BOATMAN & MAGNANI INC.

MARBLE | STONE | TERRAZZO

600 Ritchie Road | Capitol Heights, MD

BOATMAN & MAGNANI INC.

UNION CRAFTSMANSHIP

- Company Founded in 1960
- Boatman & Magnani continues to make its mark using Time Honored Principals and Exceptional Craftsmanship
- Proof that no project is too large or too small, we have completed over 9,000 projects
- Full Service Marble & Granite Fabrication Shop, Polishing Facility and Terrazzo Sample Shop
- In House Drafting Department
- Project Management and Skilled Craftsman have completed many notable projects
  - Ronald Reagan Building
  - Capital Visitor Center
  - New Doha Airport
- New Doha Airport - Largest Single Project Contract to date: $39,000,000

FINANCIAL STRENGTH

- Bonding Capacity
- Project / Project Capability
- Purchasing Power
    - Domestic & International
- Debt Free Company

CRAFTSMANSHIP AWARDS

- Over 9,000 Projects Completed
- Multiple NTMA Awards
- IMI Golden Trowel Awards
- Over 70 Washington Building Congress Awards, Including Star Awards for the Following:
  - DC Ritz Carlton
  - US Capitol Visitor Center
  - Tysons II

NTMA SPECIAL ART AWARD

- The Denver History of Colorado Museum

NTMA PROJECT OF THE CENTURY AWARD

- Ronald Reagan Building at Federal Triangle

ACTIVE BIDDING AREA

RAINSCREEN, STONE & TERRAZZO

ACTIVE BIDDING AREA
SPECIAL TERRAZZO PROJECTS - COMPLEX DESIGN AND/OR LARGE FOOTPRINT

Boatman & Magnani Inc.

RAINSCREEN CLADDING

CLADDING MATERIALS

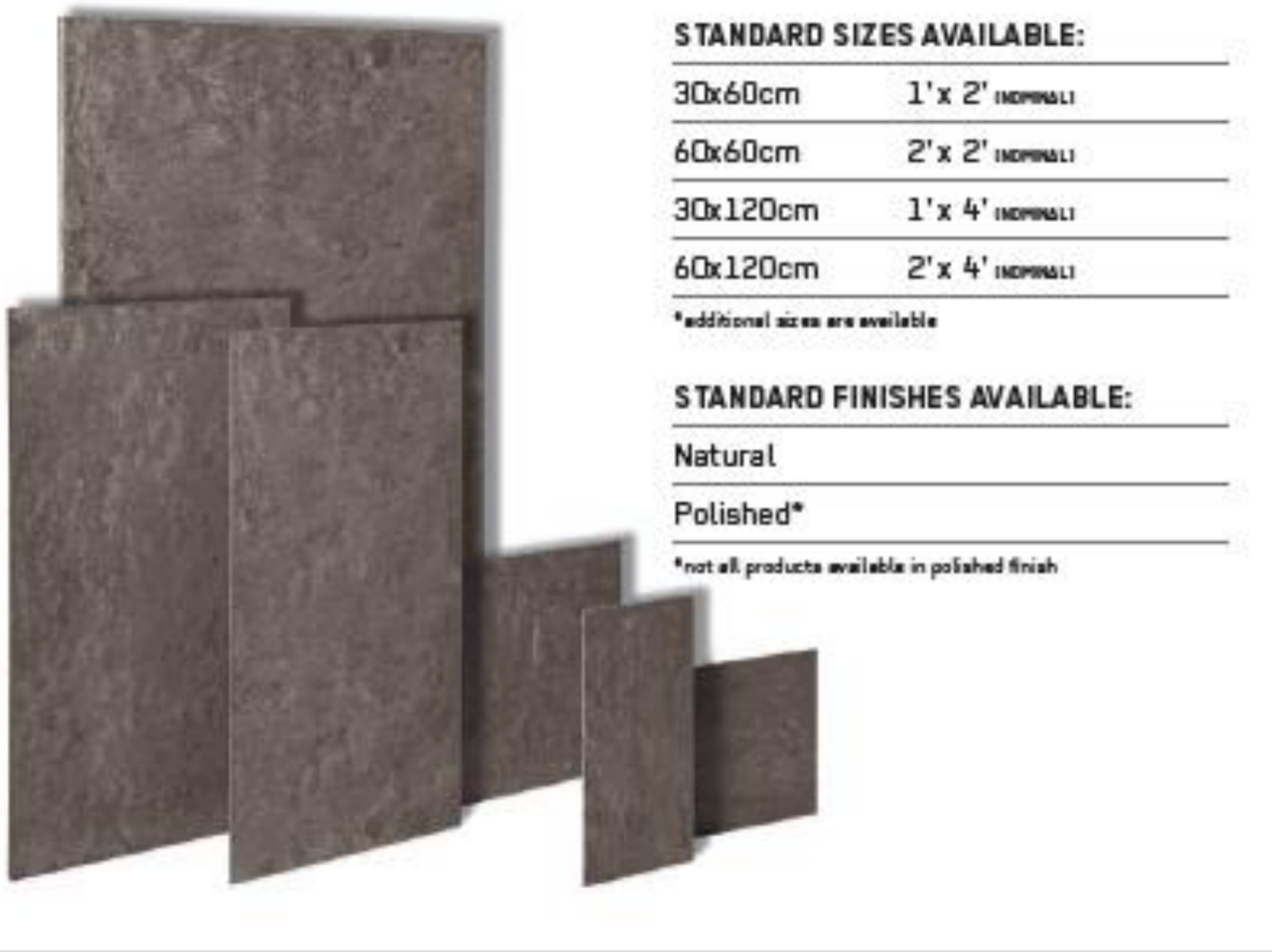
Porcelain / Ceramic

Large Format Porcelain Sizes

Field Fabricated Cuts

- Standard Sizes
  - 30x60 cm
  - 60x60 cm
  - 30x120 cm
  - 60x120 cm

- Standard Finishes
  - Natural
  - Polished




LIFE SCIENCES HALL

Fiber Cement / Fiber Concrete

HOWARD HUGHES MEDICAL INSTITUTE | ASHBURN, VA | WBG

HOWARD HUGHES MEDICAL INSTITUTE | ASHBURN, VA | WBG

TOWSON UNIVERSITY - HARFORD CAMPUS
HARFORD, MD | GWWO

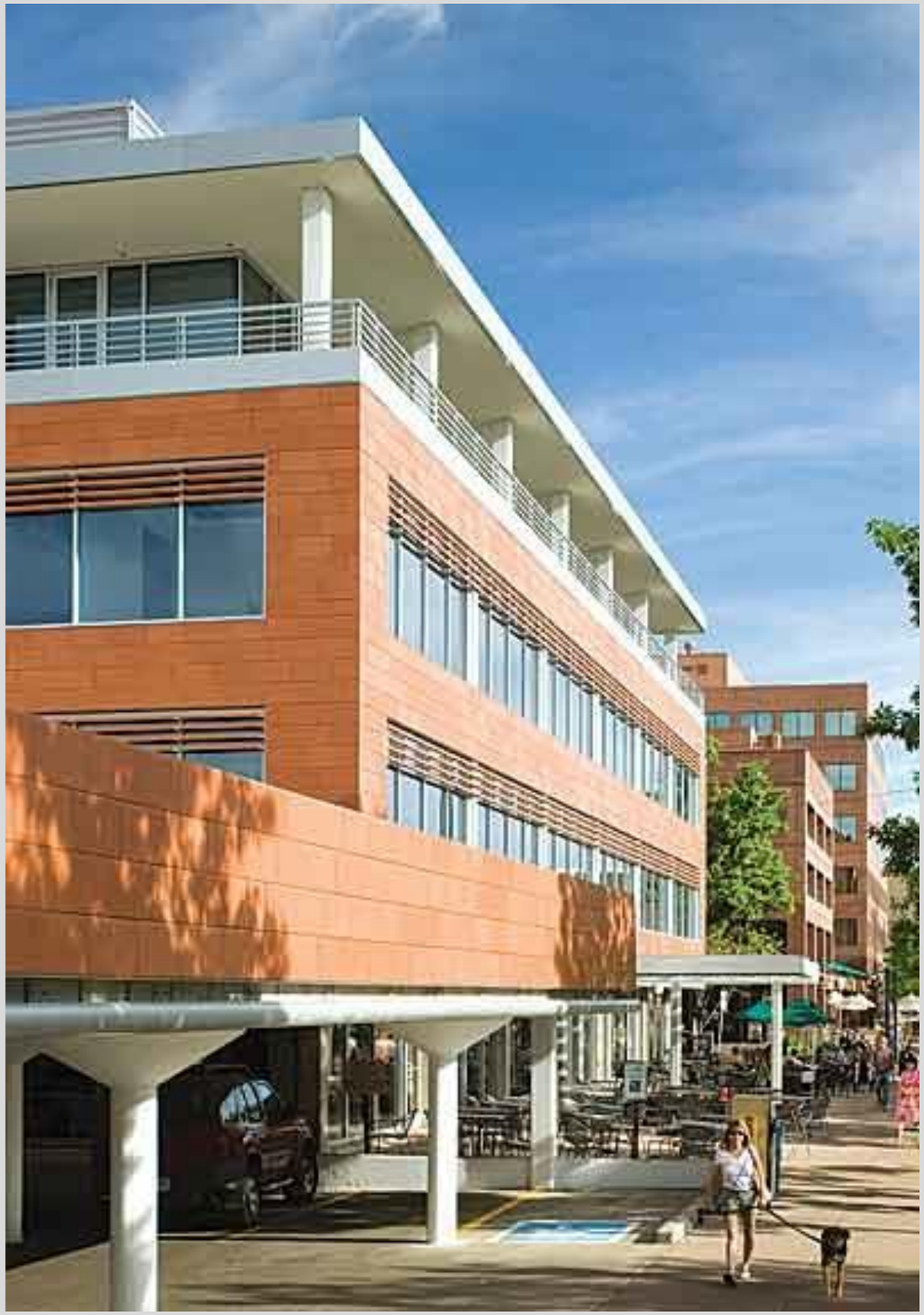
TOWSON UNIVERSITY - HARFORD CAMPUS
HARFORD, MD | GWWO

Bradlee Rd Safeway | Alexandria, VA | Architect: Cunningham Quill/ Freeman Morgan

Bradlee Rd Safeway | Alexandria, VA | Architect: Cunningham Quill/ Freeman Morgan

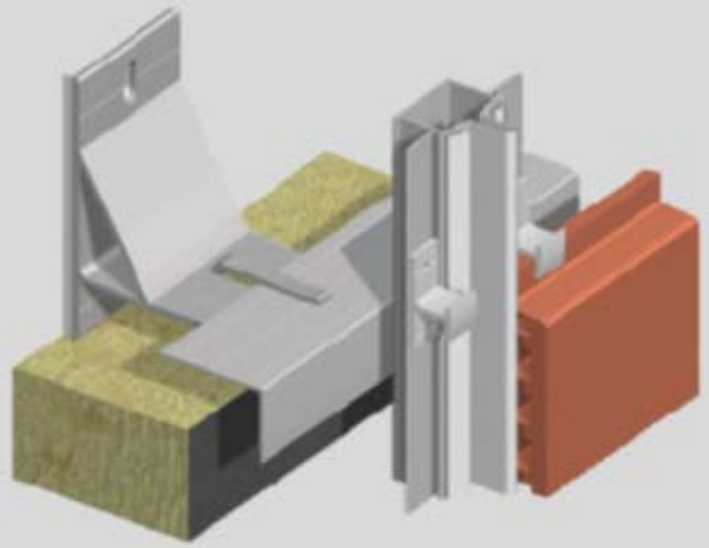
Smithsonian National African American Museum Entrance Canopy – Concealed Fastening System

TERRACOTTA



Traditional, Double-Skinned 30 MM Terracotta Tile Format

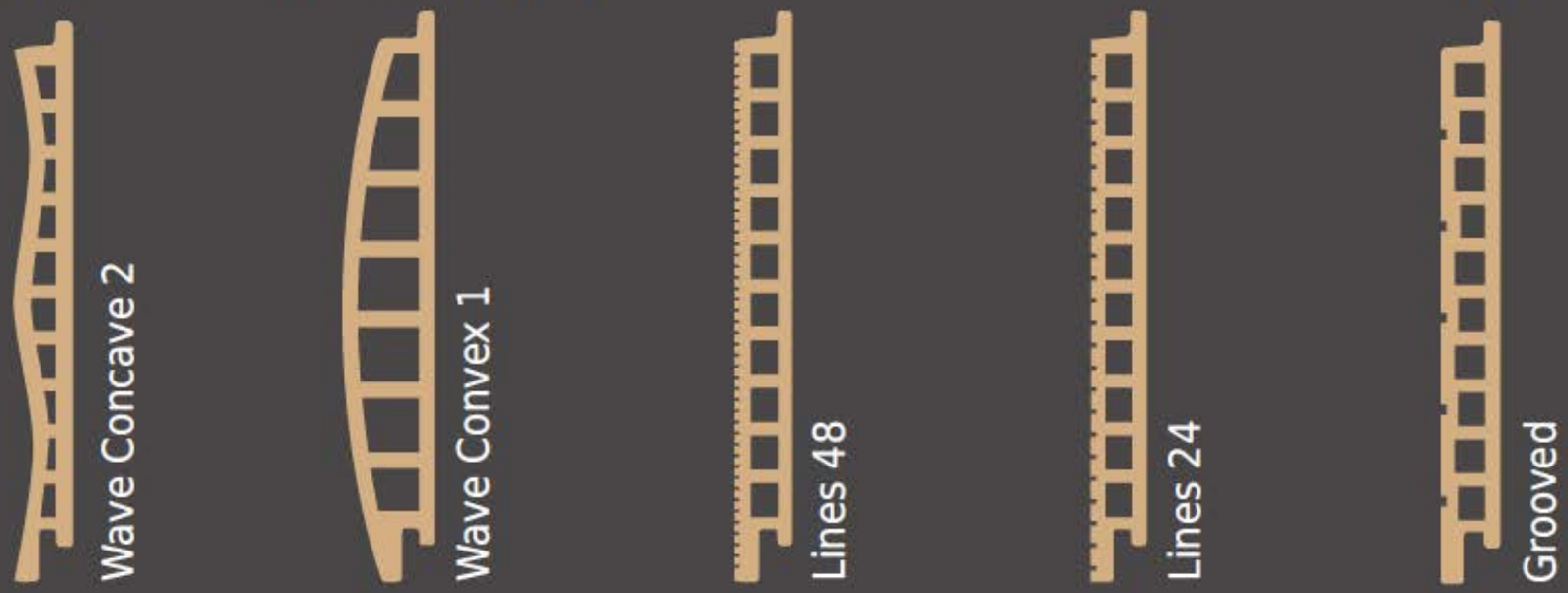
- Variety of Modular Heights and Lengths up to 60”
- Fluted Inner Cavity for Impact Resistant Design
- Pollution Resistant
- Anti-Graffiti Treatments
- Attachment Clips Concealed in Tile Shiplap



The shapes below are standard in the 300mm height tiles. For project sizes over 10,000 sq. ft., these shapes and others are available in a variety of heights. Please contact your Cladding Corp representative to assist in your project’s design.

