



# DESIGN CRITERIA STANDARDS

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MIAMI DADE COLLEGE  
FACILITIES MANAGEMENT DEPARTMENT

January 2020

**FACILITIES MANAGEMENT DEPT.**

MSV Mission Statement and Vision

**PHASE SUBMITTAL DELIVERABLES CHECKLISTS**

DSS Design Submittal Statement  
 Phase I Schematic Design  
 Phase II Design Development  
 Phase III Construction Documents 50%  
 Phase III Construction Documents 90%  
 Phase III Construction Documents 100%  
 LEED Project Checklist

**DIVISION 00 PROCUREMENT AND CONTRACTING REQUIREMENTS**

PROVIDED AT FUTURE DATE

**DIVISION 01 GENERAL REQUIREMENTS**

PROVIDED AT FUTURE DATE

**DIVISION 02 EXISTING CONDITIONS**

**02 01 00 GENERAL**

**02 20 00 ASSESSMENT**  
 02 21 13 Site Surveys  
 02 21 16 Building Surveys (Measured Drawings)  
 02 22 00 Existing Conditions Assessment  
 02 24 00 Environmental Assessment  
 02 26 00 Hazardous Material Assessment

**02 30 00 SUBSURFACE INVESTIGATION**  
 02 32 00 Geotechnical Investigation

**02 40 00 DEMOLITION AND STRUCTURE MOVING**  
 02 41 00 Demolition

**02 50 00 SITE REMEDIATION**

**DIVISION 03 CONCRETE**

**03 01 00 GENERAL**

**03 30 00 CAST-IN-PLACE CONCRETE**  
 03 33 00 Architectural Concrete

**03 40 00 PRECAST CONCRETE**  
 03 41 00 Precast Structural Concrete  
 03 47 13 Tilt-Up Concrete

**03 50 00 CAST DECKS AND UNDERLAYMENT**

03 52 00 Lightweight Insulating Concrete

**03 60 00 GROUTING**

**DIVISION 04 MASONRY**

**04 01 00 GENERAL**

**04 20 00 UNIT MASONRY**  
 04 21 00 Clay Unit Masonry (Brick)  
 04 22 00 Concrete Unit Masonry  
 04 23 00 Glass Unit Masonry

**DIVISION 05 METALS**

**05 01 00 GENERAL**

**05 10 00 STRUCTURAL METAL FRAMING**  
 05 12 00 Structural Steel Framing

**05 20 00 METAL JOISTS**  
 05 21 00 Steel Joist Framing

**05 30 00 METAL DECKING**  
 05 31 00 Steel Decking

**05 40 00 COLD FORMED METAL FRAMING**

**05 50 00 METAL FABRICATIONS**

**DIVISION 06 WOOD, PLASTICS AND COMPOSITES**

**06 01 00 GENERAL**

**06 10 00 ROUGH CARPENTRY**

**06 40 00 ARCHITECTURAL WOODWORK**

06 42 00 Wood Paneling

**06 60 00 PLASTIC FABRICATIONS**

**DIVISION 07 THERMAL AND MOISTURE PROTECTION**

**07 01 00 GENERAL**

07 01 50 Maintenance of Membrane Roofing  
07 01 50.19 Preparation for Re-Roofing

**07 10 00 DAMP PROOFING AND WATERPROOFING**

07 11 13 Bituminous Damp proofing  
07 13 26 Self-Adhering Sheet Waterproofing  
07 14 13 Hot Fluid Applied Rubberized Asphalt Waterproofing  
07 14 16 Cold Fluid Applied Waterproofing  
07 18 00 Traffic Coatings  
07 19 00 Water repellent

**07 20 00 THERMAL PROTECTION**

07 21 00 Thermal Insulation

07 26 00 Vapor Retarders

**07 50 00 MEMBRANE ROOFING**

07 52 16 Styrene-Butadiene-Styrene Modified Bituminous Membrane Roofing  
07 54 16 Ethylene Interpolymer (KEE) Roofing  
07 54 19 Polyvinyl-Chloride Roofing

**07 60 00 FLASHING AND SHEET METAL**

07 62 00 Sheet Metal Flashing and trim

**07 70 00 ROOF AND WALL SPECIALTIES ACCESSORIES**

07 71 23 Gutters and Downspouts  
07 71 29 Roof Expansion Joints  
07 72 33 Roof Hatches

**07 80 00 FIRE AND SMOKE PROTECTION**

07 81 00 Applied Fireproofing  
07 84 13 Penetration Fireproofing  
07 84 43 Joint Firestopping

**07 90 00 JOINT PROTECTION**

07 92 00 Joint Sealants  
07 95 00 Expansion Control  
07 95 13 Expansion Joint Cover Assemblies

**DIVISION 08 OPENINGS**

**08 01 00 GENERAL**

**08 10 00 DOORS AND FRAMES**

08 13 00 Metal Doors (Exterior)  
08 14 00 Wood Doors (Interior)

