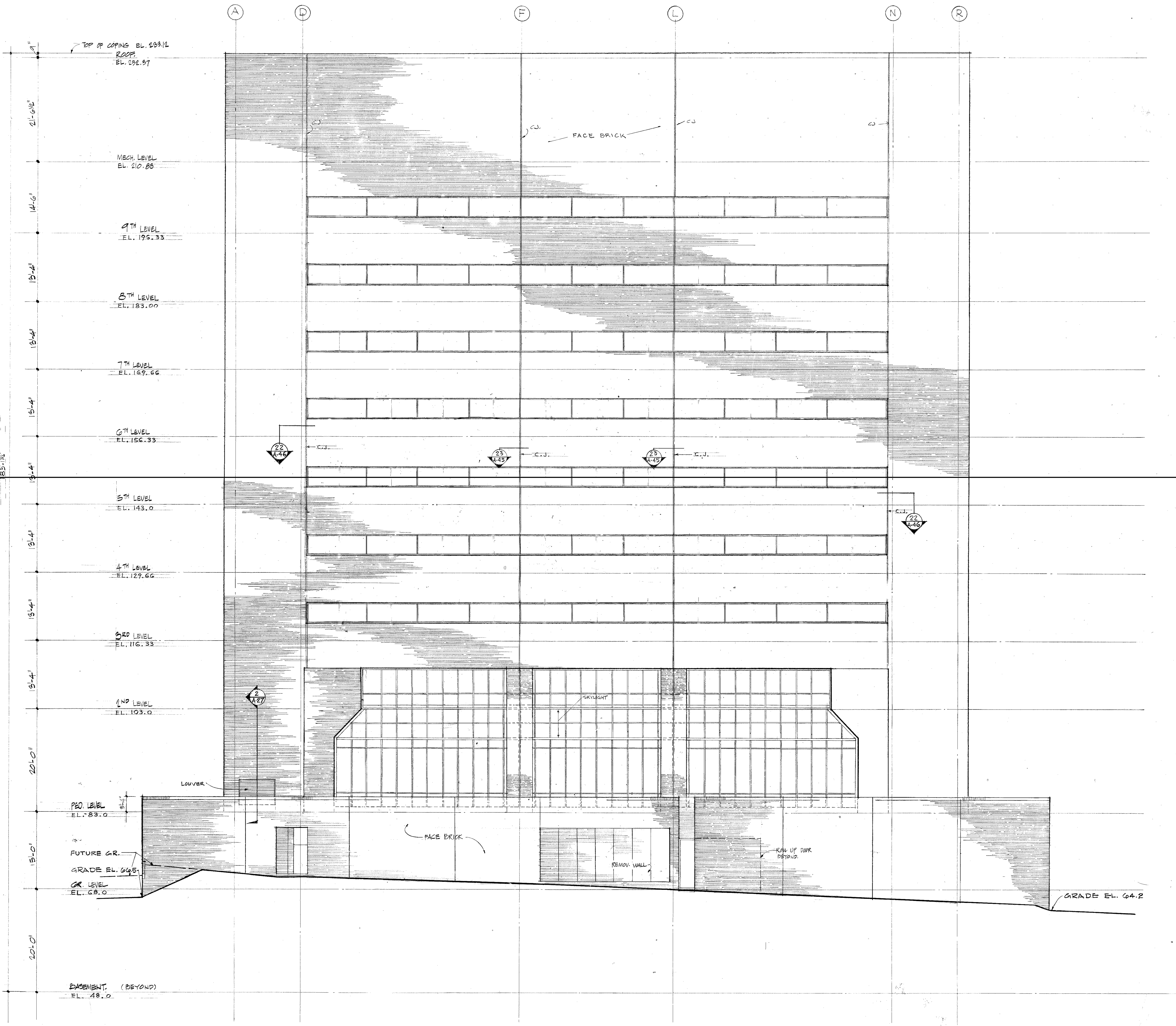
APPROVED

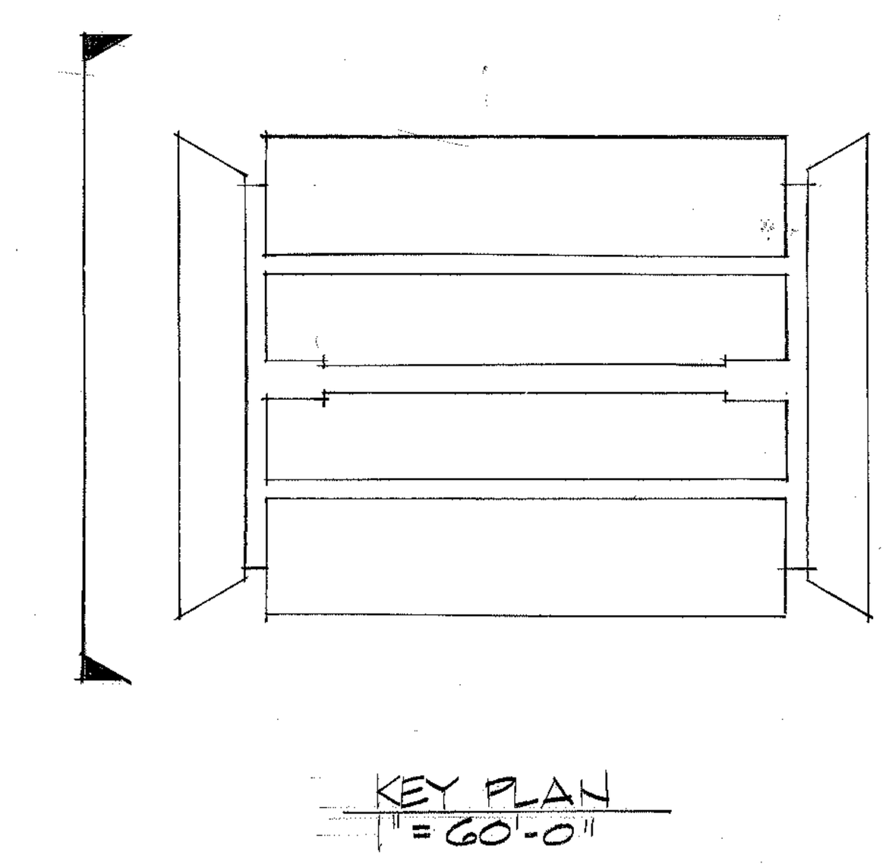
NO	REVISIONS	DATE

UNIVERSITY OF MARYLAND AT BALTIMORE
MEDICAL SCHOOL TEACHING FACILITY
BALTIMORE MARYLAND

A-21
OF: 48
DATE – JAN. 25, 1974
JOB NO. – UB-723

File 19-Dwg. No. 1522 839|UB-723|A-21





WEST ELEVATION

SCALE: 1/8" = 1'-0"

97-011.01 ROOF REPLACEMENT 7-31-96

GAUDREAU INC. ARCHITECTS
330 N. CHARLES STREET BALTIMORE, MARYLAND 21201
FAISANT ASSOC, INC. STRUCTURAL ENGR.
ALBERT B. GIPE & ASSOC, INC MECHANICAL ENGR.

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OFFICE OF DESIGN & CONSTRUCTION
APPROVED

NO	REVISIONS	DATE

UNIVERSITY OF MARYLAND AT BALTIMORE
MEDICAL SCHOOL TEACHING FACILITY
BALTIMORE MARYLAND

A-22
OF: 48

DATE – JAN. 25, 1974
JOB NO. – UB-723

File 19 - Dwg. No. 1523

INFRARED PREDICTIVE SURVEYS INCORPORATED

INFRARED ROOF INSPECTION

University of Maryland-Baltimore
Medical Teaching Facility (MSTF)

FOR:

University of Maryland-Baltimore
Mark Ewing
622 W. Fayette St. Rom 208
Baltimore, MD

DATE:

July 23, 2019

BY:

Infrared Predictive Surveys, Inc.
PO Box 224
Adamstown, MD 21710

Phone: 301-831-1978
Toll Free: 800-869-3720
Fax: 301-874-2295

INFRARED PREDICTIVE SURVEYS INCORPORATED

SYNOPSIS

An infrared survey of the roofs has been made at the UMB Medical Teaching Facility; located at 10 Pine Street. Visual observations have been made and the data has been documented.

INTRODUCTION

This report has been prepared for the exclusive use of the University of Maryland, for the specific application of the roofs at 10 Pine Street.

Authorization

Authorization to perform this evaluation, analysis and Infrared roof scan was in the form of an agreement between Mark Ewing at the University of Maryland Baltimore and Infrared Predictive Surveys, Inc. (IPSI)

Scope

The scope of the roof survey included infrared thermography and moisture meter verification. Data from this survey has been incorporated into this final report.

Purpose

The purpose of the roof survey was to gain an overview of the condition of the roof areas.

General

Observations described in this report are based upon roof at the time of the survey and these conditions may change as the roof ages.

Infrared Predictive Surveys, Inc. warrants that these findings are published after being prepared in accordance with generally accepted practices of the construction industry. No other warranties are implied or expressed.

INFRARED PREDICTIVE SURVEYS INCORPORATED

TEST INSTRUMENT DESCRIPTION

(Only testing that has been completed during your survey will be checked.)