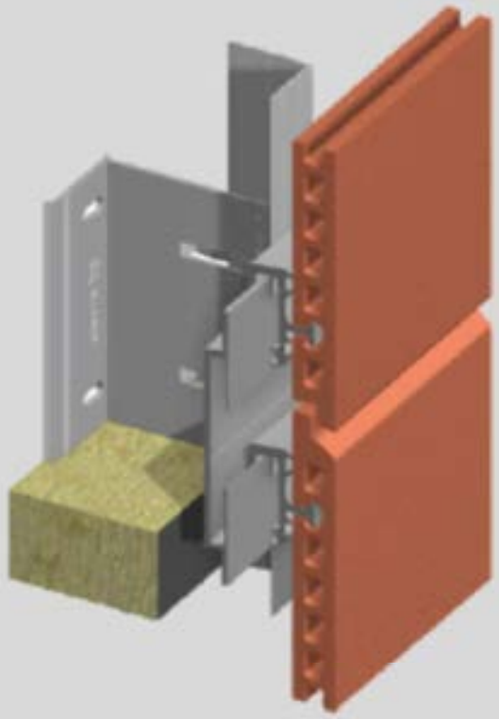
DESIGN SHAPES

TC30



Thinner, Fluted 18 MM Tile Format

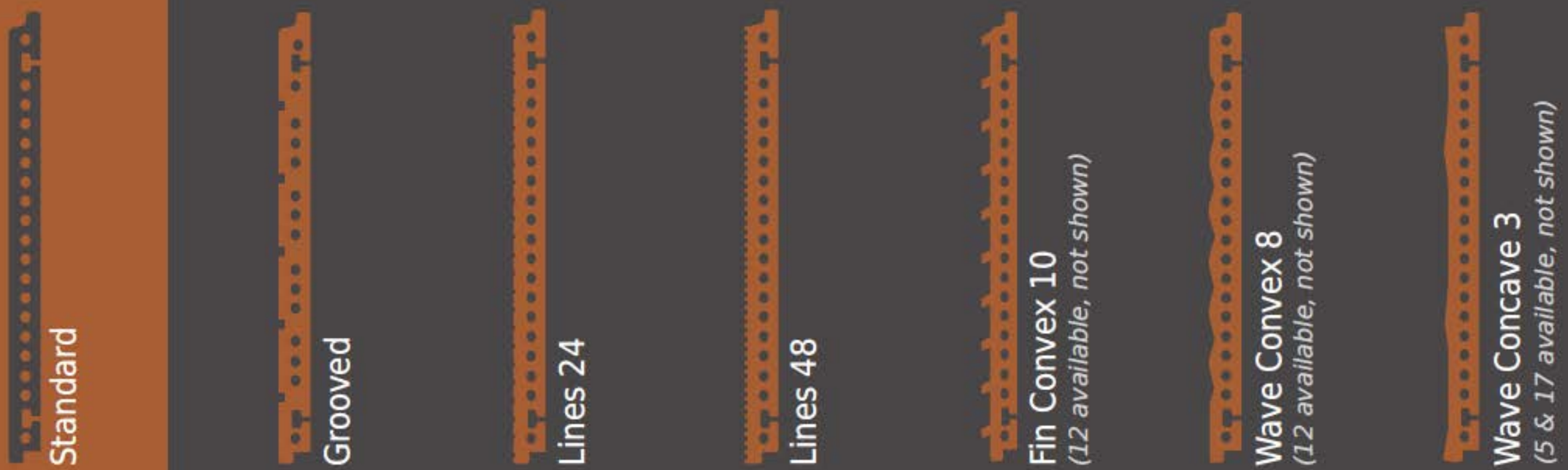
- Variety of Modular Heights and Lengths up to 48”
- Lightweight, economical, easy to maneuver and install
- Use if depth of system is an issue
- Ideal for retro-fit and new build
- Installs on versatile horizontal rail system



TC18

DESIGN SHAPES

The shapes below are standard in the 300mm height tiles. For project sizes over 10,000 sq. ft., these shapes and others are available in a variety of heights. Please contact your Cladding Corp representative to assist in your project’s design.



Wood/Wood Based Composites

Educare, Washington DC | RDG

Educare | Washington, DC | RDG

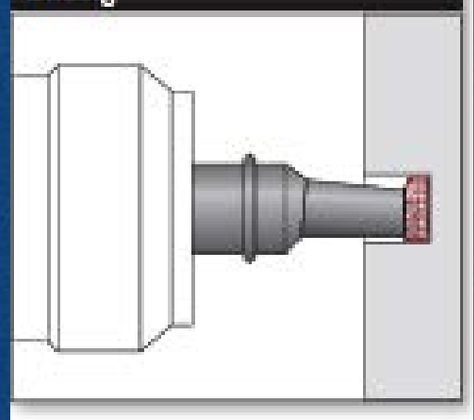
Educare | Washington, DC | RDG

STONE RAINSCREEN

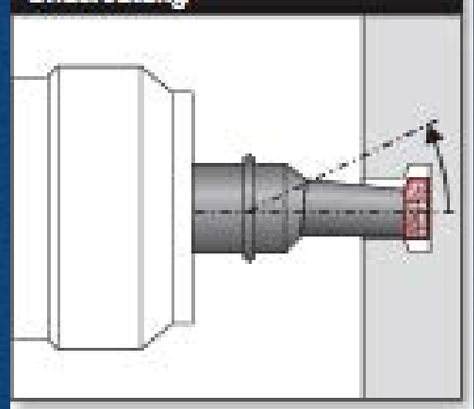
SUNY MARITINE COLLEGE | BRONX, NY | EYP

DOLOMITE LIMESTONE & GRANITE
UHPC & Porcelain Concealed Fastening
KEIL ANCHORING SYSTEM

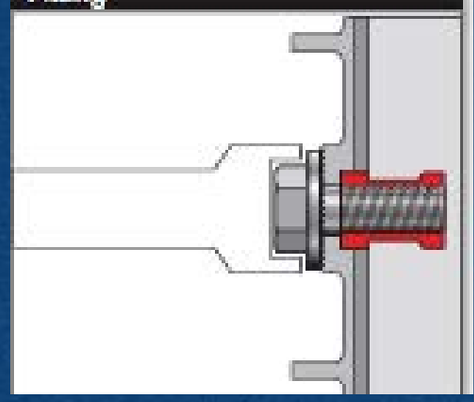
Drilling

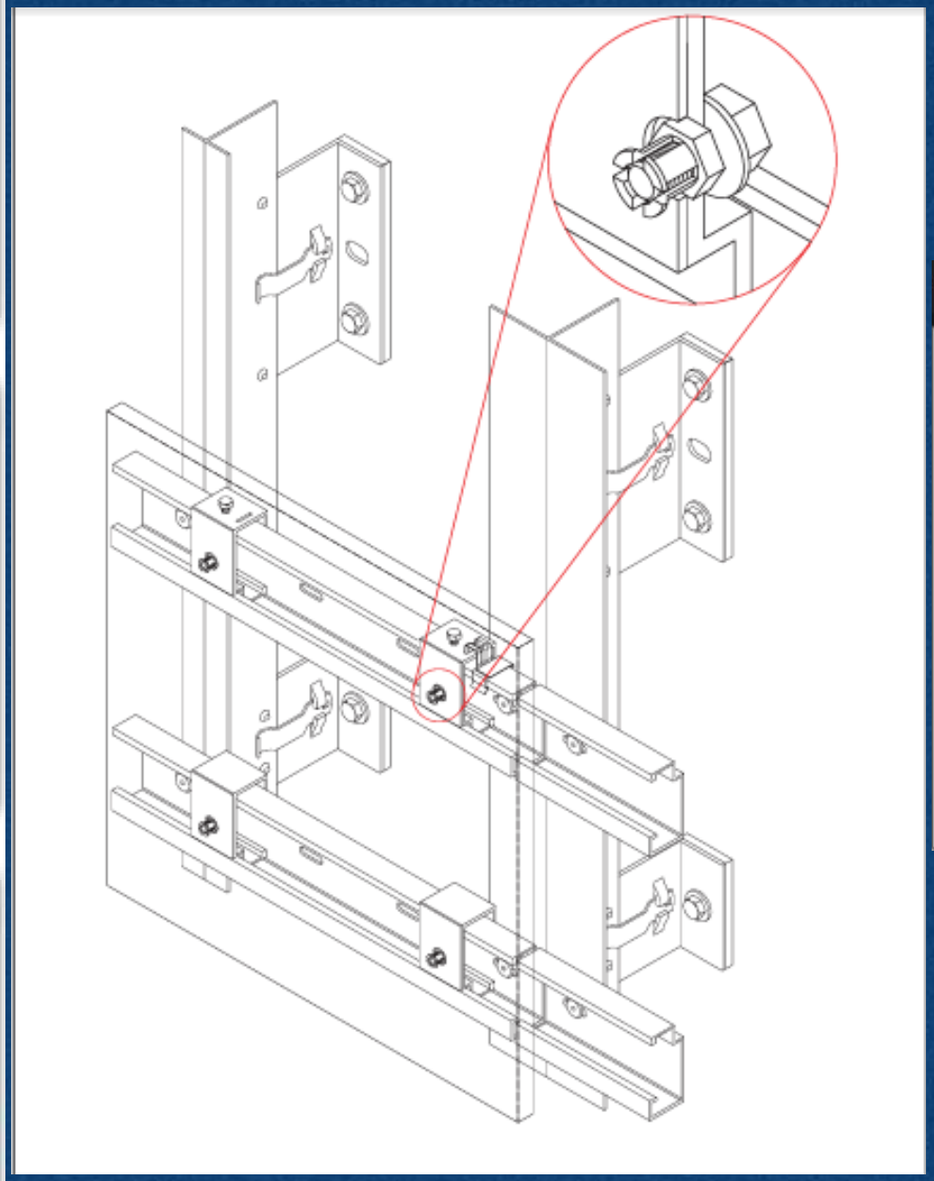


Undercutting

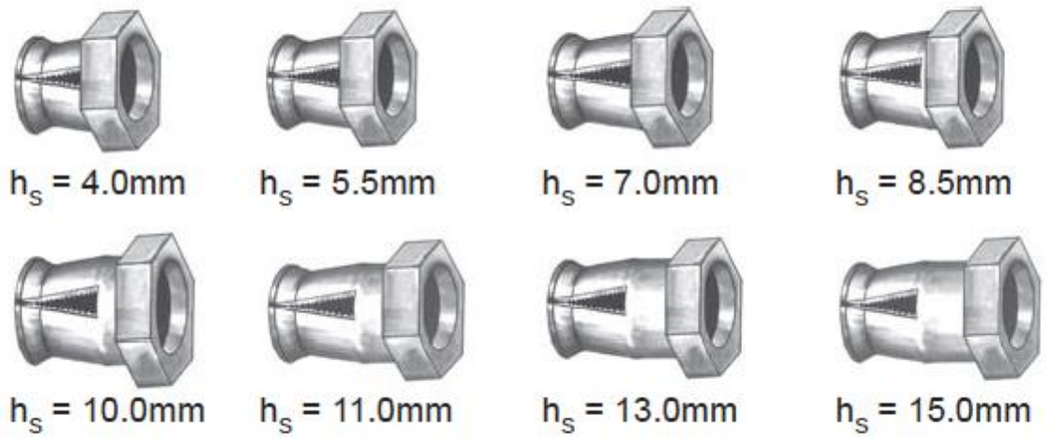


Fitting





Types



Engineered Sub Framing

Design for Material, Structural and Seismic Performance

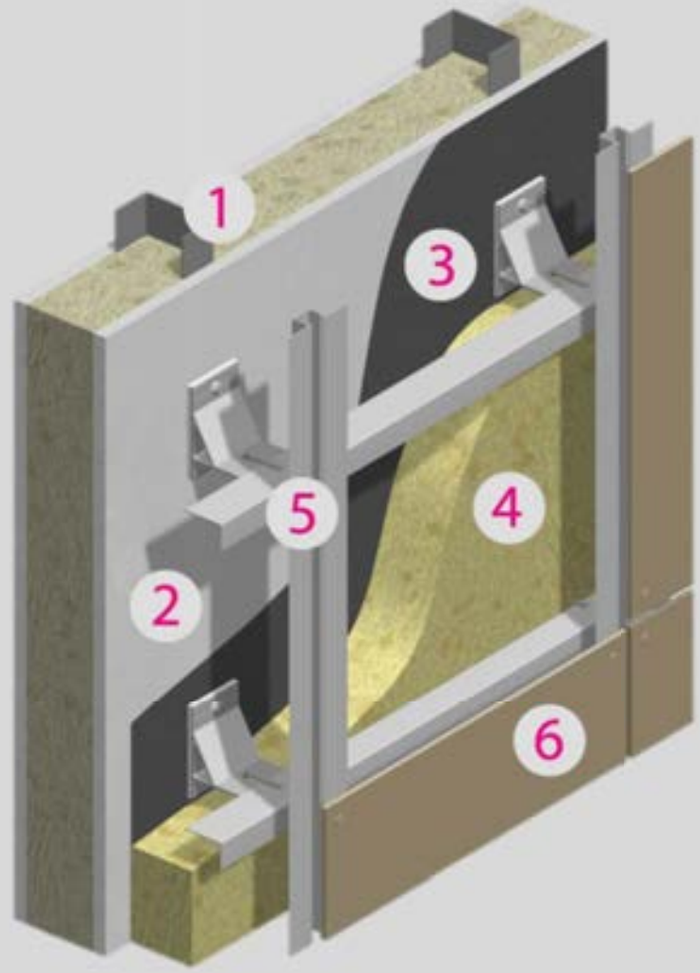
Intelligent Design of Sub Framing

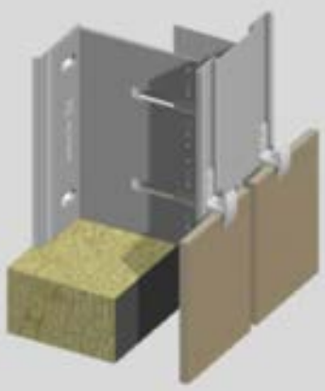
- Fixed and Sliding (slotted) point connections designed to accommodate movement
  - Profiles slotted for thermal movements
  - Brackets designed for thermal movements and windload
    - Fixed point connections for deadload
    - Sliding point connections for windload

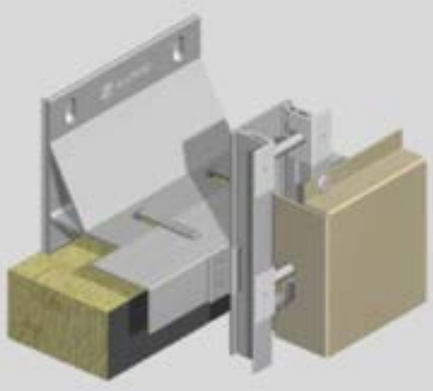
- Profile lengths limited to minimize effects of thermal movements

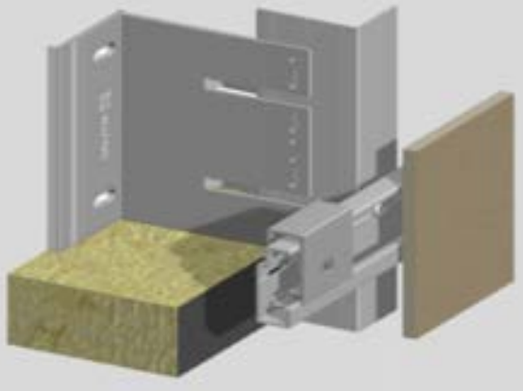
Typical Backup Wall

1. Stud backup wall
2. Sheathing
3. Membrane
4. Insulation (optional)
5. Sub-framing system
6. Cladding material









Boatman & Magnani Inc.