**08 30 00 SPECIALTY DOORS AND FRAMES**

**08 40 00 ENTRANCES, STOREFRONT AND CURTAIN WALLS**

**08 50 00 WINDOWS**

**08 60 00 ROOF WINDOWS AND SKYLIGHTS**

**08 70 00 HARDWARE**

**08 80 00 GLAZING**

08 81 00 Glass Glazing (Interior and Exterior)  
08 83 00 Mirrors

**08 90 00 LOUVERS**

**DIVISION 09 FINISHES**

**09 01 00 GENERAL**

09 06 00 Schedules for finishes

**09 20 00 PLASTER AND GYPSUM BOARD**

09 21 00 Plaster and Gypsum Board Assemblies  
09 29 00 Gypsum Board

**09 30 00 TILING**

<b>09 50 00</b>	<b>CEILINGS</b>	10 21 23	Cubicle Curtains and Tracks	<b>11 40 00</b>	<b>FOOD SERVICE EQUIPMENT</b>
09 51 00	Acoustical Ceilings	10 22 13	Wire Mesh door and partitions	11 41 33	Foodservice Shelving
09 54 00	Specialty Ceilings	10 22 23	Movable Panel Systems	11 48 13	Commercial Dishwashers
<b>09 60 00</b>	<b>FLOORING</b>	10 26 00	Wall and Door Protection	<b>11 50 00</b>	<b>EDUCATIONAL AND SCIENTIFIC EQUIPMENT</b>
09 64 00	Wood Flooring	10 28 13	Commercial Toilet Accessories	11 52 00	Audio Visual Equipment
09 65 00	Resilient Flooring	<b>10 40 00</b>	<b>SAFETY SPECIALTIES</b>	11 52 13	Projection Screen
09 66 00	Terrazzo Flooring	10 41 00	Emergency Access and Information Cabinets	11 53 00	Laboratory Equipment
09 67 00	Fluid-Applied Flooring	10 44 16	Fire Extinguishers	<b>11 60 00</b>	<b>ENTERTAINMENT AND RECREATION EQUIPMENT</b>
09 68 00	Carpeting	<b>10 50 00</b>	<b>STORAGE SPECIALTIES</b>	11 61 43	Stage Curtains
<b>09 70 00</b>	<b>WALL FINISHES</b>	10 51 13	Metal Lockers	<b>11 80 00</b>	<b>FACILITY MAINTENANCE AND OPERATION EQUIPMENT</b>
<b>09 90 00</b>	<b>PAINTING AND COATING</b>	10 55 13	Central Mail Delivery Boxes	<b>11 90 00</b>	<b>OTHER EQUIPMENT</b>
		10 56 13	Metal Storage Shelving	11 95 13	Kilns
		<b>10 70 00</b>	<b>EXTERIOR SPECIALTIES</b>		
<b>DIVISION 10 SPECIALTIES</b>		10 71 13	Exterior Sun Control Devices		
<b>10 01 00</b>	<b>GENERAL</b>	10 73 16	Metal Canopies		
<b>10 10 00</b>	<b>INFORMATION SPECIALTIES</b>	10 75 00	Flagpoles		
10 11 00	Visual Display Units	<b>DIVISION 11 EQUIPMENT</b>		<b>DIVISION 12 FURNISHINGS</b>	
10 12 00	Display Cases	<b>11 01 00</b>	<b>GENERAL</b>	<b>12 01 00</b>	<b>GENERAL</b>
10 13 00	Directories	<b>11 10 00</b>	<b>VEHICLE AND PEDESTRIAN EQUIPMENT</b>	<b>12 10 00</b>	<b>ART</b>
10 13 13	Electronic Directories	11 11 36.13	Commercial Electric Vehicle Charging Unit	<b>12 20 00</b>	<b>WINDOW TREATMENT</b>
10 14 00	Signage	11 12 00	Parking Control Equipment	<b>12 30 00</b>	<b>CASEWORK</b>
10 14 16	Plaques	11 13 00	Loading Dock Equipment	12 36 40	Stone Countertops
10 14 19	Dimensional Letter Signage				
<b>10 20 00</b>	<b>INTERIOR SPECIALTIES</b>				
10 21 13	Toilet Compartments				
10 21 16	Shower and Dressing Compartments				

<b>12 40 00</b>	<b>FURNISHINGS AND ACCESSORIES</b>				
12 48 00	Rugs and Mats				
<b>12 50 00</b>	<b>FURNITURE</b>				
12 56 51	Library Furniture				
<b>12 60 00</b>	<b>MULTIPLE SEATING</b>				
12 61 00	Fixed Audience Seating				
12 66 00	Telescoping Stands				
<b>12 90 00</b>	<b>OTHER FURNISHINGS</b>				
12 92 00	Interior Planters and Artificial Plants				
12 93 00	Interior Public Space Furnishings				
DIVISION 13 (Not used)					
DIVISION 14 CONVEYING EQUIPMENT					
<b>14 01 00</b>	<b>GENERAL</b>				
14 01 10	Dumbwaiter Rehabilitation				
14 01 20	Elevator Rehabilitation				
<b>14 10 00</b>	<b>DUMBWAITERS</b>				
<b>14 20 00</b>	<b>ELEVATORS</b>				
14 21 00	Electric Traction Elevators (Passenger)				
14 21 13	Electric Traction Elevators (Freight)				
14 24 00	Hydraulic Elevators (Passenger)				
14 24 13	Hydraulic Elevators (Freight)				
14 24 23	Passenger Elevators				
		14 27 00	Elevator Cab Finishes (MDC standards)	<b>22 10 00</b>	<b>PLUMBING PIPING</b>
				22 11 23	Domestic Water Pumps
		<b>14 30 00</b>	<b>ESCALATORS AND MOVING WALKS</b>	22 13 23	Sanitary Waste Interceptors
				22 14 29	Sump Pumps
		<b>14 40 00</b>	<b>LIFTS</b>	22 15 00	General Service Compressed Air Systems
		14 42 00	Wheelchair Lifts		
DIVISION 15-20 (Not used)					
DIVISION 21 FIRE PROTECTION					
		<b>21 00 01</b>	<b>GENERAL</b>		
		<b>21 10 00</b>	<b>WATER BASED FIRE SUPPRESSION SYSTEMS</b>		
		<b>21 30 00</b>	<b>FIRE PUMPS</b>		
DIVISION 22 PLUMBING					
		<b>22 01 00</b>	<b>GENERAL</b>		
		22 05 29	Hangers and Supports for Plumbing Piping and Equipment	<b>23 01 00</b>	<b>GENERAL</b>
		22 05 53	Identification for Plumbing Piping and Equipment	23 08 00	HVAC Commissioning
		22 07 16	Plumbing Equipment Insulation	23 09 00	Instrumentation and Control for HVAC
		22 07 19	Plumbing Piping Insulation	23 09 23	Direct Digital Control System for HVAC
				<b>23 20 00</b>	<b>HVAC PIPING AND PUMPS</b>
				<b>23 30 00</b>	<b>HVAC AIR DISTRIBUTION</b>
				23 31 00	HVAC Ducts and Casing
				23 34 00	HVAC Fans
				<b>23 60 00</b>	<b>CENTRAL COOLING EQUIPMENT</b>
				23 64 00	Package Water Chillers
				23 65 00	Cooling Towers

<b>23 70 00</b>	<b>CENTRAL HVAC EQUIPMENT</b>	<b>27 10 00</b>	<b>STRUCTURED CABLING</b>	<b>32 20 00</b>	<b>EARTH MOVING</b>
23 72 00	Air-to-Air Energy Recovery Equipment	27 11 00	Communications Equipment Room Fittings	31 23 00	Excavation, Backfill, and Compaction
<b>23 80 00</b>	<b>DECENTRALIZED HVAC EQUIPMENT</b>	27 15 00	Horizontal Cabling	31 23 19	Dewatering
		27 16 00	Communications Connecting Cords, Devices and Adapters	<b>31 30 00</b>	<b>EARTHWORK METHODS</b>
<b>DIVISION 24-25 (Not used)</b>		<b>27 40 00</b>	<b>AUDIO-VIDEO COMMUNICATIONS</b>	31 31 00	Soil Treatment
				31 31 16	Termite Control
<b>DIVISION 26 ELECTRICAL</b>		<b>DIVISION 28 ELECTRONIC SAFETY SECURITY</b>		<b>31 60 00</b>	<b>SPECIAL FOUNDATIONS AND LOAD-BEARING ELEMENTS</b>
<b>26 01 00</b>	<b>GENERAL</b>	<b>28 01 00</b>	<b>GENERAL</b>	31 62 13	Concrete Piles
26 08 00	Commissioning of Electrical Systems	28 05 00	Intrusion Detection and Access Control		
26 09 13	Electrical Power Monitoring	<b>28 10 00</b>	<b>FIRE DETECTION AND ALARM SYSTEM</b>	<b>DIVISION 32 EXTERIOR IMPROVEMENTS</b>	
<b>26 20 00</b>	<b>LOW VOLTAGE ELECTRICAL DISTRIBUTION</b>	<b>28 20 00</b>	<b>VIDEO SURVEILLANCE</b>	<b>32 01 00</b>	<b>GENERAL</b>
<b>26 30 00</b>	<b>FACILITY ELECTRICAL POWER GENERATING AND STORING EQUIPMENT</b>	<b>28 40 00</b>	<b>LIFE SAFETY</b>	32 02 00	Civil
<b>26 40 00</b>	<b>ELECTRICAL PROTECTION</b>	28 48 00	Emergency Response systems	<b>32 10 00</b>	<b>BASES, BALLASTS, AND PAVING</b>
<b>26 50 00</b>	<b>LIGHTING</b>	<b>DIVISION 29-30 (Not used)</b>		32 10 01	General
<b>DIVISION 27 COMMUNICATIONS</b>		<b>DIVISION 31 EARTHWORK</b>		32 10 02	Paving and Surfacing
<b>27 01 00</b>	<b>GENERAL</b>	<b>31 00 01</b>	<b>GENERAL</b>	32 10 03	Electric Vehicle Supply Equipment Requirements
27 05 00	Common Work Results for Communications	<b>31 10 00</b>	<b>SITE CLEARING</b>	32 10 04	Protection of the Work
		31 10 01	Dig Permits	32 10 05	Repair of Pavement
				32 12 16	Asphalt Paving
				32 13 13	Concrete Paving
				32 13 16	Decorative Concrete Paving
				32 13 73	Concrete Paving Joint Sealants
				32 14 00	Unit Paving
				32 14 43	Permeable Unit Paving