☒ Infrared Testing

The infrared roof survey locates moisture in a roof by seeking areas of increased surface temperature. Roof areas that contain moisture have higher thermal conductivity and capacitance than dry areas. During the heating season, heat from the building interior is lost at a greater rate through wet roof areas and their surface temperatures are elevated. Alternatively, during the cooling season, solar heat is absorbed into the wet area, and then retained for hours after the sun sets.

When viewed through the infrared imager, wet areas appear as brighter, lighter tones of gray in black-and-white images. Alternatively, in color images, wet areas will appear as hotter colors. A color scale appears at the side of color images. As colors progress upward, temperatures increase. In general, the higher the concentration of water, the higher the surface temperatures.

Because higher surface temperatures, and consequently hotter colors, may be produced by several phenomena not related to moisture intrusion, tests are made to verify the findings of the infrared inspection using destructive testing (core cuts) and other non-destructive tests (capacitance & nuclear). Wet areas found by infrared testing are illustrated with thermograms (photographs of infrared images).

☐ Capacitance (Verification)

The Tramex capacitance meter is a mobile device that is used for detecting relative moisture content of roof areas. This non-destructive testing method is often combined with nuclear and thermal testing and/or moisture intrusion testing to accurately identify water entry pathways and areas of entrapped water. The Tramex moisture meter is designed for testing built up roofing and non-conductive single ply membrane. It provides instantaneous, clear indications of roof conditions and is able to detect as little as 2% excess moisture in roofing systems.

☒ **Core Sampling**

Core samples consist of cuts through the roof membrane. The sample provides an absolute test of moisture content and location. The core cut also permits the constituents of the roof system, and their condition, to be determined. Core sample may be weighed, dried and reweighed to provide a quantitative measure of moisture content.

Cut into roof with two inch (2") circumference roof sampling tool. Repair core cuts with appropriate material.

☐ **Nuclear Backscatter**

A radioactive isotope consisting of Americium-241 with a beryllium target is utilized. The measurement method relies on the thermalization (slowing) of fast neutrons by the hydrogen atoms in water. Since other hydrogen bearing materials also thermalize neutrons, a measurement survey is necessary to establish a relative base level before an analysis can be performed.

The meter used, Troxler 3216, is a portable instrument with a periodic counter to measure the rate of thermalization of neutrons.

FIELD SURVEY METHODS

Visual Observations

Visual observations were made by Infrared Predictive Surveys, Inc. (IPSI) personnel. These observations included roofing structure, roof drainage, roof surface conditions and other accessory items.

Photographic Documentation

Photographs were made by IPSI personnel. While these photographs were not intended to provide a complete record of the roof, they do provide a visual description of typical roof conditions or selected problem areas.

PROJECT IDENTIFICATION

Project Location

10 Pine Street

Roof Construction Materials

See core details below.

INFRARED ROOF SCAN

Date of Scan: July 15, 2019

These scans were performed in conjunction with the visual roof survey conducted the same day. The purpose of these scans was to locate areas of suspected subsurface moisture and determine the extent of the moisture migration.

Environmental Conditions

July 15, 2019-Maximum daytime temperature was 55˚F with no wind.

INFRARED CAMERA(S) USED

☐ Inframetrics-FLIR ThermaCAM SC1000. Temperature sensitivity is <0.1 degree C and a focal array of 256 x 256.

☒ NEC/Avio R500

FINDINGS AND RESULTS

Notes:

Alphabetical roof delineations were made by IPSI personnel for reporting purposes only.

MFTS (Roof D)

- MFTS: Two (2) suspected wet areas were found.
  - One (1) core cut (#CC3) was taken on this roof section at wet area #D1.
    - ¾" Mod Bit
    - ¼" Wood Fiber (Compressed) (Top: 99.9%: Bottom: 99.9%)
    - ¼" Wood Fiber (Compressed) (Top: 95.9%: Bottom: 99.9%)
    - ¼" Asphalt
    - 4+" Perlite (Top: 99.9%: Bottom: 99.9%)

If additional information is required, please do not hesitate to contact me. Thank you again for giving us the opportunity to provide our services.

Sincerely,

Joseph Fitzpatrick
Infrared Predictive Surveys, Inc.
PO Box 224
Adamstown, MD 21710

Phone: 301-831-1978
Toll-Free: 800-869-3720
Fax: 301-874-2295
E-mail: joe@infraredpsi.com
Website: www.InfraredPSI.com

INFRARED PREDICTIVE SURVEYS INCORPORATED

APPENDIX

- Maintenance Program
- Survey Photographs
- Infrared Photographs
- CAD Drawing

INFRARED PREDICTIVE SURVEYS INCORPORATED

MAINTENANCE PROGRAM

The following is a recommended minimum for roof maintenance:

1. Inspect the roofs twice a year, once in the spring and once in the fall. An inspection of the building should also be made to check for structural problems that may affect the performance of the roof.