Italian Marble

Quarry

Quarry

Blocks

Dry-Lay

Packaging

Finished Lobby

Boatman & Magnani Inc.

STONE

American University | Washington, DC

American University | Washington, DC

CAPITOL VISITORS CENTER

STONE & TERRAZZO

Capitol Visitors Center | Washington, DC

Capitol Visitors Center | Washington, DC

Capitol Visitors Center | Washington, DC

Capitol Visitors Center |
Washington, DC

Capitol Visitors Center | Washington, DC

Capitol Visitors Center | Washington, DC

Woodrow Wilson Building | Washington, DC

Woodrow Wilson Building | Washington, DC

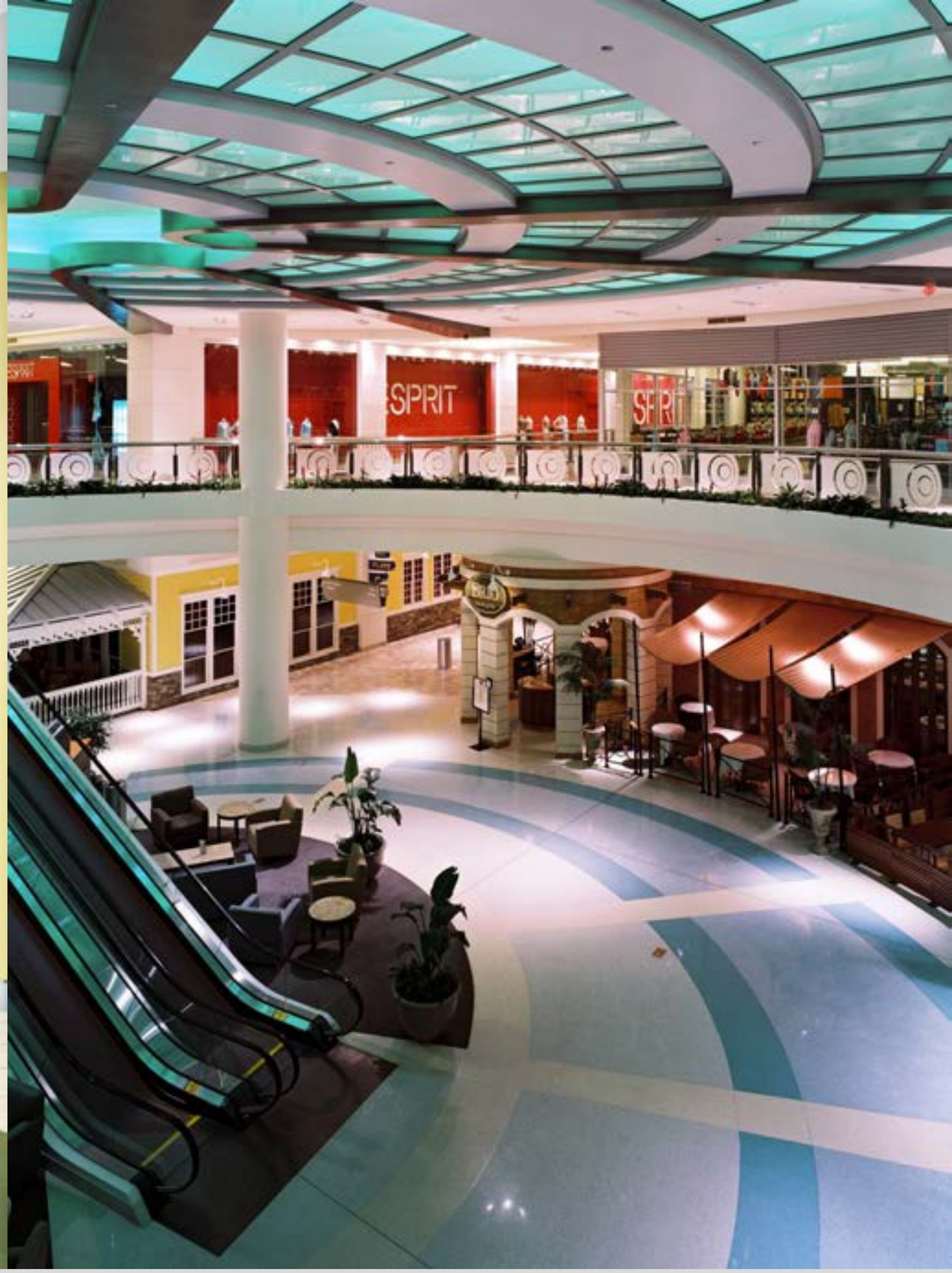
COVINGTON | CITY CENTER | WASHINGTON, DC

COVINGTON | CITY CENTER | WASHINGTON, DC

COVINGTON | CITY CENTER | WASHINGTON, DC

COVINGTON | CITY CENTER | WASHINGTON, DC

COVINGTON | CITY CENTER | WASHINGTON, DC



TYSON CORNER MALL EXPANSION | MCLEAN, VA

TYSON CORNER MALL EXPANSION | MCLEAN, VA

TYSON CORNER MALL EXPANSION | MCLEAN, VA

TYSON CORNER MALL
EXPANSION | MCLEAN, VA

Safeway | Alexandria, VA

Safeway | Alexandria, VA

ASUF | Washington, DC

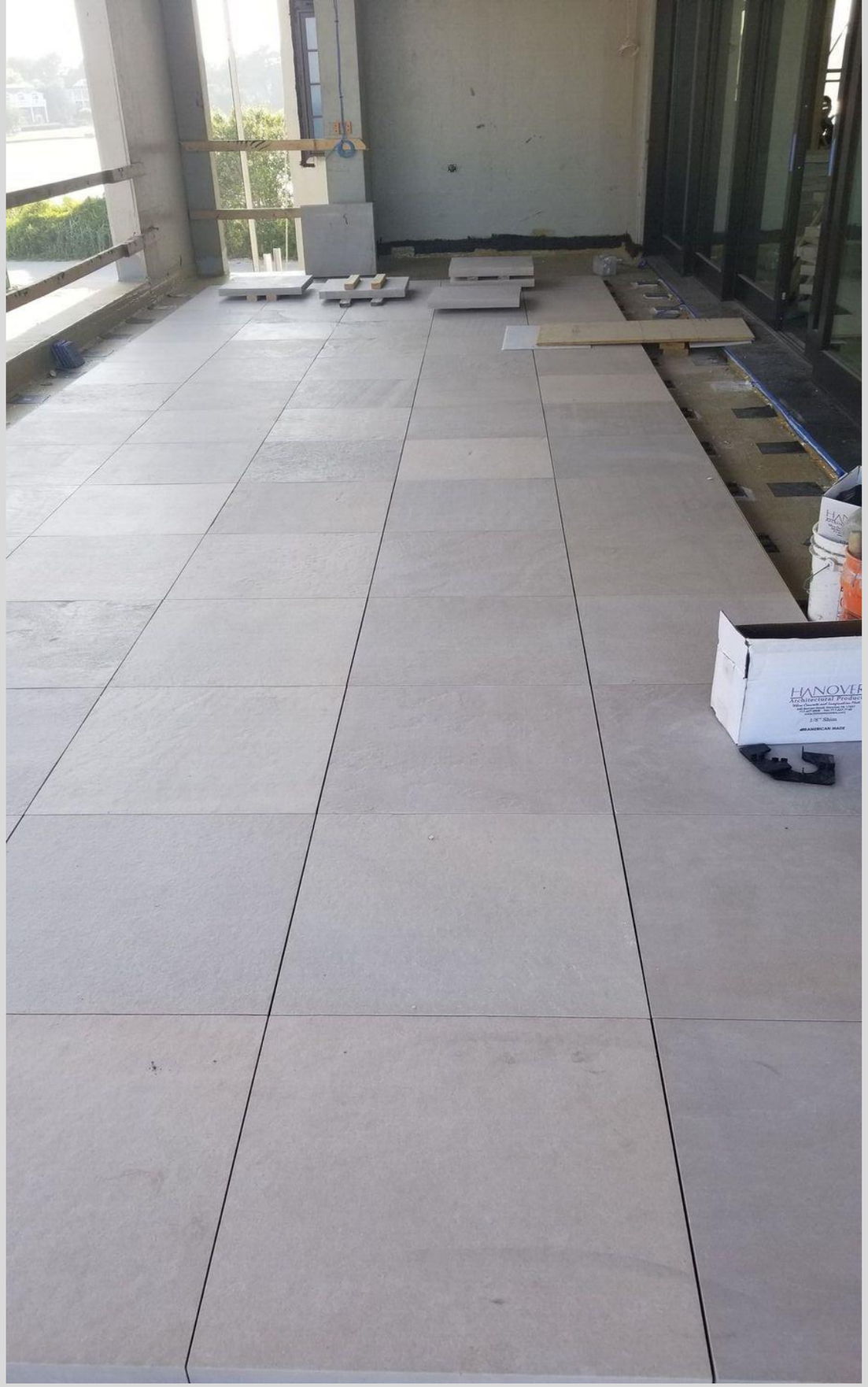
ASUF | Washington, DC

MGM National Harbor | Oxon Hill, MD

Boatman & Magnani Inc.

RESIDENTIAL

Private Residence | Pedestal Paving



Private Residence | Pedestal Paving

Private Residence

Private Residence

Private Residence

Private Residence

Private Residence

Private Residence

Winton House | Remove & Re-Install

Winton House | Remove & Re-Install

Winton House | Remove & Re-Install

Winton House | Remove & Re-Install

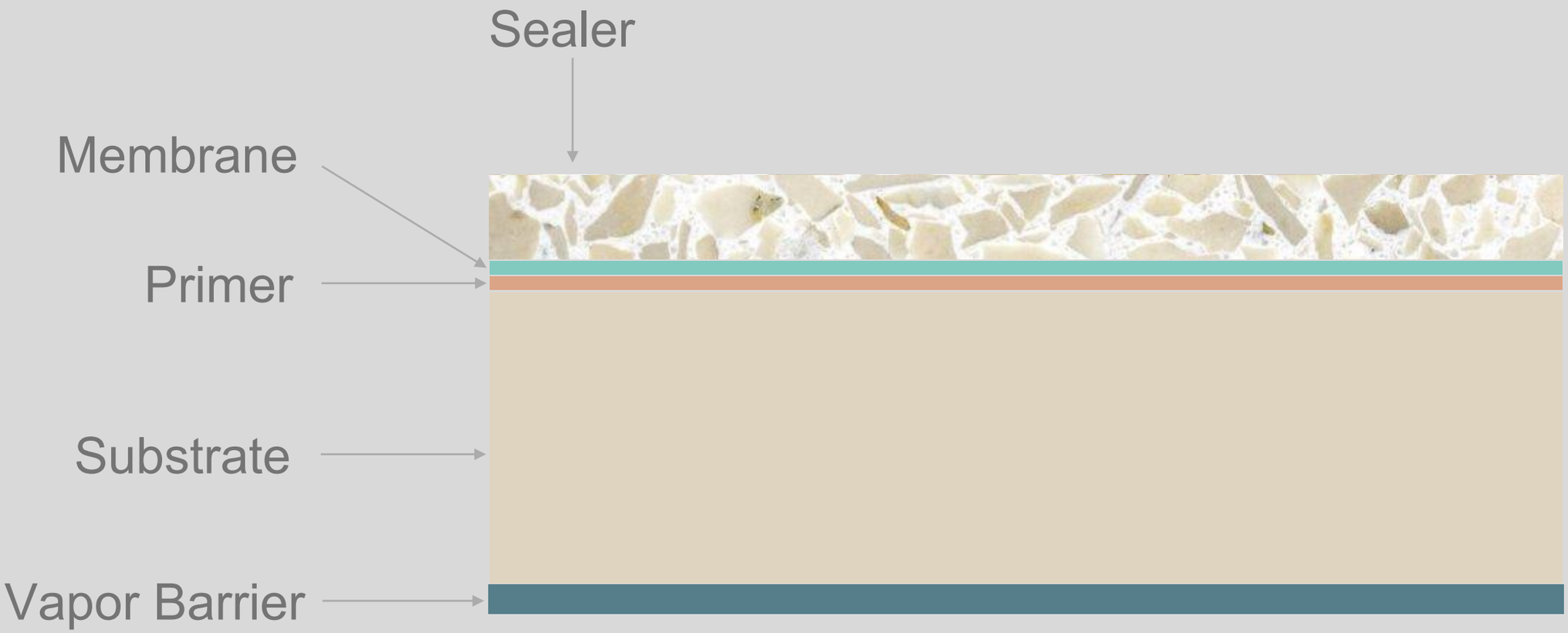
Boatman & Magnani Inc.