32 17 13	Parking Bumpers	32 91 00	Planting Preparation and Guidelines	33 05 97	Identification and Signage for Utilities
32 17 16	Manufactured Traffic-Calming Devices	32 91 13	Soil Preparation	33 08 10	Commissioning of Water Utilities
32 17 23	Pavement Markings	32 91 13.16	Mulch	33 08 30	Commissioning of Sanitary Sewerage Utilities
32 18 01	Athletic Fields and Hardcourts	32 91 13.19	Planting Soil Mixing		
		32 91 16	Planting Soil Stabilization	33 08 40	Commissioning of Stormwater Utilities
<b>32 30 00</b>	<b>SITE IMPROVEMENTS</b>				
32 30 01	Bicycle Facilities	32 91 19	Landscape Grading	<b>33 10 00</b>	<b>WATER UTILITIES</b>
32 30 02	Guardrails	32 92 00	Turf and Grasses	33 14 00	Potable Water Systems
32 30 03	Traffic Signage	32 93 00	Plants	33 14 19.1	Backflow Prevention
32 30 04	Traffic Signals	32 96 00	Transplanting	33 14 19.2	Hydrants
32 30 05	Vision Triangle			33 19 00	Metering
32 31 00	Fence and Gates				
32 31 13	Chain Link Fences and Gates			<b>33 30 00</b>	<b>SANITARY SEWERAGE</b>
32 31 19	Decorative Fences and Gates	<b>32 93 00 B</b>	<b>GENERAL</b>	33 31 00	Sanitary Sewerage Piping
32 33 00	Site Furnishings	32 93 00 B.1	Tree Replacement Notes and Guidelines	33 32 00	Sanitary Sewerage Equipment
<b>32 80 00</b>	<b>IRRIGATION</b>				
<b>32 80 01</b>	<b>GENERAL</b>	32 93 00 B.2	Recommended Planting Lists	<b>33 40 00</b>	<b>STORMWATER UTILITIES</b>
32 81 00	Irrigation Components and Guidelines	32 93 00 B.3	Prohibited Planting List	33 42 00	Stormwater Conveyance
32 82 00	Irrigation Pumps	32 93 00 B.4	Typical Landscape Details (SK-32.01-Sk-32.11)	<b>33 50 00</b>	<b>GAS SERVICE</b>
32 84 00	Planting Irrigation				
32 84 13	Drip Irrigation			<b>33 60 00</b>	<b>HOT/CHILLED WATER</b>
<b>32 90 00</b>	<b>PLANTING</b>			<b>33 70 00</b>	<b>SITE ELECTRICAL</b>
<b>32 01 00</b>	<b>GENERAL</b>				
		<b>33 01 00</b>	<b>GENERAL</b>		
		33 05 09.43	Wet Taps		
		33 05 61.1	Sanitary Sewerage Manholes and Structures		
		33 05 61.2	Stormwater Manholes and Structures		
					<b>DESIGN CRITERIA – EDIT REQUEST</b>
					<b>END OF TABLE OF CONTENTS</b>

## FACILITIES MANAGEMENT DEPARTMENT

### MISSION

To provide a safe, high-performance, well-maintained physical environment by practicing responsible stewardship in the planning and delivery of all facility-related services.

### VISION

To be a nationally recognized leader in the creation and care of innovative environments that inspire student learning and enrich our community.

### LEADERSHIP

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## FACILITIES MANAGEMENT DEPARTMENT

### STANDARD OPERATING CHARTER

#### MISSION

#### VISION

#### LEADERSHIP

#### ORGANIZATIONAL CHART

#### FUNCTIONAL GROUPS



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**ORGANIZATIONAL CHART**

Please refer to attached link for the organizational chart for the Facilities Management Department.

<https://www.mdc.edu/facilities/docs/organizational-charts.pdf>

**FUNCTIONAL GROUPS**

**Facilities Budget Management**

Facilities Budget Management area is responsible for the department's fiscal operations including budget development, accounts payable, purchasing, and administrative services.

**Contracts Management**

Contracts Management area is responsible for the development and maintenance of all facilities management contracts for outsourced services and the current database for all RFQ's and contract-required documents.

**Maintenance Operations**

Maintenance Operations area is responsible for the maintenance and repair of the physical plant and grounds of Miami Dade College which consists of 134 buildings across 8 campuses totaling approximately 6.6 million net square feet.

**Planning**

Facilities Planning area is responsible for all facilities inventory and State reporting functions including the implementation of the annual Capital Improvement Plan and the Educational Plant Survey.



### Project Management

Project Management area is responsible for the development of all facets of minor and major capital projects for the college's 8 campuses from inception through design, construction, move-in and post-occupancy evaluation.

### Emergency Management

The mission of the Office of Emergency Preparedness (OEP) is to ensure the college is a disaster resilient institution of higher education by incorporating a "whole community" approach in its mitigation strategy to: prepare for, respond to, and recover from natural disasters or man-made hazards as a core capability.

This information is also available on MDC's departmental website: <https://www.mdc.edu/facilities/>

DESIGN SUBMITTAL  
STATEMENT

I, \_\_\_\_\_ Principal of \_\_\_\_\_,  
(Name of Principal) (Name of A/E Firm)

Hereby certify that all the documents submitted for \_\_\_\_\_,

have been coordinated among all the following design and/or specialty disciplines:

(Mark all that apply.)

- electrical*
- mechanical*
- structural*
- civil*
- landscape*
- estimating*
- specifications*
- other*

\_\_\_\_\_ *specify other specialty discipline(s)*

AND

Attest that to the best of my knowledge and professional belief, these documents are in compliance with the applicable state codes and MDCPS requirements (provide evidence by attaching complete deliverables checklist).