2. These inspections should include, but not be limited to base flashings, pipe penetrations, gravel stops, drains, equipment supports, the field membrane, rising walls, visible deck, and any leaks.

3. Clean debris and trash from drains and associated piping.

4. Any problems noted during these inspections should be located and recorded on a roof plan. Then roof membrane defects should be reported to the roof membrane manufacturer and temporarily sealed until permanent corrective action is taken.

5. After the inspection has been completed, specifications should be prepared for any needed repair that is not covered by the roof membrane warranty.

6. After the specifications have been prepared, any specified work should be executed within a short period of time and when weather conditions are conducive to proper application by a qualified contractor.

7. *New Roofs Only*: In addition to the items described above, a roof moisture survey should be performed on these roofs before final payment is made on the new roof, six months prior to the expiration of the contractor's and the manufacturer's warranty, and at least once every two years. This survey will detect subsurface problems that would go unnoticed during a visual inspection.

8. Accurate records should be kept of the inspections and repairs.

9. The roof inspections should be conducted by professionals experienced in locating and recognizing any problems or potential problems that may exist and that need to be addressed.

10 Pine St. (MSTF) Building to right-looking South

10 Pine St.-Center West side, looking North

10 Pine St.-Roof D Center, looking South

10 Pine St.-Roof D Southwest corner, looking East

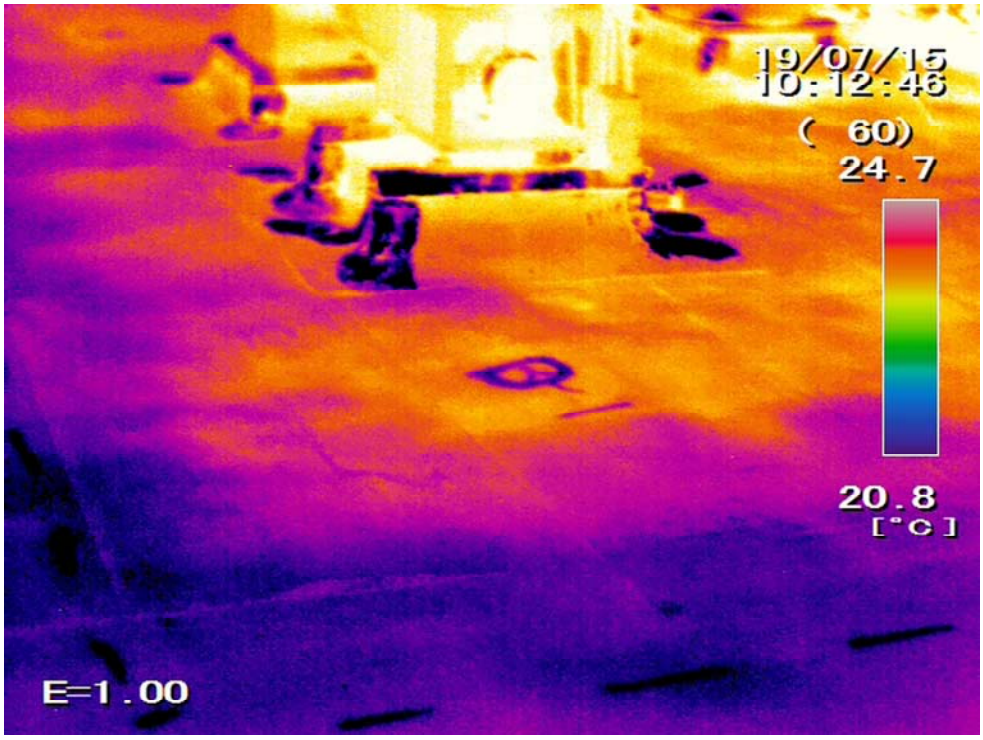
10 Pine-Roof D, wet area D-1 North end, looking East.
(Mislabeled as B1 in photo)

Wet area D-1, Northend

Roof D-Wet area D-1, South end, looking East. (Mislabeled as B1 in photo)