TERRAZZO

TERRAZZO TODAY

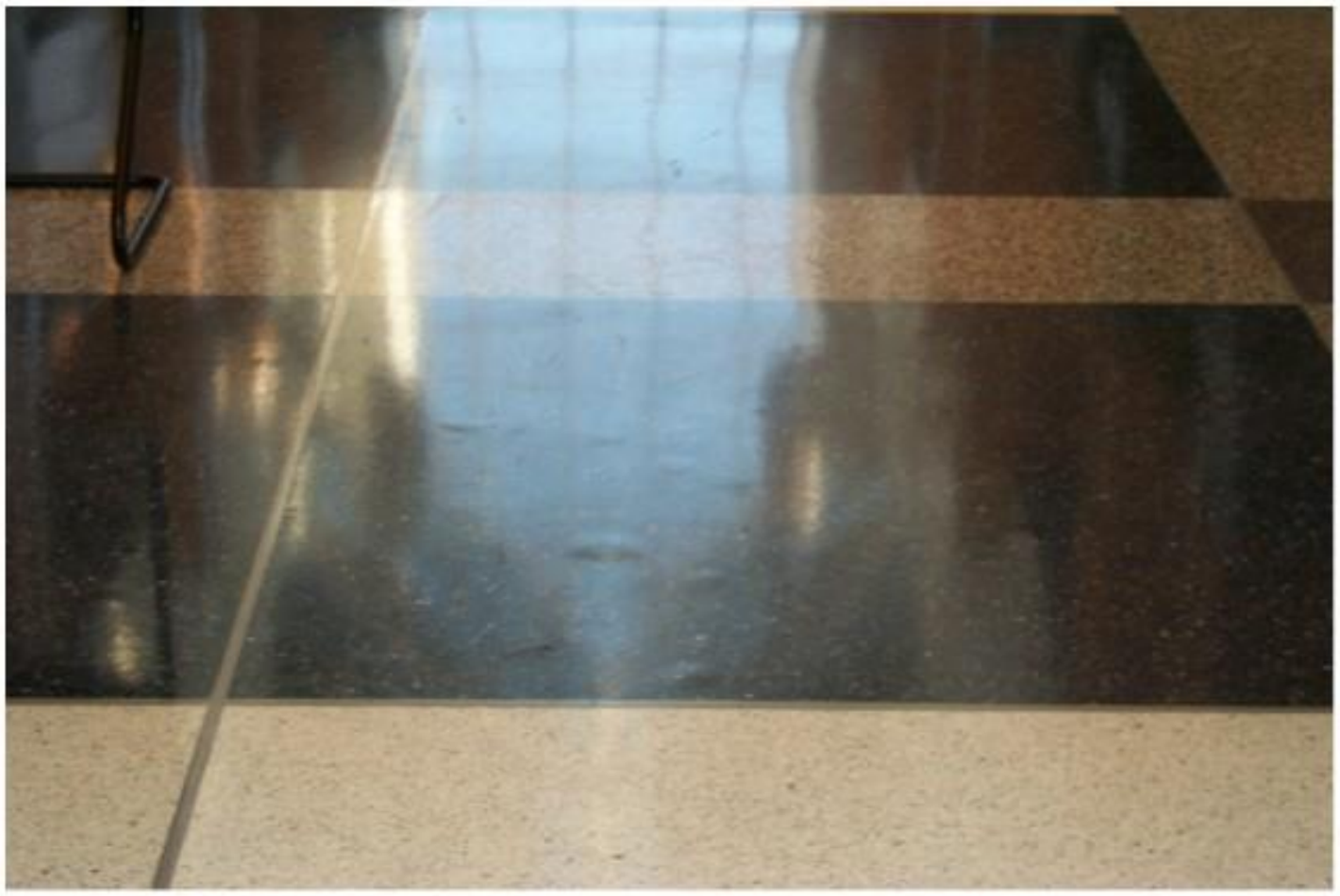
- Primarily Epoxy Matrix
- Marble, Granite, Glass or Other Chips
- Zinc, Brass, Aluminum or Plastic Divider Strips
- Optional Crack Isolation Membrane & Moisture Vapor Treatment
- Poured in Place/Ground & Polished
- Seamless, Life-Time Floor Finish

TERRAZZO TODAY



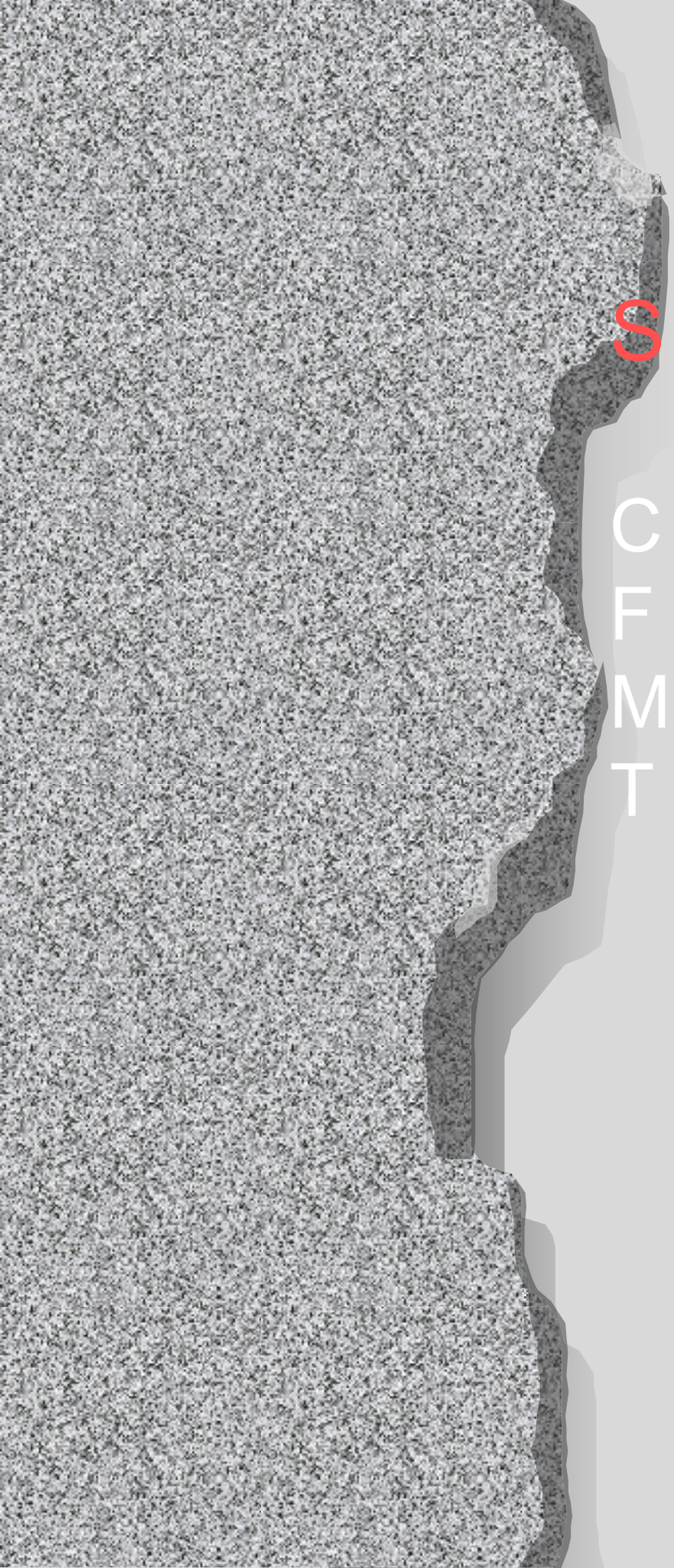
Technical Details

Moisture Vapor Transmission - slab on grade



The Problem

- Inadequate Vapor Barrier Design, detailing and installation
- Unheated or temporary climate controls
- Poor perimeter drainage (no gutters, perimeter slope)
- Uncontrolled substrate moisture
  - clay soils, underground springs, busted pipes



SINS OF THE SUBSTRATE

CRACKS & JOINT DETAILING
FLATNESS & LEVELNESS
MOISTURE VAPOR
TRANSMISSION

Communication with

General Contractors,

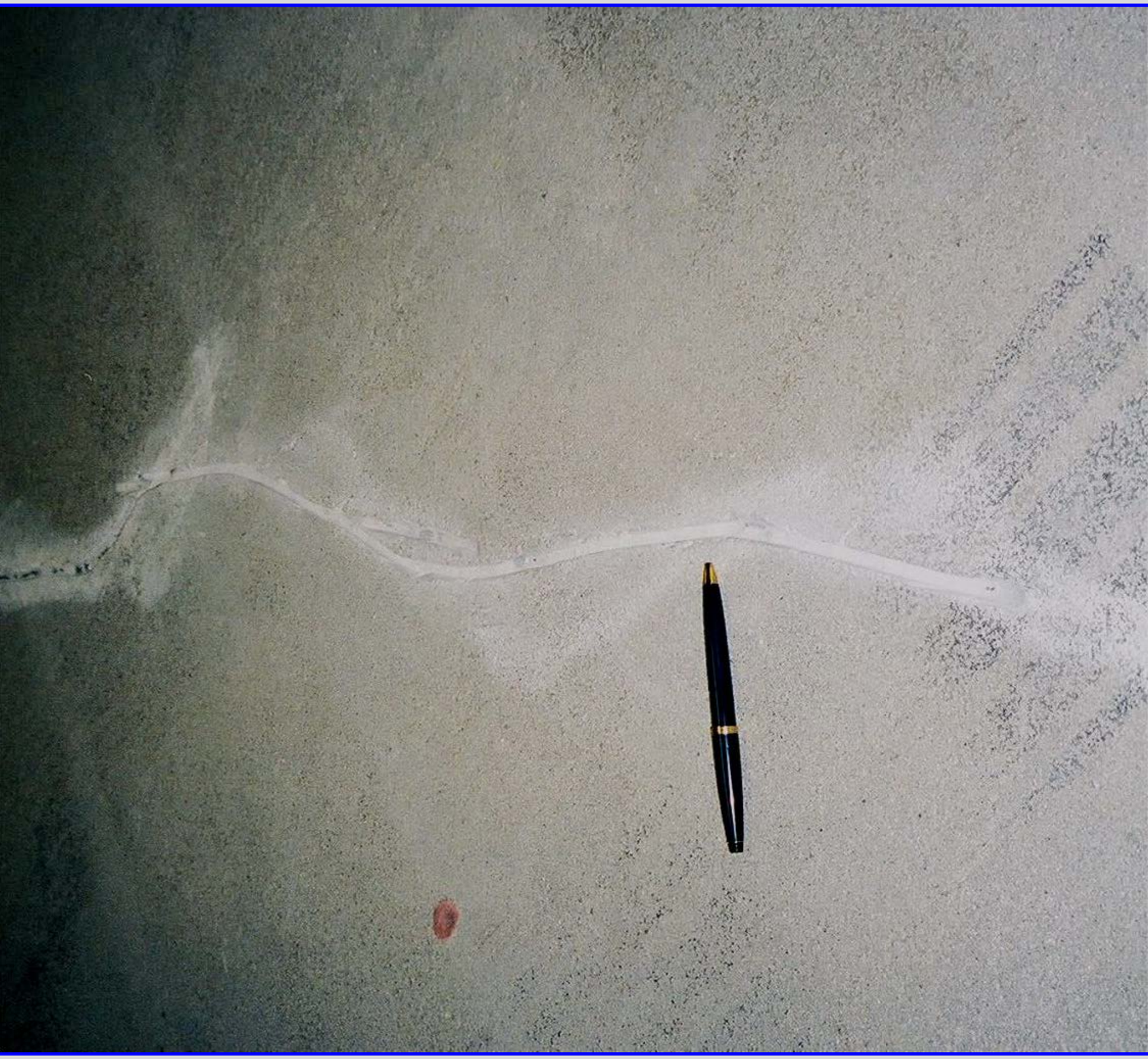
Architects & Owners

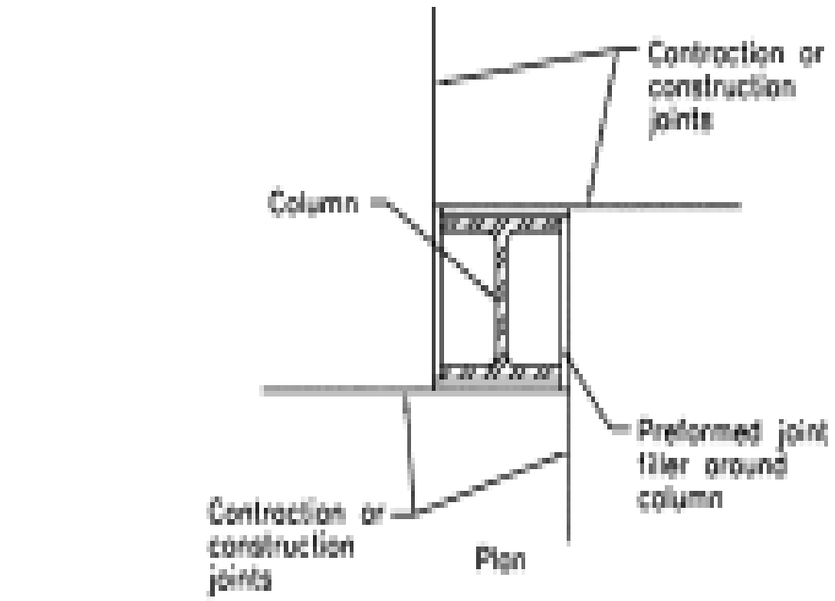
GOALS OF PROGRAM

- Understand the NTMA Position
- Gain collective experience from the Panel & terrrazzo contractors
- Review Shop Talks and Form Letters available to support technical position
- Better manage project risks
- Execute a quality installation that will sell the next job

CRACK & JOINT DETAILS

- Crack Detailing
- Construction Joints (Cold Joints)
- Isolation Joints
- Contraction Joints (Control Joints)
- Epoxy Control Joints
- Expansion Joints