\_\_\_\_\_  
Signature

\_\_\_\_\_  
Date

**PHASE I**

**Schematic Design Documents**

- (a) Title Sheet, clearly labeled "Phase I", which includes all required data.
- (b) **A/E to obtain and/or provide the following material reports as per division 02:**
  - 1. Existing Condition Assessment
    - Movement and vibration assessment
    - Acoustic assessment
    - Traffic assessment
    - Accessibility assessment
    - Landscape assessment
  - 2. Environmental Assessment
    - Natural environment assessment
    - Air assessment
    - Water assessment
    - Land assessment
    - Soil assessment
  - 3. Hazardous Material Reports
    - Asbestos assessment
    - Lead assessment
    - Polychlorinated biphenyl assessment
    - Biological assessment
    - Mold assessment
- (c) Site Plan showing walls, roads, parking areas, existing and proposed contours, building locations and sizes, significant utility lines, and adjoining land use.
- (d) Documents including:
  - 1. 1/8" floor plans showing:
    - Programmed and Mechanical Spaces.
    - Wall Thickness
    - Room Sizes with Room Type and Number Identification
    - Layouts of All Fixed Equipment
  - 2. 1/4" Area Plans or More Complex Areas of Work, Including:
    - Labs
    - Kitchens
    - Mechanical Equipment Rooms
    - FF&E layout, including toilet rooms, labs. and kitchens (incl. I.C. and N.I.C. equipment)

**PHASE I**

**SCHEMATIC DESIGN**

\_\_\_\_\_  
DATE

\_\_\_\_\_  
PROJECT NAME

\_\_\_\_\_  
PROJECT #

\_\_\_\_\_  
A/E

\_\_\_\_\_  
A/E SIGNATURE



## MIAMI DADE COLLEGE – PHASE SUBMITTAL DELIVERABLES CHECKLIST

- 3. Exterior elevations of all facades showing:
  - Finished Grades
  - Floor Elevation
  - Fenestration
  - Materials
- 4. Reflected ceiling plans showing:
  - Lighting Layouts
- (e) Engineering Narratives
  - Civil
  - Landscape
  - Mechanical
  - Electrical
  - Plumbing
  - Structure
- (f) Index of Outline specifications
  - Include specification index for all items to be included in the project.
- (g) LEED minimum program compliance as per attached checklist at end of file. A/E to certify that a coordination meeting was scheduled during Phase I to delineate strategy to achieve LEED points as required by contract, including identifying equipment to complete a Life Cycle Cost Analysis (LCCA).
- (h) A completed Phase I deliverable checklist certifying that all required items are part of the Submittal.
- (i) A statement/checklist that certifies that the A/E has checked all documents for proper coordination of work among the different disciplines.



**PHASE II**

**Design Development Documents**

- (a) Title Sheet, clearly labeled "Phase II", which includes all required data.
- (b) Documents. Shall include in addition to the Phase I requirements the following:
  1. Site plan showing:
    - Acreage
    - Points of The Compass
    - Scale
    - Contours and General Topographical Conditions
    - Flood Plain Elevation and Velocity Zone
    - Overall Dimensions
    - Adjacent Highways
    - Roads
    - Emergency Access
    - Fire Hydrants
    - Power Transmission Lines
    - Transmission Lines
    - Ownership and Use of Adjacent Land
    - Walks and Paths
    - Vehicle and Bike Parking Areas
    - Accessibility for the Disabled
    - Service Areas
    - Play Areas
    - Bus and Car Loading Zones
    - Existing Buildings and Use
    - Location of Proposed Building(s) and Future Additions
    - Community Use Buildings
    - Phased Construction
  2. A statement on the site plan signed and dated by the A/E of record, identifying:
    - The FEMA flood plain
    - Velocity zone in which the project is located
  3. Evidence showing that the required environmental studies have been completed.
  4. Landscaping
    - Landscaping
    - Drainage
    - Water Retention Ponds
    - Sewage Disposal and Water Supply Systems
    - Such physical features that may adversely affect or enhance the safety, health, welfare, visual

**PHASE II**

**DESIGN DEVELOPMENT**

\_\_\_\_\_  
DATE

\_\_\_\_\_  
PROJECT NAME

\_\_\_\_\_  
PROJECT #

\_\_\_\_\_  
A/E

\_\_\_\_\_  
A/E SIGNATURE



## MIAMI DADE COLLEGE – PHASE SUBMITTAL DELIVERABLES CHECKLIST



- environment, or comfort of the occupants
5. A statement on the site plan, signed and dated by the design professional, identifying:
    - The number of existing trees
    - The number of required trees
    - The number of new trees to be planted
  6. Soil testing results.
    - Include soil report. When special foundation problems occur, submit the proposed method of treatment.
  7. Floor plans shall include, but not be limited to, the following:
    - a. A floor plan drawn at an architectural scale that will allow the entire facility to be shown on one sheet, without breaklines.
    - b. 1/4" Min. Floor plans drawn at a larger scale showing:
      - Typical Student Occupied Spaces or Special Rooms with Dimension
      - Equipment and Furnishing Layouts
      - Sanitary Facilities
      - Stairs
      - Elevators
      - Identification of Accessible Areas for the Disabled
    - c. Floor Plans for Additions to an Existing Facility that Indicate:
      - Connections and tie-ins to the Building
      - Include All Existing Spaces
      - Exits
      - Plumbing Fixtures and Locations
      - Any Proposed Changes Thereto
      - And Distinguish Between New and Existing Areas for Renovation, Remodeling or an Addition
  8. Plans and diagrams (riser) illustrating:
    - Basic Structural Systems that Establish Size/Relationship Requirements
    - Basic Mechanical Systems that Establish Size/Relationship Requirements
    - Basic Electrical Systems that Establish Size/Relationship Requirements
      - Floor Plans shall clearly indicate dimensions and locations of electrical utility company Transformer or Vault, Switchgear Room, Electrical, IT Rooms, and routing of incoming electric and Telephone Utilities
      - Preliminary rough order of magnitude load summaries shall be shown for normal and emergency power
  9. Building and typical wall sections, including:
    - Roof and Footing
    - Column and Beam Schedule
    - Foundation Plans. Reinforcement, and Preliminary Calculations
  10. Preliminary schedules
  11. 1/8" Min. Life-safety plan showing:



- exit strategy
- rated doors and walls
- emergency wall openings
- working stage protection
- range and fume hoods
- eye wash
- emergency showers
- Brief calculation of Life Safety Items
  - a. By symbol, indicate:
    - Fire Sprinklers If Provided
    - Fire Alarm Equipment
    - Smoke Vents
    - Master Valves and Emergency Disconnects
    - Emergency Lighting
    - Emergency Power Equipment
    - Fire Extinguishers
    - Exit Signs
    - Smoke and Fire Dampers
    - Other Life-Safety Equipment Relevant to the Facility
  - b. By symbol, indicate connections and tie-ins to existing equipment.
- 12. Plumbing fixture
  - Locations and fixture unit calculations.
- 13. 1/8" Min. Elevations
  - A minimum of two (2) exterior building elevations, and others as necessary to show the general character of the facility.
- 14. 1/8" Min. Typical building sections showing:
  - Dimensions
  - Proposed Construction Materials
  - Relationship of Finished Floor to Finished Grades.
- 15. Outline Specifications, with General Descriptions of:
  - Finishes
  - Materials
  - Systems Including:
    - HVAC
    - Electrical
    - Plumbing
    - specialty items, including fire sprinklers, if proposed.
- (c) Life-Cycle Cost Analysis (LCCA). LCCA by a commercially available life-cycle cost analysis program. Include assumptions made and or data sources, must include equipment, installation, energy, water, operational and maintenance costs, as well as any overhauls or other costs. Identify potential utility



## MIAMI DADE COLLEGE – PHASE SUBMITTAL DELIVERABLES CHECKLIST



- rebates. To be updated in selecting specific equipment.
- (d) Florida Energy Efficiency Code for Building Construction (FEEC) forms, including:
  - Calculations for Mechanical Systems.
  - Documenting Energy Efficiency Ratio Rating of HVAC Equipment
  - Electrical Systems
  - Insulation and Building Envelope
- (e) LEED minimum program compliance as per attached checklist at end of file. A/E to certify that a coordination meeting was scheduled during Phase II to delineate/update strategy to achieve LEED points as required by contract
- (f) Present to MDC preliminary finish options for review and approval
- (g) Written responses to all outstanding comments/mandatories from previous phase I