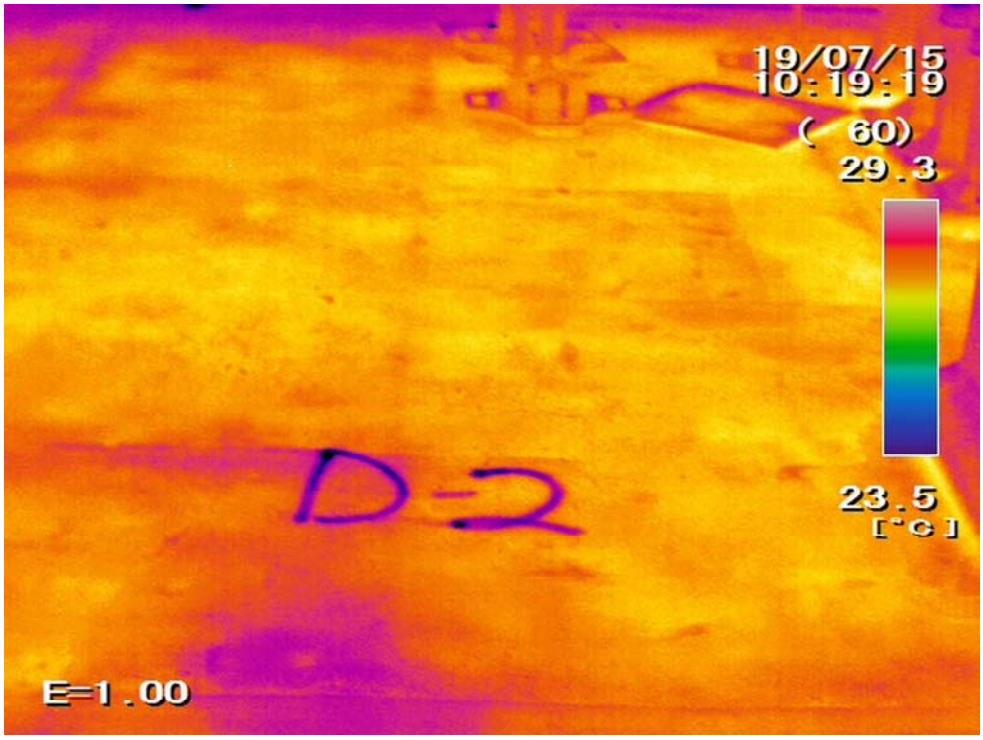
Roof D-Core cut #CC3 (Wet)