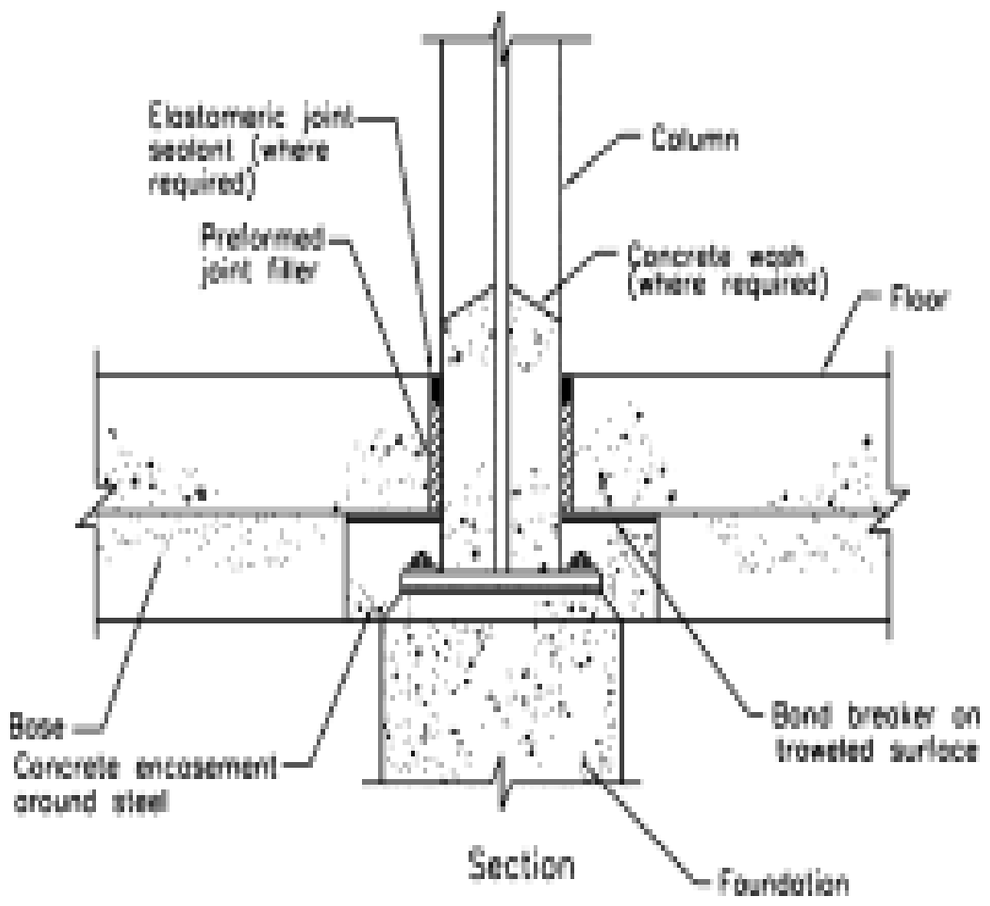
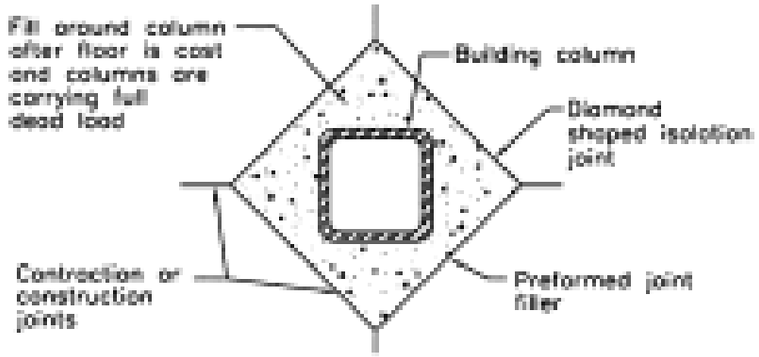
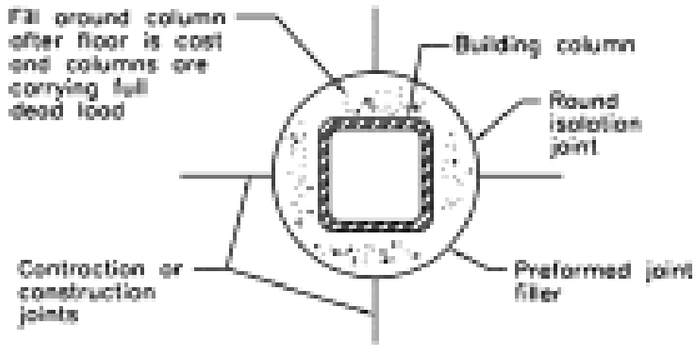


Fig. 3.4—Typical isolation joint at wide flange column.





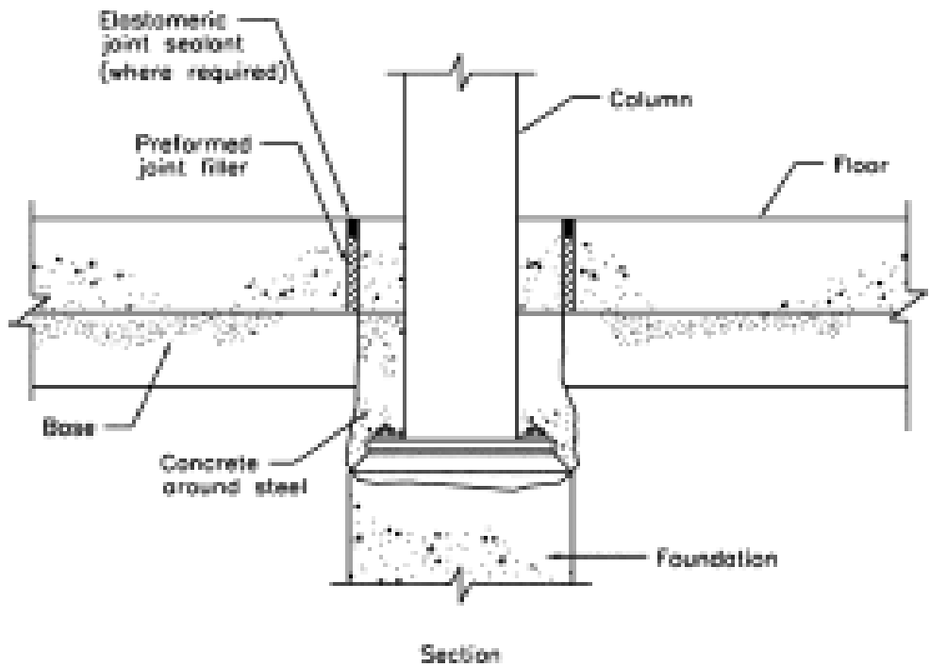


Fig. 3.3—Typical isolation joints at tube columns.

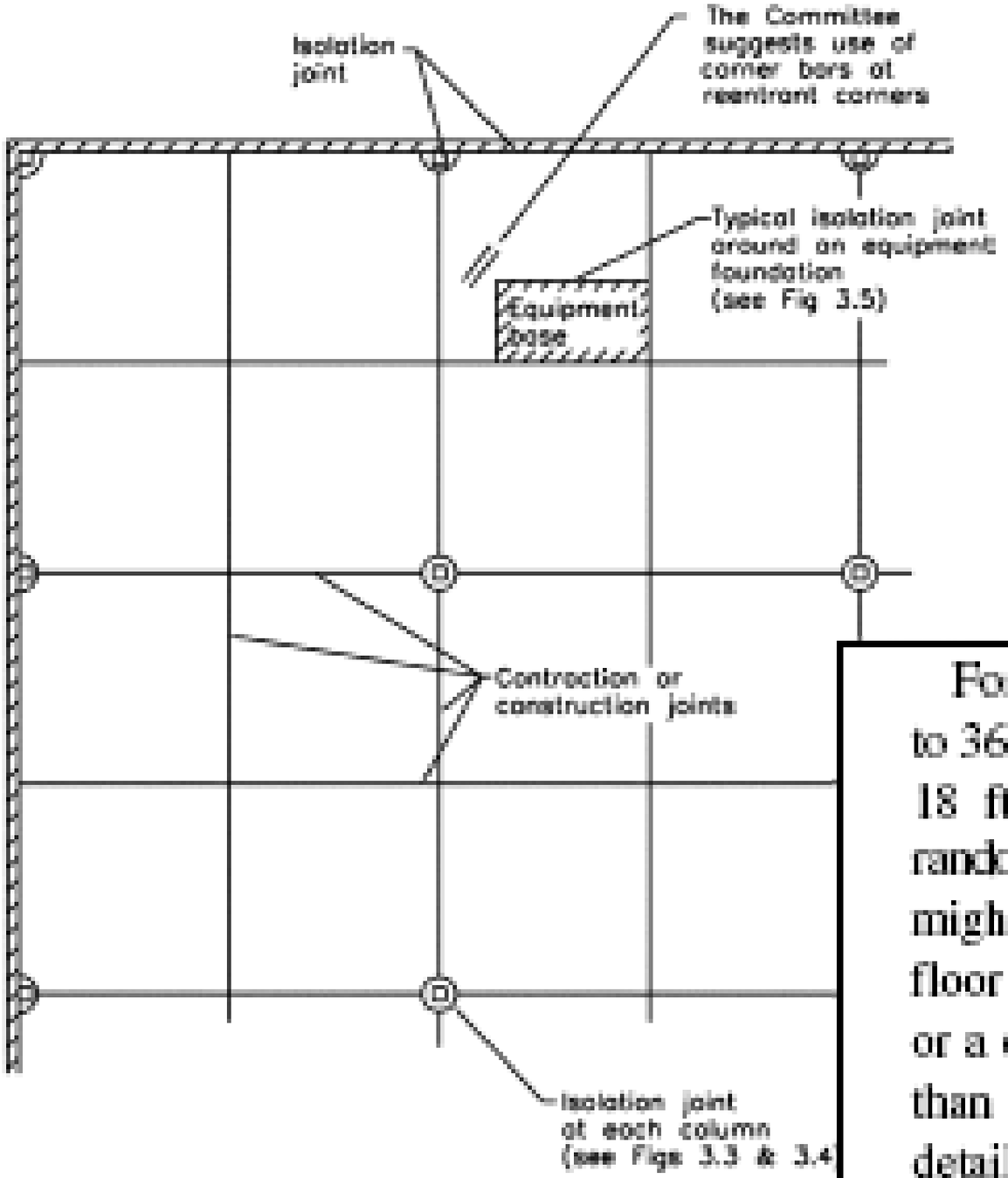


Fig. 3.2—Appropriate locations for joints.

For unreinforced, plain concrete slabs, joint spacings of 24 to 36 times the slab thickness, up to a maximum spacing of 18 ft (5.5 m), have produced acceptable results. Some random cracking should be expected; a reasonable level might be random visible cracks to occur in 0 to 3% of the floor slab panels formed by saw-cutting, construction joints, or a combination of both. If slab curl is of greater concern than usual, joint spacing, mixture proportion, and joint details should be carefully analyzed.

Joint spacing in nominally reinforced slabs (approximately 0.2% steel placed within 2 in. [50 mm] of the top of the slab) can be increased somewhat beyond that recommended for unreinforced, plain concrete slabs, but the incidence of random cracking and curling will increase. Reinforcement will not prevent cracking. If the reinforcement is properly sized and located, cracks that do occur should remain tightly closed.