**PHASE III**

**Construction Documents (50%)**

- (a) Title Sheet clearly labeled and dated indicating “50% Construction Documents”.
- (b) Documents. Shall include, in addition to Phase I & II requirements, the following:
  - 1. Key Plan/Drawing Index identifying areas of the work-to be used as a reference for the various indexed drawing.
  - 2. Site Plans:
    - Indicating architectural features (sidewalks, ramps, paving, etc.)
    - Indicating engineering features (underground lines. catch basins, etc.)
    - If new site development, a separate drawing for cut and fill.
    - Phasing plans and time work is to be completed.
    - Associate narrative for each phase
  - 3. Exterior elevations of facades in new construction and affected elevations in existing facilities
  - 4. Interior elevations, to include but not be limited to:
    - Toilet rooms
    - Locker/shower rooms
    - Food Service areas
    - Casework installations
    - Typical chalkboard/tackboard installations
    - Typical signage installations
    - Doors and Windows
    - Outlet location
    - Wall lighting, Fire alarm devices, PA, Clocks
    - Architectural millwork
    - Finishes
    - Paint plans
    - Finish floor plans
  - 5. • Roofing plan where new roofing or reroofing is involved.
  - 6. • Foundation plan
  - 7. • Wall sections and partition sections identified with reference to a section
  - 8. • Schedules (minimum)
    - Door
    - Window

**PHASE III**

**CONSTRUCTION DOCUMENTS 50%**

\_\_\_\_\_  
DATE

\_\_\_\_\_  
PROJECT NAME

\_\_\_\_\_  
PROJECT #

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A/E

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A/E SIGNATURE



- Hardware
- Equipment (including Owner-furnished and installed)
- Casework
- Electrical panels and equipment
- Column, beam, and footings
- Room finishes
- Space charts (on floor plans)
- Others, as required by PM
- 9. Reflected ceiling plan indicating tile grid, lights, diffusers, soffits, etc. if the ceiling is being installed or modified.
- 10. Safety Barrier/fence locations
  - Show phasing, required barricades and site security fencing
  - Provide adequate narrative on appropriate drawings
- 11. Structural:
  - General Structural Notes indicating material basic information (concrete strength, steel ASTM designation, etc.).
  - Progress beams columns and footings schedules and floor plans.
  - Elevation designations for all levels.
  - Sections.
  - Soil investigation and recommendations report signed and sealed by Registered Geotechnical Engineer.
  - Uplift pressure diagram by zones as per ASCE 7-93.
  - Preliminary Structural design calculations
- 12. HVAC/Electrical/Plumbing/Civil:
  - Electrical Vehicle Charging stations, Solar water heating, Photovoltaic (Solar Energy) and power monitoring need to be added and checked if applicable.
  - Preliminary set of specifications.
  - Preliminary detailed and itemized construction cost estimate according to contract requirements, including the updated LCCA with any applicable rebates or incentives from FPL for energy efficient equipment.
  - Progress drawings coordinated with plans and specifications of structural, architectural, electrical, civil, laboratory equipment supplier, kitchen equipment supplier work, and not-in-contract equipment.
- 13. Progress Mechanical and Electrical coordination shall include the following:
  - Electrical Floor plans should indicate room numbers, light density in Watts per Square Foot, and lighting levels in foot-candles, for each room/space shown.

## MIAMI DADE COLLEGE – PHASE SUBMITTAL DELIVERABLES CHECKLIST

50%

- Show location of Electrical Panels, TV, Fire Alarm, Intercom, Security, Surveillance and Telephone/Data equipment. Show ¼” scale or larger layout of Switchgear Room and Electric Rooms with all equipment drawn to scale.
- Show Lighting Layout for all spaces including Site Lighting. Show detailed information on all Lighting Systems, Device Locations for all Electrical Systems, and connections for all Mechanical Systems Equipment including the interlock with the BAS of lighting occupancy sensors. This shall include all power and data connections for receptacles, computers, printers, telecommunications and audio visual devices.
- Show overall Life Safety Plan, including Emergency and Exit Lighting, Fire Alarm initiation and notification devices and Intercom.
- Provide riser diagrams for the following: Utility Source, Service Entrance, Distribution Equipment, Feeders, Panelboards, Telephone/Data, Fire Alarm, Intercom Systems, Access Control and Surveillance Systems.
- Provide the following Schedules: Panel Schedules, Feeder Schedules, Transformer Schedules, Power Generation and Photovoltaic Systems.
- Plans for all Lighting, Power, and Systems shall be on 1/8” scale (minimum). Lighting plans shall be on separate sheets from Power. Also, Fire Alarm Systems shall be shown on separate drawings. Telephone/Data, Intercom, Surveillance Access Control and Security Systems may be combined on the same drawing or be shown separately.
- Reflected Ceiling Plans, showing Lighting, shall also show location of all devices including and not limited to ceiling diffusers, sprinkler heads, speakers and strobes
- Equipment capacities, voltages, and phasing.
- Wiring diagrams and control sequence narrative.
- Additional materials and equipment furnished and installed by specific trades.
- Plumbing and HVAC controls.
- Progress motor control component diagrams noting factory, and field wiring.
- Progress temperature control component diagrams noting specific contractor responsibility.
- Progress HVAC air distribution system and equipment including valving, instrumentation, controls, temperature sensors, smoke detectors, humidistats, and other associated components.
- Progress plumbing and HVAC piping system component diagrams including details of control and coil valving, strainers, thermometers, pressure gages with pressure snubbers, shut-off cocks, and other associated components.
- Progress control diagrams for kitchen ventilation system including components.
- Progress BAS/controls schedule to include controls hardware, monitoring and control points identifying equipment monitored/controlled and sequence of operations.
- Provide the following, but not limited to, drawings, details, and schedules:
- HVAC schedules with reference flag notation to be used in equipment rooms for identification.

- Progress Plumbing schedules.
- Progress fan schedules including area served by type of fan, wheel, arrangement, CFM, static pressures in inches of WG, maximum allowable brake horsepower, speed, voltage, phase, and zone ratings.
- Roof curbs, flashing details, platforms, hanging and support methods, vibration isolators, housekeeping pads, and other equipment mounting details.
- Duct and piping roof penetration details.
- Ductwork flags indicating SMACNA pressure change construction classifications.
- Indicate insulation requirements at fringe areas to indicate interior, exterior, exposed, or concealed.
- Fire damper and fire/smoke damper mounting details.
- Coil connections, water treatment, air compressor controls, expansion tanks, duct fittings, branch takeouts, splinters, lab equipment, and other equipment or installation details required for clarity.
- Vertical or horizontal duct, pipe, and insulation supports.
- Architectural life safety plan indicating fire rated walls coordinated with mechanical and fire protection drawings.
- Fire protection system layout if required including hydraulic calculations according to NFPA.
- 14. Provide 1/4" or larger scale drawings including, but not limited to, the following congested areas.
  - Group toilets.
  - Group showers.
  - Laboratories.
  - Kitchens.
  - Equipment rooms.
  - Plumbing Sections and details.
  - Provide riser diagrams as applicable for: sanitary, domestic water, storm drainage, gas, acid, compressed air, solar energy system, chiller equipment room
  - Riser diagrams.
- 15. Plumbing and civil drawings shall include the following in addition to the general requirements:
  - Adjacent streets located and identified.
  - Existing, new, and future construction located and identified including curbing, fences, and gates.
  - Finished NVGD elevations of existing and new construction to include finish floors, walks, roadways, and landscaped or play areas.
  - Plumbing legend and abbreviations.
  - Correct job title.
  - Locate and provide sizing, loads including fixture units, materials, maximum and minimum pressures, slopes and inverts at building exit, obstructions or other lines, and points of connection

within property lines of the following:

- Sewer, drainage, gas, fuel oil, fire, and water lines.
- Chilled water and heating lines.
- Wells, manholes, tanks, catch basins, soakage pits, french drains, septic tanks, and drain fields.
- Potential hazards or obstructions for plumbing system installation created by existing or new utilities or construction.
- Distance separation noted between building foundations and parallel pressure, sewer, or drainage lines to avoid pressure gradients and undermining conditions.
- 16. Drawings and specifications shall assign sole responsibility to the contractor:
  - For locating buried pipes and duct banks, with hand trenching as necessary.
  - To repair damage at the contractor's expense.
  - Extension of utilities to grassed areas to provide for future building connections. Provide line termination with cap or plug in valve boxes or valves at pressure lines if new construction is scheduled within 3 years.
  - Note on site plan "CONTRACTOR SHALL VERIFY DEPTHS AND LOCATIONS OF CONNECTION POINTS TO EXISTING PRESSURE LINES AND DRAINAGE LINES BEFORE STARTING WORK".
  - Minimum and maximum water pressures.
  - At line connections and appropriate intervals, identify slopes and loads as existing, capacity available, future, and maximum allowable. Loads shall be noted as follows:
    - Fixture units at sewer or water lines.
    - Square footage of roof and paved areas for storm drainage lines.
    - Tonnage on HVAC condensate lines.
    - Type, pressure, material, and cubic feet per hour of gas lines.
    - Gallons per minute at fire lines.
    - Locations, size, and identify adjacent and on-site domestic water lines, fire lines, and facility water meters.
  - A heating and air-conditioning site plan of large central systems. Small systems may be shown on plumbing site plan if properly cross referenced.
- 17. Plumbing floor plans shall include the following:
  - Plumbing connections of fixtures and equipment to the appropriate system.
  - Fixture and equipment identification by the common name abbreviation and a number of each different model of the same type on risers, details, and other drawing locations.

Examples:

WC-1	Water closet
WC-2	Water closet, ADA accessible
L-1	Lavatory, wall hung
L-2	Lavatory, counter top
L-3	Lavatory, ADA accessible
SK-1	Sink, stainless steel
SK-2	Sink, enameled cast iron
ARSK-1	Acid resistant sink
EWC-1	Electric water cooler
EWC-2	Electric water cooler (ADA accessible)
PLTR-1	Plaster trap
FD-1	Floor drain
HD-1	Fume Hood

- Routings shall be generally parallel building walls. Standardized symbols and text shall locate and identify lines rises, drops, valves, cleanouts, and other related items
- Locate plumbing lines at finished areas in chases. Lines routed in stud partitions shall be coordinated with electrical and other trades to insure adequate fit. Block walls shall not be cut to install vertical or horizontal lines.
- 18. Note elevations on floor plans of:
  - Sanitary lines underground.
  - Storm lines underground.
  - Acid waste lines underground.
  - Plumbing lines at obstructions, offsets at HVAC ducts, allowable beam penetrations, and limited or congested areas shall be detailed separately or shown on 1/4" per foot minimum scale drawings.
  - Pressure lines, gravity lines, or systems grouped for compatibility at congested areas may be shown on separate drawings. Reference separated systems to a specific drawing.
  - Coordinate storm drainage system for roof material, roof assembly thickness, gutter, downspout sizes, and locations. (detail at roof sumps).
  - Insulation for condensation protection is not necessary for rain water leaders, domestic cold water lines, or other similar systems unless installed in a plenum
  - Field tag numbers of installed valves shall correspond to drawing valve number identification.
  - Reference line continuation at match lines or drawings of a different scale to a specific drawing.
  - Isometric drawings shall provide an ellipse at slab penetrations.
  - Identify and provide utilities to NIC equipment to be installed by contractor or for future installation by others with provision of utilities.

## MIAMI DADE COLLEGE – PHASE SUBMITTAL DELIVERABLES CHECKLIST

III 50%

- Isolation valves for groups of fixtures for domestic water lines.
  
- (c) Before 50% submittal, consult with personnel from MDC Facilities Operations Maintenance, Office of Emergency Management (OEM), and MDC Police, to identify final locations to receive access control system, motion detectors and other security measures.
  
- (d) Submit final color board for MDC approval as per Division 09 under “General Requirements”.
  
- (e) A completed Phase III (50%) deliverable checklist certifying that all required items are part of the submittal. Signature certifies that the A/E has checked all documents for proper coordination of work among the different disciplines.
  
- (f) Written responses to all outstanding comments/mandatories from previous phase II



**PHASE III**

**Construction Documents (90%)**

- (a) Title Sheet clearly labeled and dated indicating “90% Construction Documents”.
- (b) Documents. Shall include, in addition to Phase I, II & III 50% requirements, the following:
  - 1. Key Plan/Drawing Index identifying areas of the work-to be used as a reference for the various indexed drawing.
  - 2. Site Plans:
    - Indicating architectural features (sidewalks, ramps, paving, etc.)
    - Indicating engineering features (underground lines. catch basins, etc.)
    - If new site development, a separate drawing for cut and fill.
    - Phasing plans and time work is to be completed.
    - Associate narrative for each phase
  - 3. Exterior elevations of facades in new construction and affected elevations in existing facilities
  - 4. Interior elevations, to include but not be limited to:
    - Toilet rooms
    - Locker/shower rooms
    - Food Service areas
    - Casework installations
    - Typical chalkboard/tackboard installations
    - Typical signage installations
    - Outlet location
    - Doors and Windows
    - Wall lighting, Fire alarm devices, PA, Clocks
    - Architectural millwork
    - Finishes
    - Paint plans
    - Finish floor plans
  - 5. • Roofing plan where new roofing or reroofing is involved.
  - 6. • Foundation plan
  - 7. • Wall sections and partition sections identified with reference to a section
  - 8. • Schedules (minimum)
    - Door
    - Window

**PHASE III**

**CONSTRUCTION DOCUMENTS 90%**

\_\_\_\_\_  
DATE

\_\_\_\_\_  
PROJECT NAME

\_\_\_\_\_  
PROJECT #

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A/E

\_\_\_\_\_  
A/E SIGNATURE



- Hardware
- Equipment (including Board-furnished and installed)
- Casework
- Electrical panels and equipment
- Column, beam, and footings
- Room finishes
- Space charts (on floor plans)
- Others, as required by PM
- 9. Reflected ceiling plan indicating tile grid, lights, diffusers, soffits, etc. if the ceiling is being installed or modified.
- 10. Safety Barrier/fence locations
  - Show phasing, required barricades and site security fencing
  - Provide adequate narrative on appropriate drawings
- 11. Structural:
  - General Structural Notes indicating material basic information (concrete strength, steel ASTM designation, etc.).
  - Complete beams columns and footings schedules and floor plans.
  - Elevation designations for all levels.
  - Sections.
  - Soil investigation and recommendations report signed and sealed by Registered Geotechnical Engineer.
  - Uplift pressure diagram by zones as per ASCE 7-93.
  - Complete Structural design calculations
- 12. HVAC/Electrical/Plumbing/Civil:
  - Electrical Vehicle Charging stations, Solar water heating, Photovoltaic (Solar Energy) and power monitoring need to be added and checked if applicable.
  - Completed set of specifications.
  - Completed detailed and itemized construction cost estimate according to contract requirements, including the updated LCCA with any applicable rebates or incentives from FPL for energy efficient equipment.
  - Completed drawings coordinated with plans and specifications of structural, architectural, electrical, civil, laboratory equipment supplier, kitchen equipment supplier work, and not-in-contract equipment.
- 13. Mechanical and electrical coordination shall include the following:
  - Show all branch circuits assigned for electric power outlets, dedicated for equipment, and lighting.