Roof D-Core cut #CC3 repaired, looking North



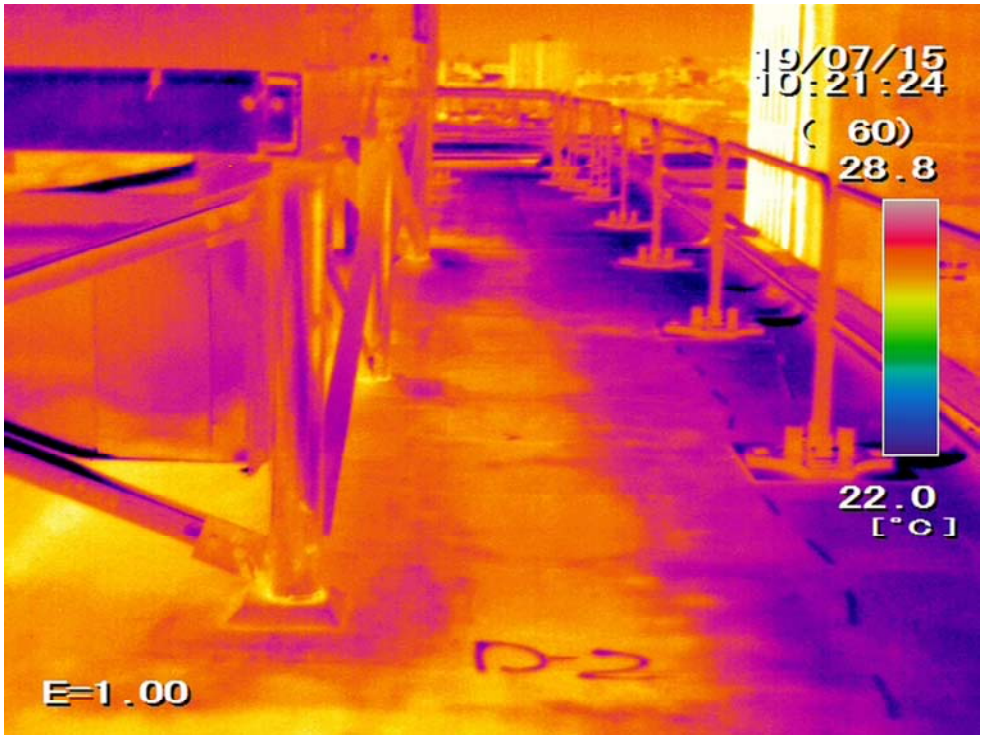
Wet area D-1, South end

Roof D-Northeast corner, suspected wet area D-2, looking West



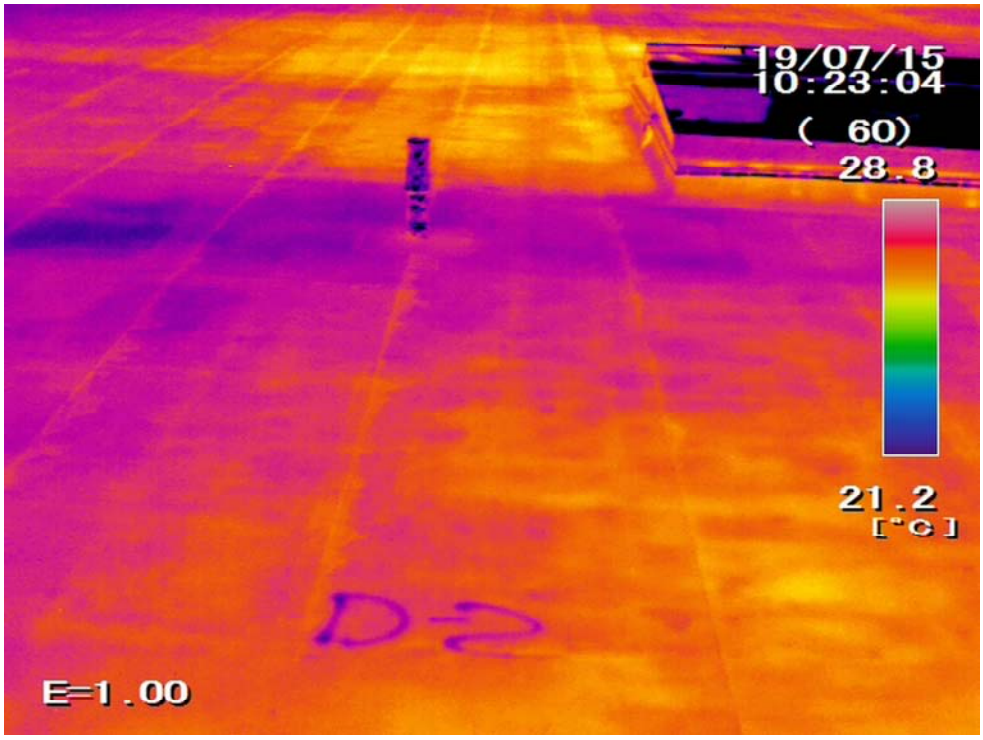
Northeast corner of suspected wet area D-2