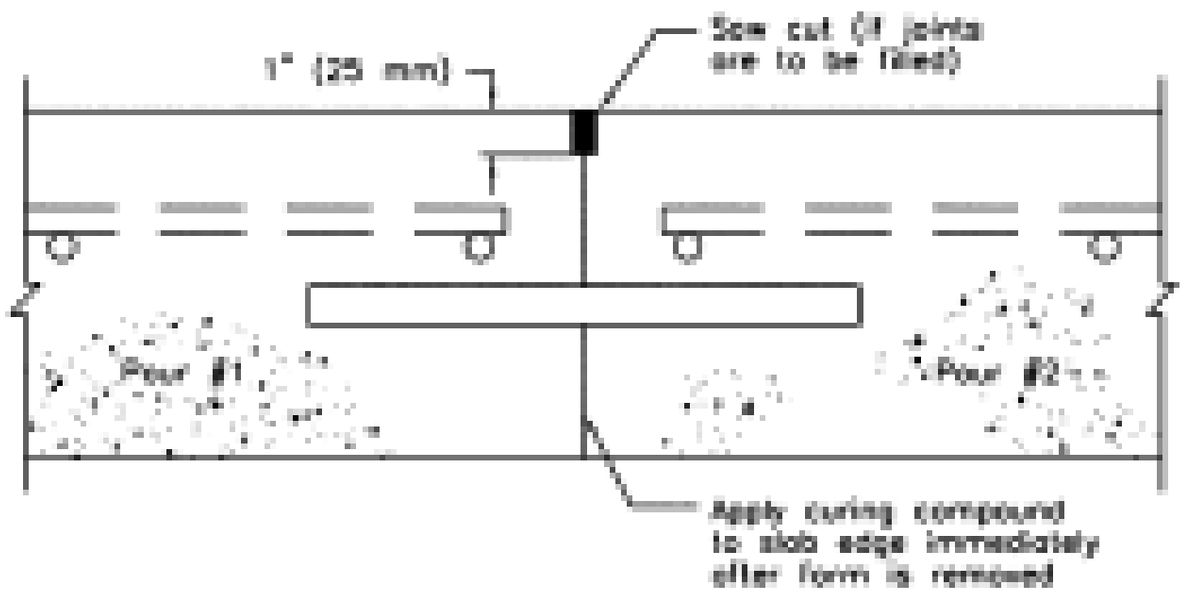
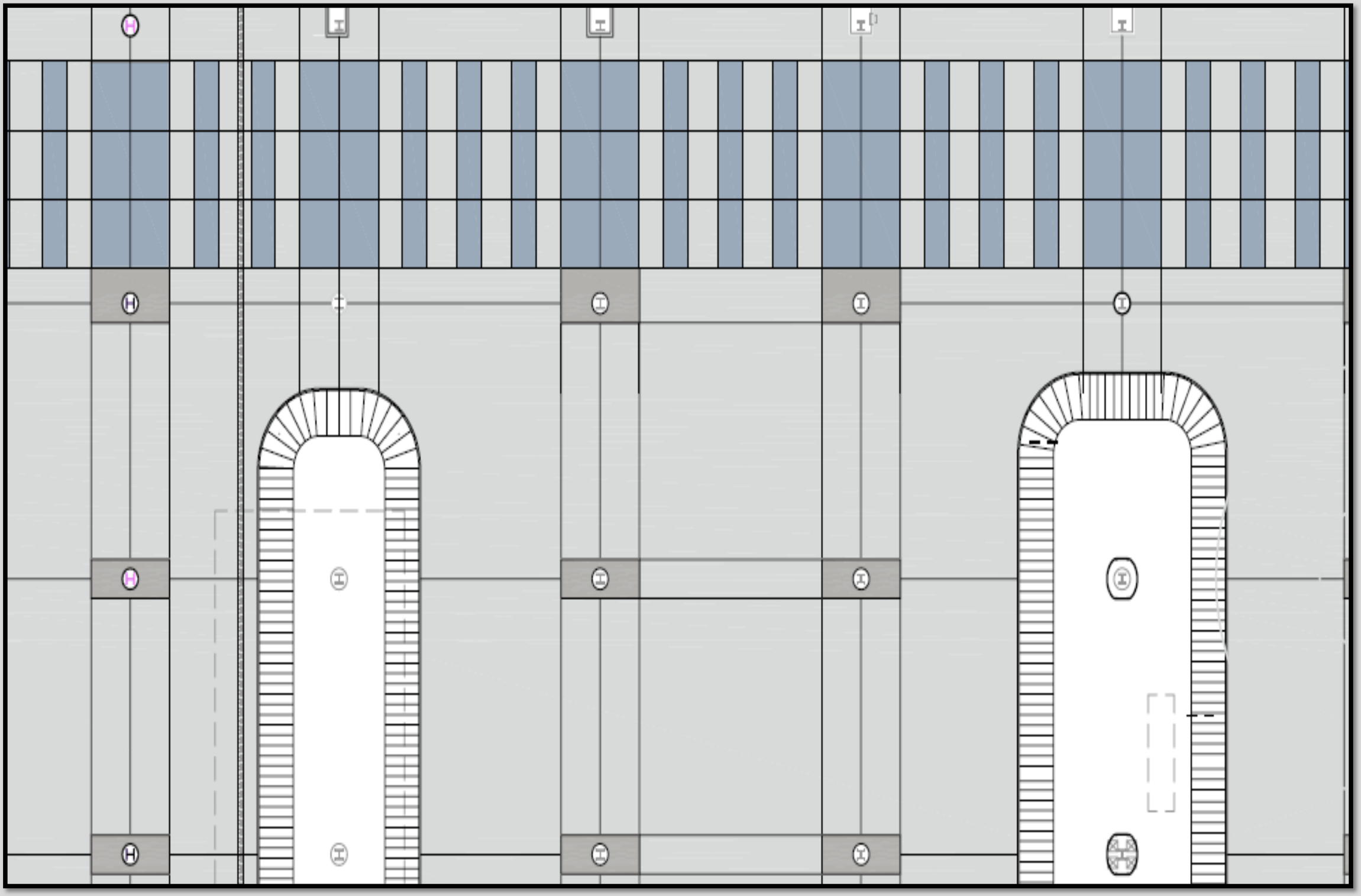
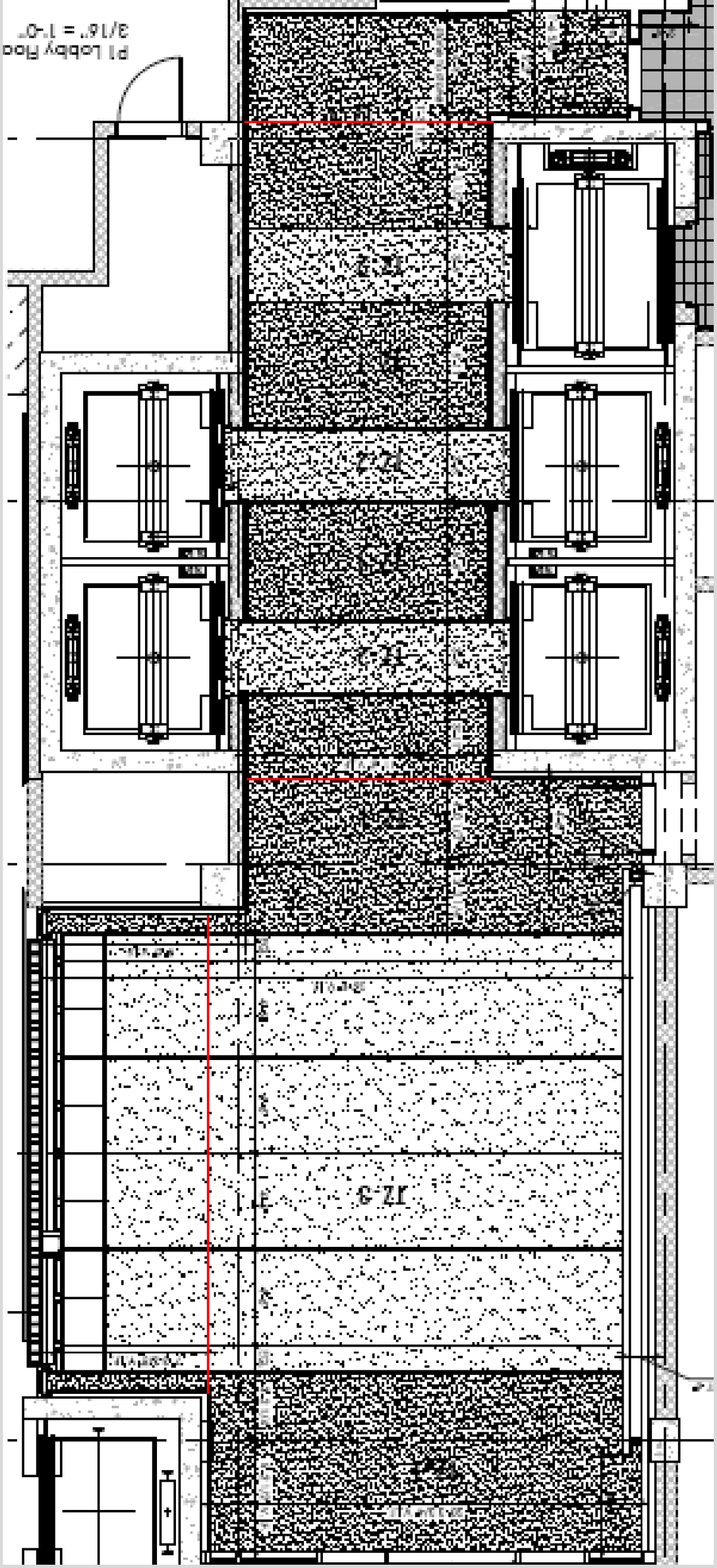
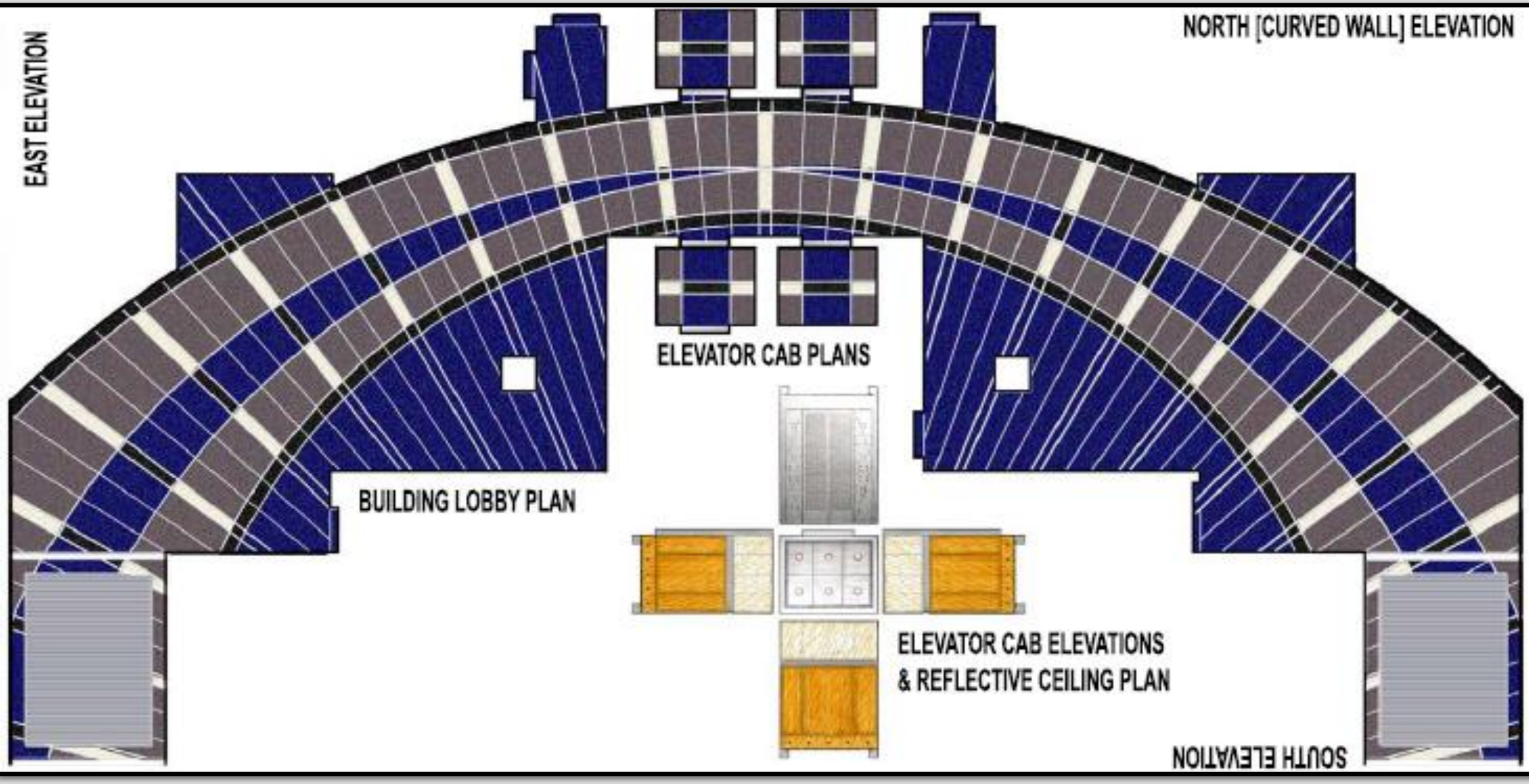


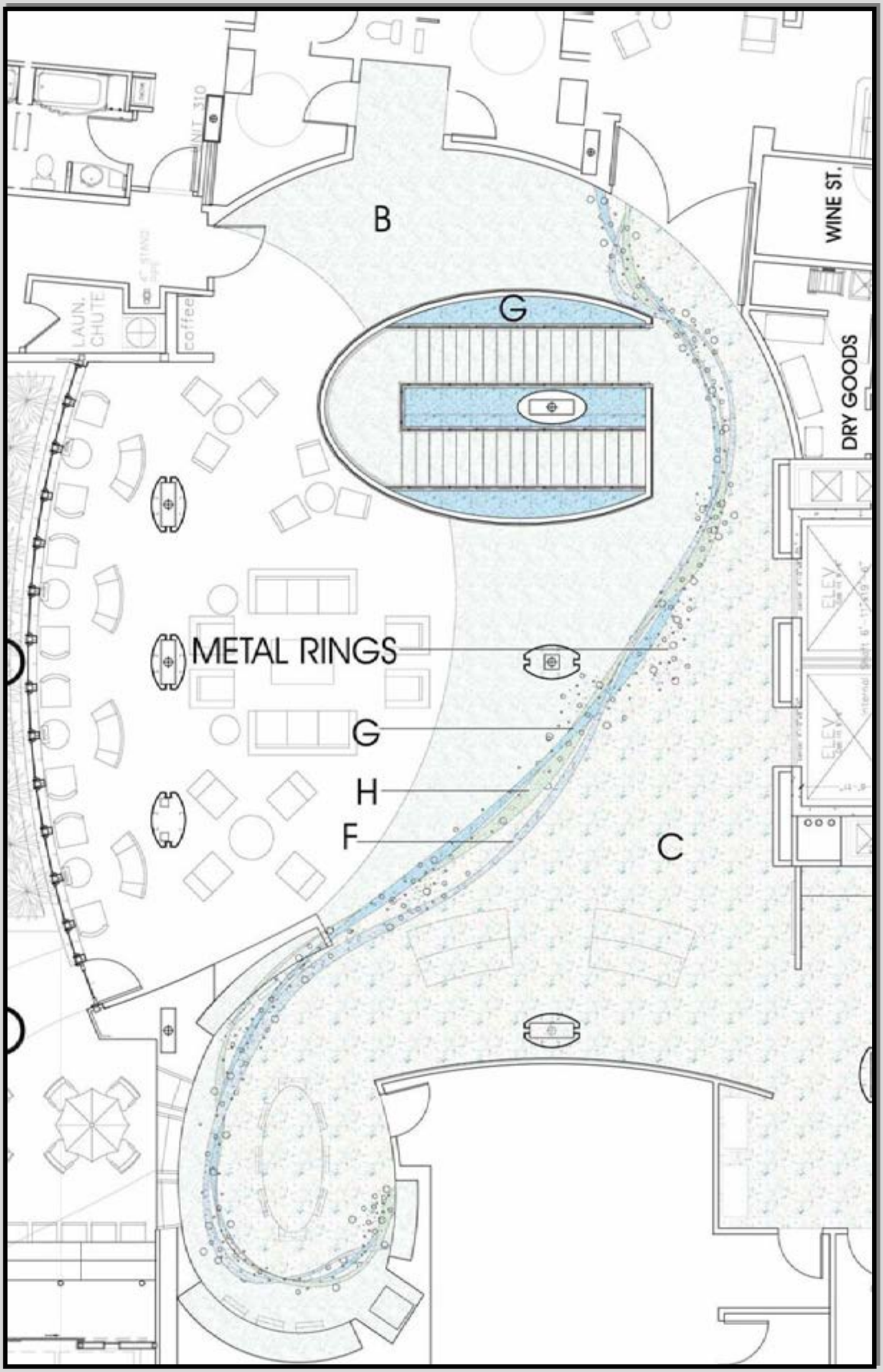
Fig. 3.6—Typical doweled construction joint.

Inspected cracks in remaining corridors that have not been topped with terrazzo. Several large shrinkage cracks opened in excess of 1/8”. In two locations, the cracks have moved up the CMU walls.




P1 Lobby Floo
3/16" = 1'-0"


EAST ELEVATION
NORTH [CURVED WALL] ELEVATION
ELEVATOR CAB PLANS
BUILDING LOBBY PLAN
ELEVATOR CAB ELEVATIONS
& REFLECTIVE CEILING PLAN
SOUTH ELEVATION


B
G
C
D
WINE ST.
DRY GOODS
LAUN. CHUTE
coffee
UNIT 310
METAL RINGS
G
H
F

"SHOP TALK"

The National Terrazzo & Mosaic Association, Inc.
201 North Maple Avenue, Suite 208
Purcellville, Virginia 20132
(800) 323-9736, (540) 751-0930, Fax (540) 751-0935
www.NTMA.com

TECHNICAL BULLETIN #08 **10/06**

CRACK SUPPRESSION MEMBRANES & THERMAL EXPANSION

Overview:

The industry has done a great job in minimizing epoxy terrazzo fissures due to concrete crack propagation caused by substrate moving and cracking. Other issues such as thermal changes below or even above the slab (solar exposure thru window walls) may contribute to heaving and shrinkage in the terrazzo independent of the substrate.

To aid in diminishing the conditions noted above, the epoxy terrazzo should be directly bonded to the slab whenever possible.

The use of a flexible membrane and reinforcement should generally be confined to conspicuous cracks in the substrate and joints treatment.

Crack Treatment:

Cracking of the concrete, mainly due to slabs shrinkage, is inherent with most large area projects. After cleaning the fissures, fill them with an epoxy and then treat with a fluid applied flexible membrane and approved reinforcement as a "bandage" technique. The membrane manufacturer can recommend the installation thickness and suggested width of the applied membrane.

Joints Treatment:

Control joints – usually saw cuts – should be honored in the terrazzo overlay whenever possible. Refer to the NTMA architectural details for divider strip placement. Where design issues prevent this, substrate joints are normally filled with a 100% solids epoxy, then treated with a flexible membrane and reinforcement, all in accordance with manufacturer's recommendations.

Note:

Floor slabs that manifest excessive cracking may require full coverage of the membrane, with or without reinforcement, per manufacturer's recommendations. When doing this, it is important to have appropriate joints incorporated in the terrazzo to accommodate potential movement in the slab.

FLATNESS/LEVELNESS

- NTMA Position
- Acceptance of Concrete Substrate
- F-numbering system/ Straight Edge
- Fill Requirements
- Location of Barrier Primer and Membrane

The F-Min Profiler is set up to simulate the exact wheel pattern of a forklift truck.