## MIAMI DADE COLLEGE – PHASE SUBMITTAL DELIVERABLES CHECKLIST

90%

- Provide Computer Generated Photometric analysis for Normal and Emergency Lighting of all rooms. This shall include Min/Max, Average, Max/Min, Average/Min ratios.
- Provide completed and detailed Feeder and Transformer Schedules, as well as other equipment schedules revised from 50% review.
- Provide detailed, filled and completed directories showing sizes, mains, branch breakers and A/C ratings for Distribution type and power and lighting panelboards.
- Electrical raiser diagrams shall be provided for complete power distribution, Fire Alarm Systems, Data/Telecommunication, Access Control, CCTV and Surveillance Systems.
- Voltage drop calculations for all feeders.
- Fault current analysis and calculations in symmetrical RMS Amps at specified Voltage.
- Selective coordination of overcurrent protective devices. Upon completion of electrical distribution installation, the EOR shall provide a written certification that settings for all adjustable circuit breakers have been verified to match the values used for the Time Current Coordination (TCC) study.
- Arc flash hazard analysis (AFHA) – Present calculations as indicated on Division 26 01 00 F
- Upon approval, provide instructions to fabricate labels for the following electrical equipment: service entrance, switchboards, distribution panelboards, Motor Control Centers (MCCs), Automatic Transfer Switches (ATS's) and fire pump controllers.
- The phrase "ARC Flash Information" shall be written on a banner on top of the label
- Additional materials and equipment furnished and installed by specific trades.
- Plumbing and HVAC controls.
- Completed motor control component diagrams noting factory, and field wiring.
- Completed temperature control component diagrams noting specific contractor responsibility.
- Completed HVAC air distribution system and equipment including valving, instrumentation, controls, temperature sensors, smoke detectors, humidistats, and other associated components.
- Completed plumbing and HVAC piping system component diagrams including details of control and coil valving, strainers, thermometers, pressure gages with pressure snubbers, shut-off cocks, and other associated components.
- Completed control diagrams for kitchen ventilation system including components.
- Completed BAS/controls schedule to include controls hardware, monitoring and control points identifying equipment monitored/controlled and sequence of operations.
- Provide the following, but not limited to, drawings, details, and schedules:
  - HVAC schedules with reference flag notation to be used in equipment rooms for identification.
  - Plumbing schedules.
  - Completed fan schedules including area served by type of fan, wheel, arrangement, CFM, static pressures in inches of WG, maximum allowable brake horsepower, speed, voltage, phase, and

- zone ratings.
- Roof curbs, flashing details, platforms, hanging and support methods, vibration isolators, housekeeping pads, and other equipment mounting details.
- Duct and piping roof penetration details.
- Ductwork flags indicating SMACNA pressure change construction classifications.
- Indicate insulation requirements at fringe areas to indicate interior, exterior, exposed, or concealed.
- Fire damper and fire/smoke damper mounting details.
- Coil connections, water treatment, air compressor controls, expansion tanks, duct fittings, branch takeouts, splinters, lab equipment, and other equipment or installation details required for clarity.
- Vertical or horizontal duct, pipe, and insulation supports.
- Architectural life safety plan indicating fire rated walls coordinated with mechanical and fire protection drawings.
- Fire protection system layout if required including hydraulic calculations according to NFPA.
- 14. Provide 1/4" or larger scale drawings including, but not limited to, the following congested areas.
  - Group toilets.
  - Group showers.
  - Laboratories.
  - Kitchens.
  - Equipment rooms.
  - Plumbing Sections and details.
  - Provide riser diagrams as applicable for: sanitary, domestic water, storm drainage, gas, acid, compressed air, solar energy system, chiller equipment room
  - Riser diagrams.
- 15. Plumbing and civil drawings shall include the following in addition to the general requirements:
  - Adjacent streets located and identified.
  - Existing, new, and future construction located and identified including curbing, fences, and gates.
  - Finished NVGD elevations of existing and new construction to include finish floors, walks, roadways, and landscaped or play areas.
  - Plumbing legend and abbreviations.
  - Correct job title.
  - Locate and provide sizing, loads including fixture units, materials, maximum and minimum pressures, slopes and inverts at building exit, obstructions or other lines, and points of connection within property lines of the following:
    - Sewer, drainage, gas, fuel oil, fire, and water lines.
    - Chilled water and heating lines.

## MIAMI DADE COLLEGE – PHASE SUBMITTAL DELIVERABLES CHECKLIST

90%

- Wells, manholes, tanks, catch basins, soakage pits, french drains, septic tanks, and drain fields.
- Potential hazards or obstructions for plumbing system installation created by existing or new utilities or construction.
- Distance separation noted between building foundations and parallel pressure, sewer, or drainage lines to avoid pressure gradients and undermining conditions.
- 16. Drawings and specifications shall assign sole responsibility to the contractor:
  - For locating buried pipes and duct banks, with hand trenching as necessary.
  - To repair damage at the contractor's expense.
  - Extension of utilities to grassed areas to provide for future building connections. Provide line termination with cap or plug in valve boxes or valves at pressure lines if new construction is scheduled within 3 years.
  - Note on site plan "CONTRACTOR SHALL VERIFY DEPTHS AND LOCATIONS OF CONNECTION POINTS TO EXISTING PRESSURE LINES AND DRAINAGE LINES BEFORE STARTING WORK".
  - Minimum and maximum water pressures.
  - At line connections and appropriate intervals, identify slopes and loads as existing, capacity available, future, and maximum allowable. Loads shall be noted as follows:
    - Fixture units at sewer or water lines.
    - Square footage of roof and paved areas for storm drainage lines.
    - Tonnage on HVAC condensate lines.
    - Type, pressure, material, and cubic feet per hour of gas lines.
    - Gallons per minute at fire lines.
    - Locations, size, and identify adjacent and on-site domestic water lines, fire lines, and facility water meters.
  - A heating and air-conditioning site plan of large central systems. Small systems may be shown on plumbing site plan if properly cross referenced.
- 17. Plumbing floor plans shall include the following:
  - Plumbing connections of fixtures and equipment to the appropriate system.
  - Fixture and equipment identification by the common name abbreviation and a number of each different model of the same type on risers, details, and other drawing locations.