Roof D-East side of suspected wet area D-2, looking North



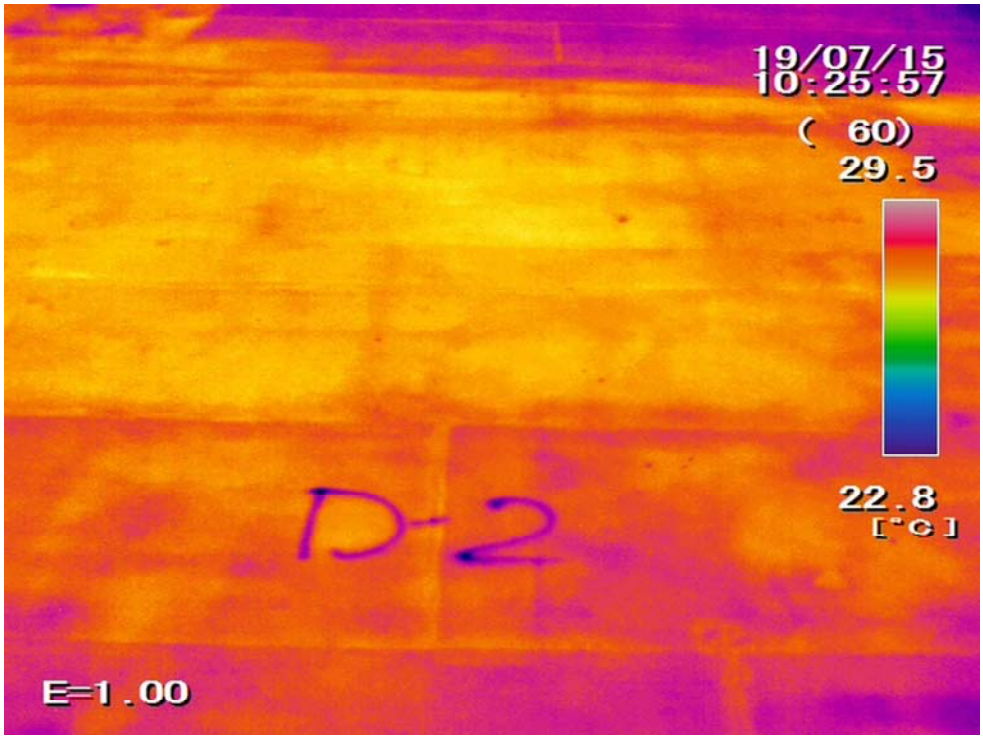
Suspected wet area D-2, East side

Roof D-Suspected wet area D-2, Southeast corner, looking West



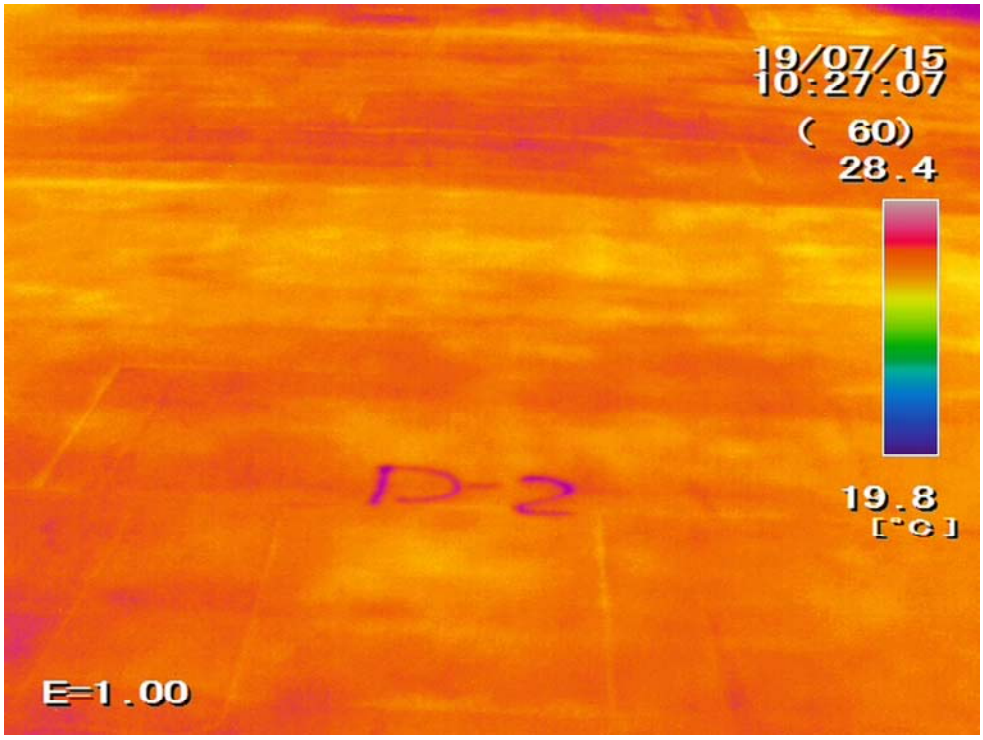
Suspected wet area D-2, Southeast corner

Roof D-Suspected wet area D-2, East side center, looking North



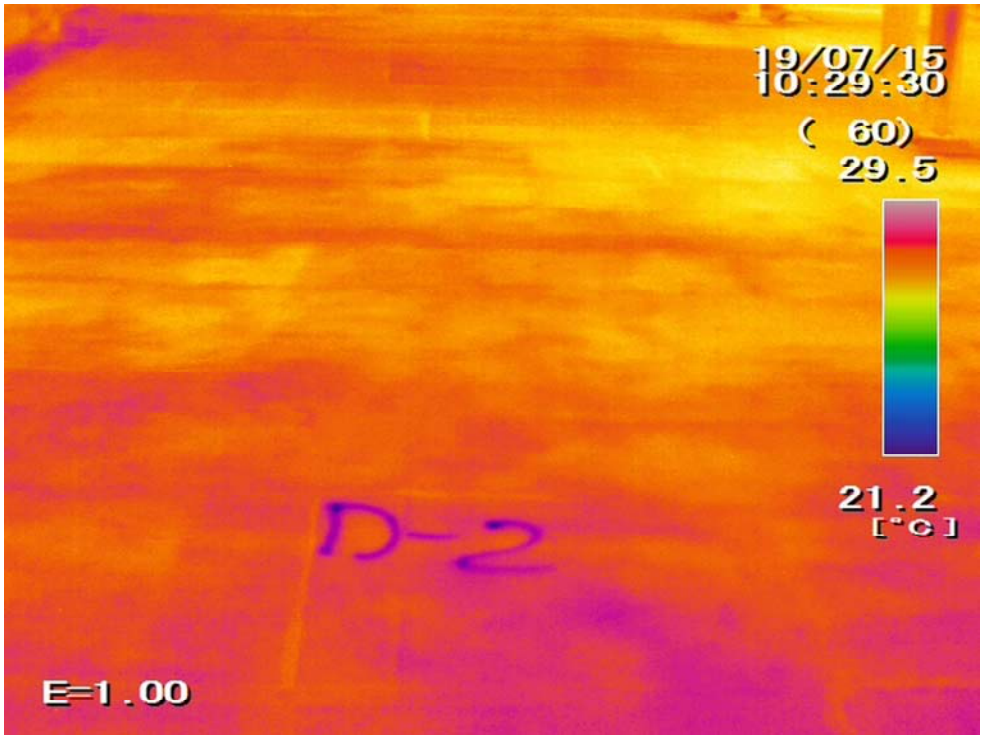
Suspected wet area D-2, East side center