Approximate Equivalence of F_F Numbers and Straightedge Measurements	
F-Number	Gap Under 10’-0” Straightedge
12	1/2”
20	5/16”
25	1/4”
32	3/16”
50	1/8”

Flatness and Levelness Tolerances: The defined traffic floor shall conform to the following surface profile tolerances: F_{min} = [75]

Floor Tolerance Measurements: F_{min} tolerances shall be tested in accordance with ASTM E 1486.

MOISTURE VAPOR TESTING

- NTMA Position
- Acceptance of Concrete Substrate
- Calcium Chloride vs. Protimeter
- When do you test?
- Topical Solutions
- Presentation of the Change Order

Designation: F 1869 – 98

Standard Test Method for Measuring Moisture Vapor Emission Rate of Concrete Subfloor Using Anhydrous Calcium Chloride[1]

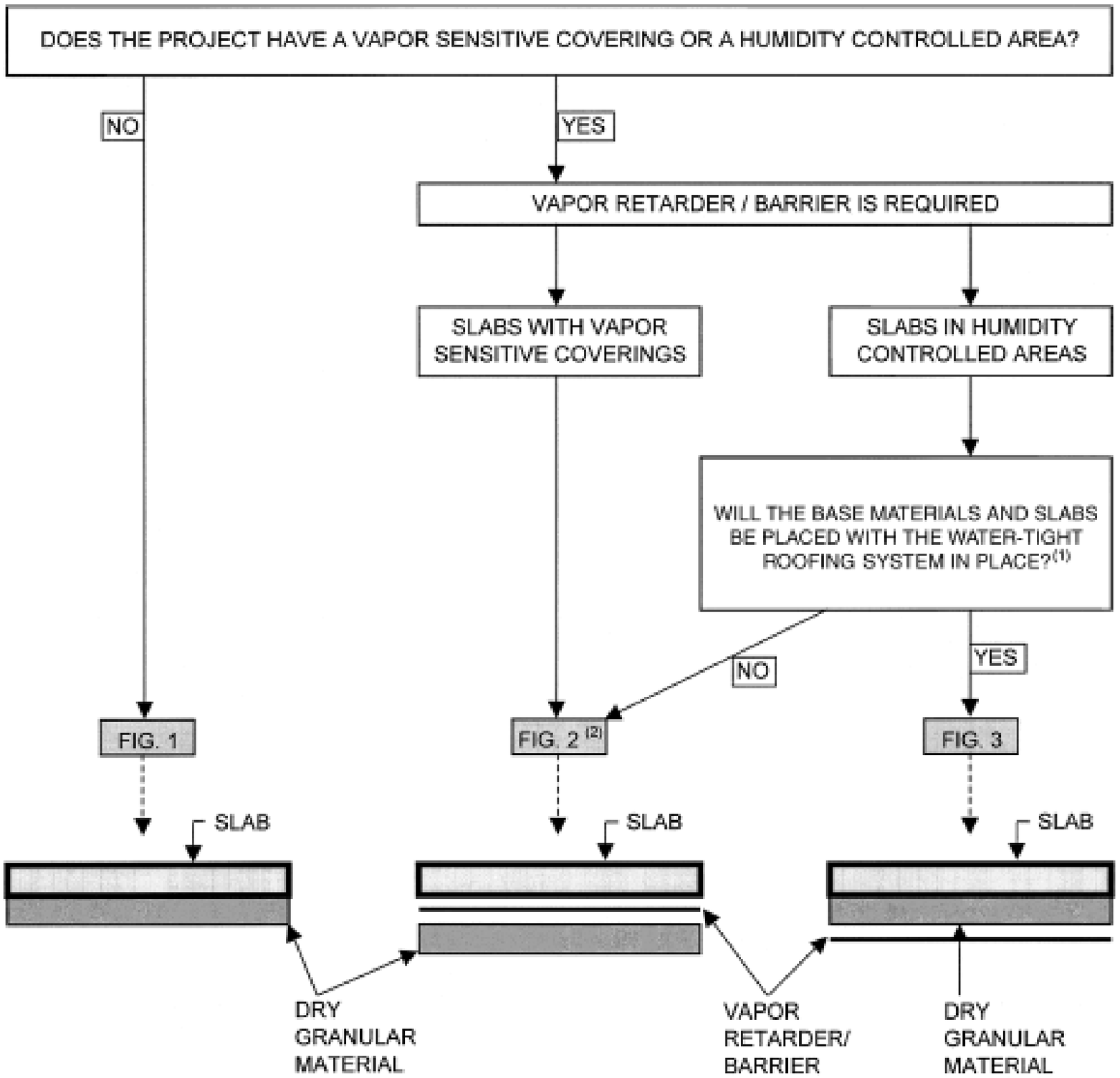
This standard is issued under the fixed designation F 1869; the number immediately following the designation indicates the year of original adoption or, in the case of revision, the year of last revision. A number in parentheses indicates the year of last reapproval. A

Designation: F 2170 – 02

Standard Test Method for Determining Relative Humidity in Concrete Floor Slabs Using *in situ* Probes[1]

This standard is issued under the fixed designation F 2170; the number immediately following the designation indicates the year of original adoption or, in the case of revision, the year of last revision. A number in parentheses indicates the year of last reapproval. A superscript epsilon (ε) indicates an editorial change since the last revision or reapproval.


DO NOT TOUCH


DOES THE PROJECT HAVE A VAPOR SENSITIVE COVERING OR A HUMIDITY CONTROLLED AREA?
NO
YES
VAPOR RETARDER / BARRIER IS REQUIRED
SLABS WITH VAPOR SENSITIVE COVERINGS
SLABS IN HUMIDITY CONTROLLED AREAS
WILL THE BASE MATERIALS AND SLABS BE PLACED WITH THE WATER-TIGHT ROOFING SYSTEM IN PLACE?(1)
NO
YES
FIG. 1
FIG. 2 (2)
FIG. 3
SLAB
SLAB
SLAB
DRY GRANULAR MATERIAL
VAPOR RETARDER/ BARRIER
DRY GRANULAR MATERIAL

APPENDIX

(Nonmandatory Information)

X1. EXAMPLE REPORT FORM

REPORT OF RELATIVE HUMIDITY IN CONCRETE

Name and address of structure	*Identify Floor*

Test Location (use room numbers or building grid)	Depth from top of slab, in.	Relative Humidity in concrete, %	Temperature in concrete, °F	Air Temperature, °F	Air Relative Humidity, %	Notes

Instrument Used

Make, Model, Serial number	Last calibration date

Tests performed by

Name	Date
Company name, address	

Terrazzo Flooring

Concrete Slabs and Moisture Issues: Guide Document for *Architects-Engineers*

Prepared for

The National Terrazzo & Mosaic Association, Inc.
201 N. Maple Ave.
Purcellville, VA, 20132
www.ntma.com
and
The International Masonry Institute
42 East St.
Annapolis, MD, 21401
www.imiweb.org
by
Howard Kanare
Senior Principal Scientist
Construction Technology Laboratories, Inc.
5400 Old Orchard Road
Skokie, Illinois 60077
U.S.A.

CTL Project No. 261664

TERRAZZO & MOSAICS

REAGAN AIRPORT MOSAICS

- Terrazzo is Italian for “terrace”
- Marble chips were a bi-product of marble manufacturing process
- Cement systems and sand/cement screed beds

Reagan Airport Mosaic Art | Washington, DC

The Sports Club | Washington, DC

THE RONALD REAGAN BUILDING

The Ronald Reagan Building | Washington, DC

The Ronald Reagan Building | Washington, DC

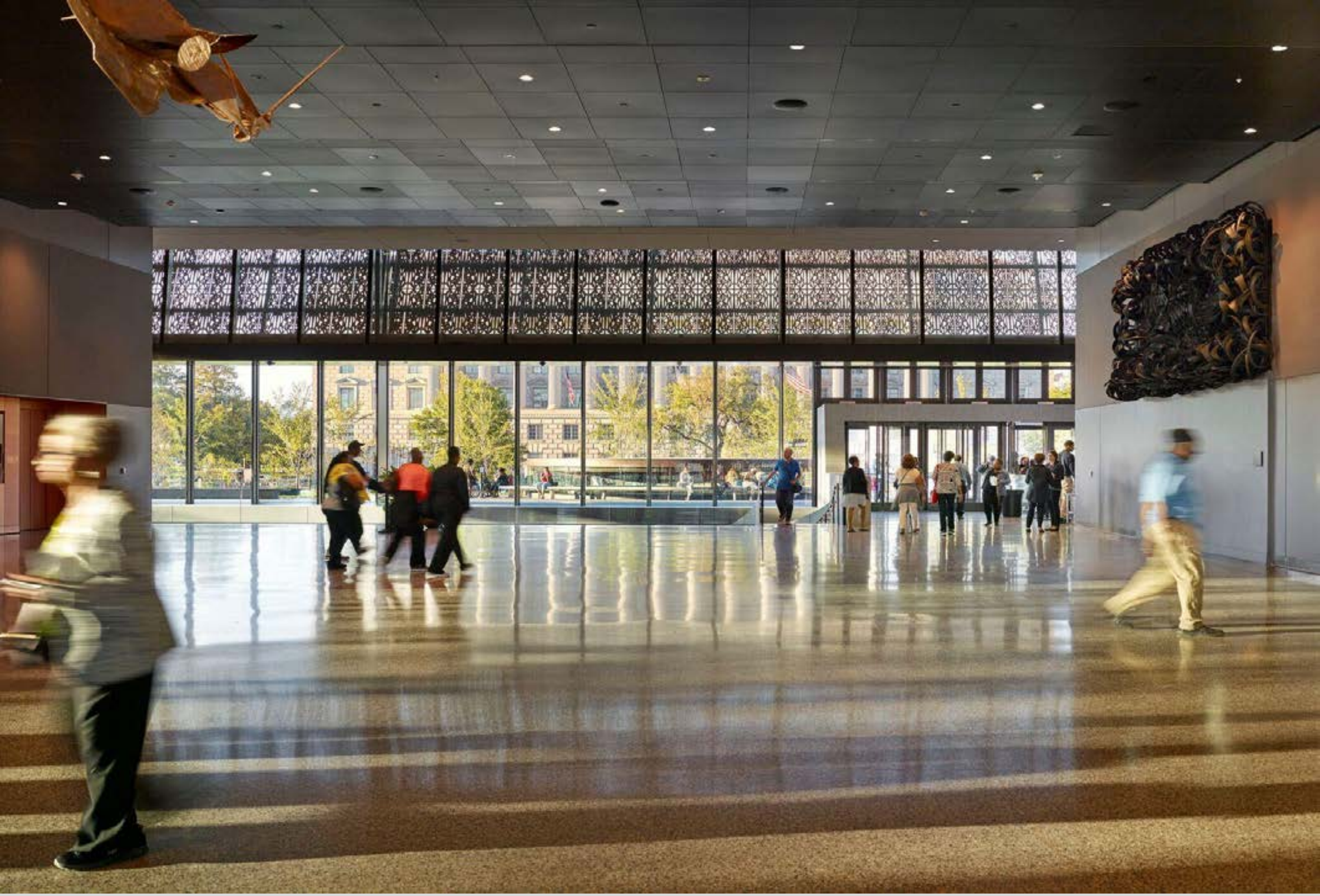
The Ronald Reagan Building | Washington, DC