Roof D-Suspected wet area D-2, center, looking North



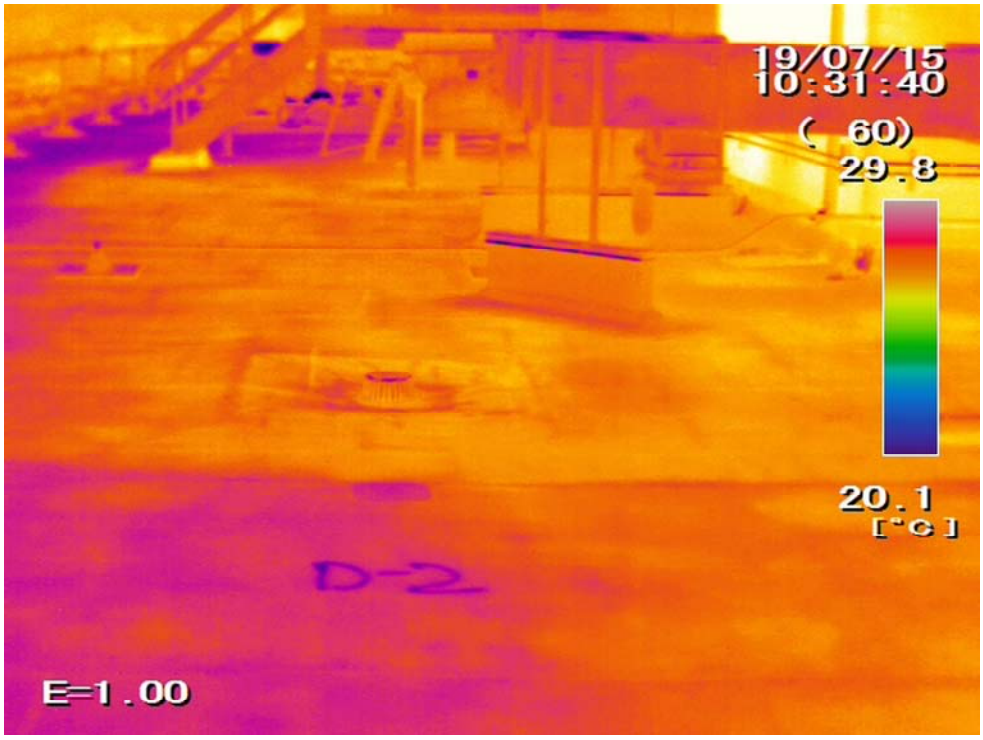
Suspected wet area D-2, Center

Roof D-Suspected wet area D-2, West side center, looking North



Suspected wet area D-2, West side center

Roof D-Suspected wet area D-2, Southwest corner, looking North



Suspected wet area D-2, Southwest corner

TOTAL SUSPECTED WET SQ FT =13029					
AREA	SIZE			SQ FT	NOTES
D1	22	x	32	704	CC3
D2	193	x	113	12325	*SEE DRAWING

MSTF ROOF SCAN OVERVIEW

SCAN NOTES:

- GRAY ROOF INDICATES AREA NOT SCANNED
- SUSPECTED MOISTURE AREAS SHADED RED
- SUSPECTED MOISTURE READINGS SHOWN ON GRID
- NUCLEAR READINGS TAKEN ON A -' x -' GRID
- CC# = CORE CUT NUMBER, P# = PROBE NUMBER
- DATE OF SCAN : 07.15.2019

UNIVERSITY OF MARYLAND
BALTIMORE

UNIVERSITY OF MARYLAND
BALTIMORE (MSTF)
10 NORTH PINE STREET
BALTIMORE, MD 21201

TITLE: BUILDING ROOF - MOISTURE SCAN

INFRARED PREDICTIVE SURVEYS INCORPORATED	DRAWN BY:	DATE DRAWN:	REV:	SHEET NO.
	AJR	07/23/19	0	715C