The Ronald Reagan Building | Washington, DC

National Museum of African American History and Culture | Washington, DC

National Museum of African American History and Culture | Washington, DC

National Museum of African American History and Culture | Washington, DC



National Museum of African American History and Culture | Washington, DC

MGM National Harbor
Oxon Hill, MD

MGM National Harbor
Oxon Hill, MD

MGM National Harbor
Oxon Hill, MD

MGM National Harbor
Oxon Hill, MD

Foley & Lardner LLP | Washington, DC

Foley & Lardner LLP | Washington, DC

Chevy Chase Pavilion | Tenant Fit Out & Renovation | Washington, DC

Chevy Chase Pavilion | Tenant Fit Out & Renovation | Washington, DC

Squires, Saunders & Dempsey Offices | Washington, DC

Squires, Saunders & Dempsey Offices | Washington, DC

Wilmer Eye Institute | Johns Hopkins | Baltimore, MD

Wilmer Eye Institute | Johns Hopkins | Baltimore, MD

Colorado Museum | Denver, Colorado

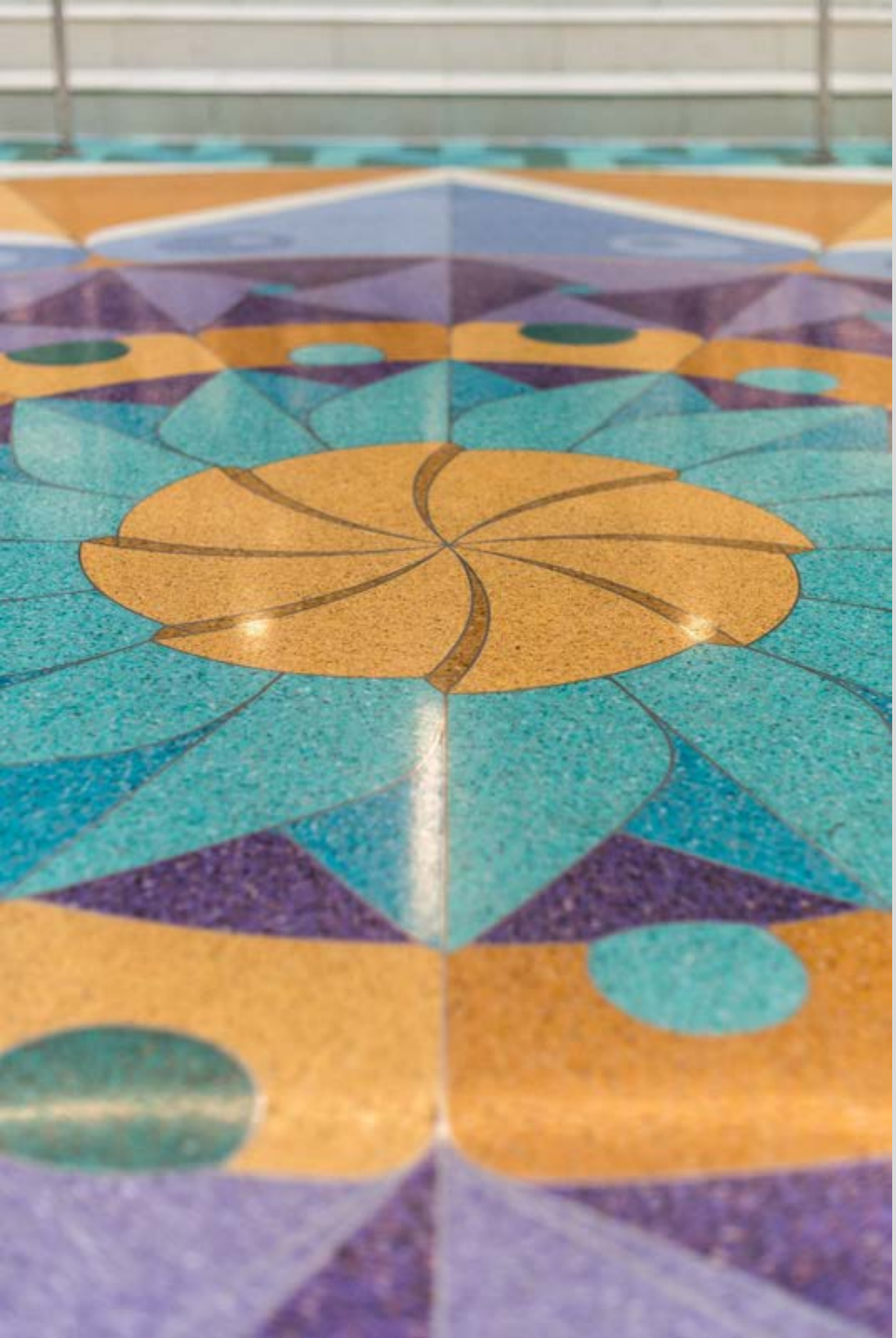
Colorado Museum | Denver, Colorado

Petworth Library | Washington, DC

Trinity Seal | Academic Center | Washington, DC

Lafayette Elementary School | Washington, DC

Lafayette Elementary School | Washington, DC



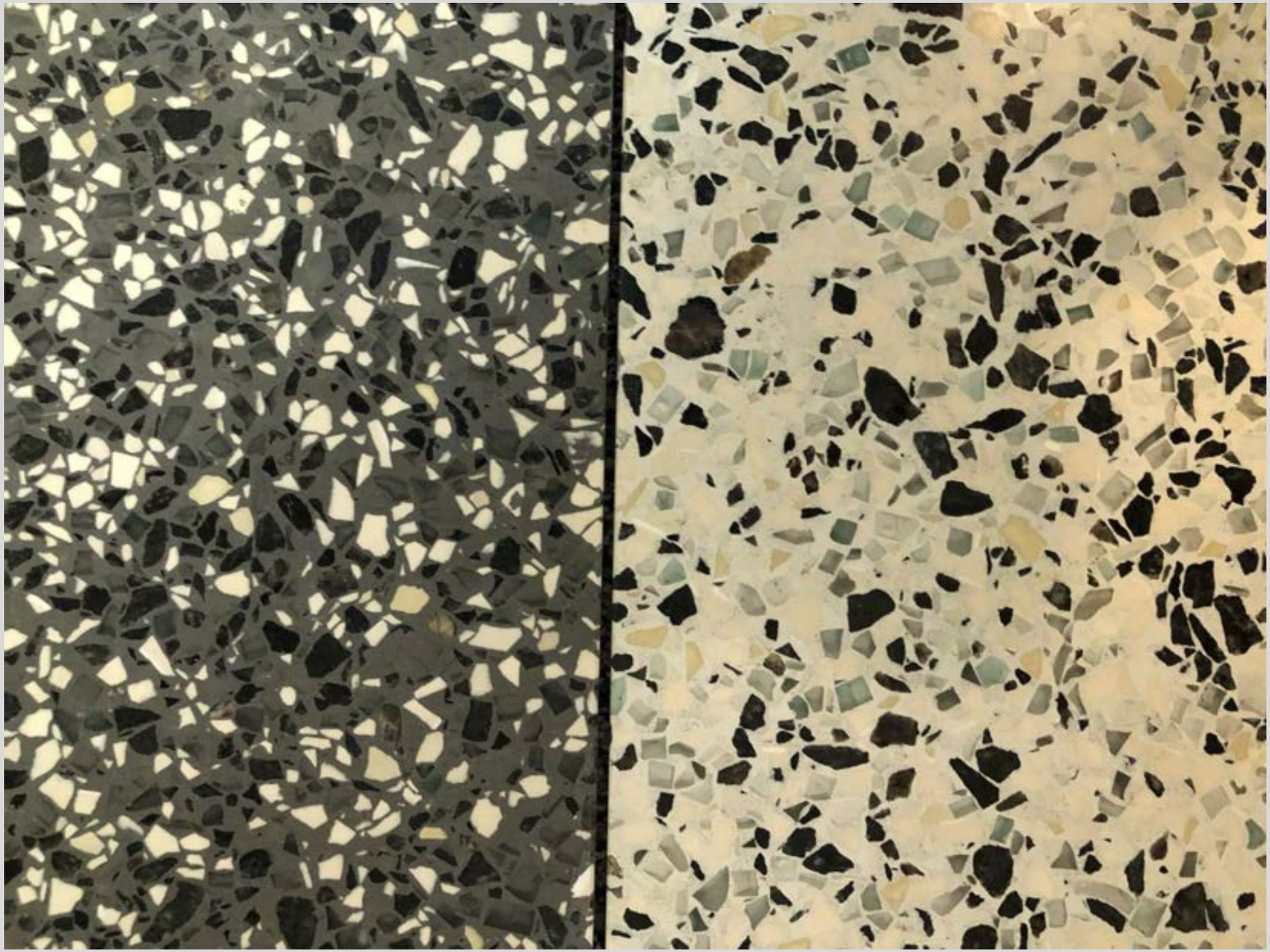
Lafayette Elementary School | Washington, DC

American Geophysical Union | Porcelain Toilets from Site

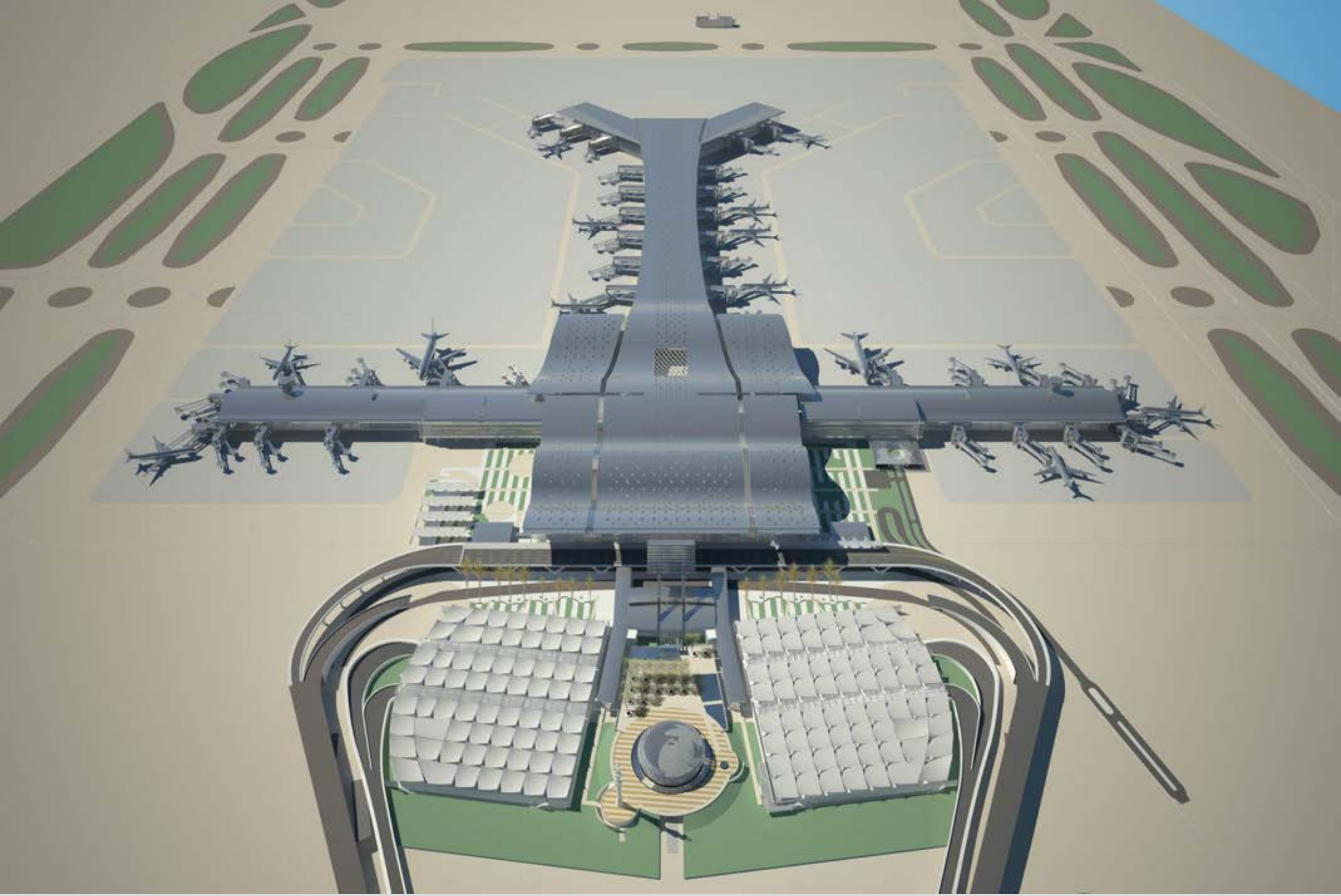
American Geophysical Union | Granite & Glass from Site

American Geophysical Union | Crushing

American Geophysical Union | Crushing



American Geophysical Union | Finished Epoxy Terrazzo Samples



Doha Airport

Doha Airport

Doha Airport

Doha Airport

Doha Airport

Doha Airport

Equipment


TERRAZZO


Equipment

Equipment

Project Management & Manpower


04.26.2011


WD
WD
WD
WD
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Material Storage and Handling


DONG FENG
CAT
05.05.2011

Vacuum Blasting - Preferred Surface Preparation

Grout Primer

Shooting Slab Elevations

Mortar Screed Rails

Mortar Fill - Epoxy & Sand

Mortar Screed - Epoxy & Sand

Strip Layout

Sanding Preparation for Placement

Terrazzo Placement

Terrazzo Placement & Power Troweling

Power-Troweling

Grouting

Rough Grinding

Flatness Tolerances for Project : 3MM OR 1/8” in 10’ ft

Inspection & BECHTEL Quality Control

Grinding

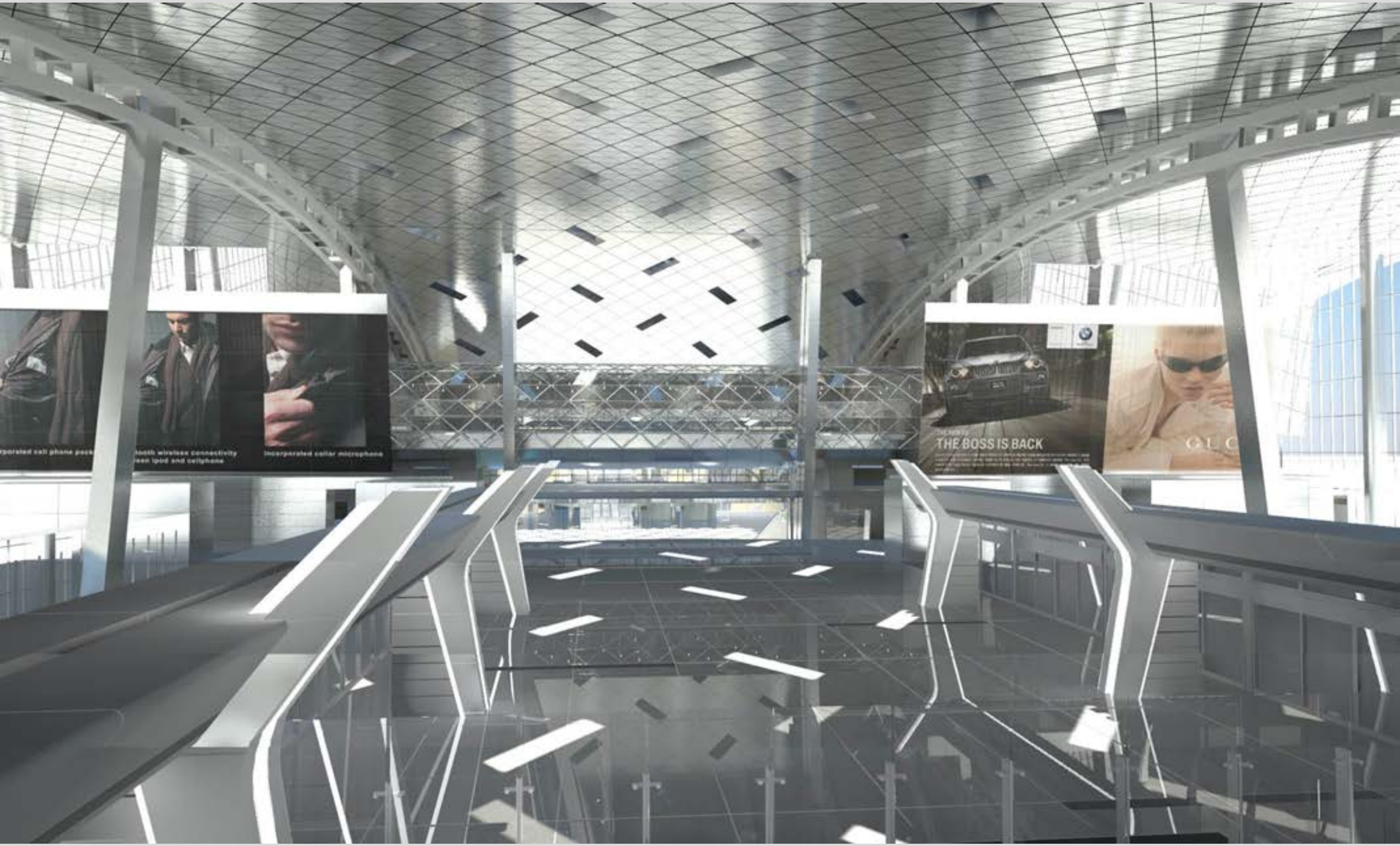
Grinding

Polishing

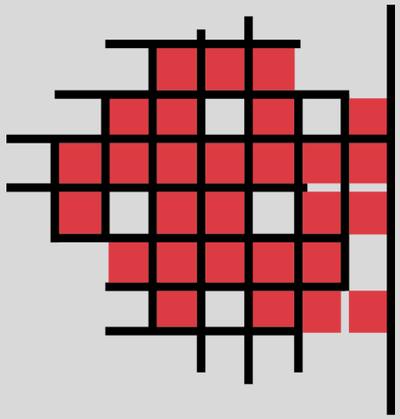
Sealing

Protection

Finished Product


incorporated cellar microphone
THE BOSS IS BACK


Transfers
Arrivals



Questions?