### Examples:

WC-1	Water closet
WC-2	Water closet, ADA accessible
L-1	Lavatory, wall hung
L-2	Lavatory, counter top

## MIAMI DADE COLLEGE – PHASE SUBMITTAL DELIVERABLES CHECKLIST

90%

L-3	Lavatory, ADA accessible
SK-1	Sink, stainless steel
SK-2	Sink, enameled cast iron
ARSK-1	Acid resistant sink
EWC-1	Electric water cooler
EWC-2	Electric water cooler (ADA accessible)
PLTR-1	Plaster trap
FD-1	Floor drain
HD-1	Fume Hood

- Routings shall be generally parallel building walls. Standardized symbols and text shall locate and identify lines rises, drops, valves, cleanouts, and other related items
- Locate plumbing lines at finished areas in chases. Lines routed in stud partitions shall be coordinated with electrical and other trades to insure adequate fit. Block walls shall not be cut to install vertical or horizontal lines.
- 18. Note elevations on floor plans of:
  - Sanitary lines underground.
  - Storm lines underground.
  - Acid waste lines underground.
  - Plumbing lines at obstructions, offsets at HVAC ducts, allowable beam penetrations, and limited or congested areas shall be detailed separately or shown on 1/4" per foot minimum scale drawings.
  - Pressure lines, gravity lines, or systems grouped for compatibility at congested areas may be shown on separate drawings. Reference separated systems to a specific drawing.
  - Coordinate storm drainage system for roof material, roof assembly thickness, gutter, downspout sizes, and locations. (detail at roof sumps).
  - Insulation for condensation protection is not necessary for rain water leaders, domestic cold water lines, or other similar systems unless installed in a plenum
  - Field tag numbers of installed valves shall correspond to drawing valve number identification.
  - Reference line continuation at match lines or drawings of a different scale to a specific drawing.
  - Isometric drawings shall provide an ellipse at slab penetrations.
  - Identify and provide utilities to NIC equipment to be installed by contractor or for future installation by others with provision of utilities.
  - Isolation valves for groups of fixtures for domestic water lines.
- (c) Submit plans, specifications, and preliminary hardware schedule to Office of Emergency Management (OEM) at least four (4) weeks prior to Phase III-90%

- (d) Submit final color board for MDC approval as per Division 09 under “General Requirements”.
- (e) A completed Phase III (90%) deliverable checklist certifying that all required items are part of the submittal. Signature certifies that the A/E has checked all documents for proper coordination of work among the different disciplines.
- (f) Written responses to all outstanding comments/mandatories from previous phase III 50%



**PHASE III**

**Construction Documents (100%)**

- (a) General Requirements.
  - 1. This submittal is the official record set. Any changes to the documents after approval shall be resubmitted signed and sealed.
  - 2. Only complete documents, signed and sealed by the design professionals, will be accepted for review; in addition, these documents shall contain a statement of compliance by the architect or engineer of record that "To the best of my knowledge these drawings and the project manual are complete, and comply with the State Requirements for Educational Facilities".
  - 3. When requested by the office, engineering calculations for mechanical, electrical, and structural systems shall be submitted separately from drawings and the project manual.
  - 4. Changes to the contract documents may be made by addenda or resubmittal of documents graphically indicating the changes. Addenda shall be signed and sealed by the design professionals and submitted to the office in duplicate as they occur during the bidding process.
- (b) Documents. The documents shall include, in addition to Phase III 90% document requirements, the following:
  - 1. Site plans including, but not limited to:
    - Area location map
    - Legal description of property
    - Demolition
    - Excavation
    - Utilities
    - Finish grading
    - Landscaping
    - Mechanical
    - Electrical
    - Civil/structural
    - Architectural site plans
  - 2. Plans and details including, but not limited to:
    - a. Title sheets including:
      - A table of contents
      - Statement of compliance by the architect or engineer of record
      - A list of abbreviations for each discipline

**PHASE III**

**CONSTRUCTION DOCUMENTS 100%**

\_\_\_\_\_  
DATE

\_\_\_\_\_  
PROJECT NAME

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PROJECT #

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A/E

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A/E SIGNATURE





## MIAMI DADE COLLEGE – PHASE SUBMITTAL DELIVERABLES CHECKLIST

100%

- A schedule of material indications
- A schedule of notations and symbols at the beginning of each discipline's section of the plans.
- b. Architectural sheets including:
  - Floor plans
  - Door, window, and finish schedules
  - Roof plans
  - Elevations
  - Sections
  - Details
- c. Civil/Structural sheets including:
  - Paving
  - Drainage
  - Foundation plans
  - Floor plans; root plans
  - Structural plans
  - Sections
  - Details
  - Pipe, culvert, beam and column schedules
- d. Mechanical sheets including:
  - Floor plans
  - Sections
  - Details
  - Riser diagrams
  - Kitchen exhaust hoods
  - Equipment, fan, and fixture schedules
- e. Electrical sheets including:
  - Floor plans
  - Sections
  - Details
  - Riser diagrams
  - Fixture and panel schedules.
- f. Life Safety Plans
  - Rated Walls and rating (fire and smoke, ceilings). Provide UL assembly number.
  - Means of Egress (exits, corridors, secondary means of egress)
  - Details and sections of rated walls (sealed to roof deck, sealed at pipe Penetrations, sealed

- at HVAC duct penetrations and how to seal).
    - Locations of fire and smoke dampers in rated walls.
    - Rated doors, frames and rating, rated hardware, glass. (This can be a schedule, on or facing floor plan, include hardware, closers, magnetic holders, latches, locks) and send a copy of catalogue cut sheet to expedite review.
    - Room name and number
    - Rescue access panels
    - Exit light locations, emergency light locations in relationship to exit corridors.
    - Exit Calculations
    - Areas with fire sprinklers
    - Emergency systems plan electrical: fire alarm, emergency power panels, outlets, generator, cut-offs, room number and name, lights, and other electrical emergency system features.
    - Emergency systems plan mechanical: fire and smoke dampers relating to rated walls, fire extinguishers, emergency eyewash/shower, emergency utility cut-offs, sprinklered areas.
    - Description of emergency systems and interconnects.
  - g. The drawings should indicate that the approved mechanical/electrical systems, from the Phase II FEEC/LCCA analysis, have been incorporated into the documents.
  - h. Drawings and Specifications shall include performance specifications defined in the LCCA, MDC equipment specifications as applicable and utility rebate equipment requirements.
- (c) Project Manual. The project manual shall include, but not be limited to, the following:
- 1. Title Page including a statement of compliance by the architect or engineer of record.
  - 2. Table of Contents.
  - 3. Schedule of Drawings.
  - 4. Invitation to Bid and Advertisement for Bids.
  - 5. Instructions to Bidders, including date and time of bid opening and notice of Prebid conference.
  - 6. Sample Forms, including:
    - Bid Form requiring the general contractor's license number
    - Subcontractors list requiring names and license numbers
    - Owner/Contractor Agreement
    - Performance and Payment Bond
    - Change Order
    - Public Entity Crime Form.
  - 7. Bonding Requirements. Bonds are required on projects costing two hundred thousand dollars (\$200,000) or more. On projects with costs less than two hundred thousand dollars (\$200,000), bonds shall be at the discretion of the board as follows:
    - a. Bid Security equaling five (5%) percent of the base bid. Security shall be in the form of a

- certified check, cashier's check, treasurer's check, or bank draft of any national or state bank.
- b. Performance Bond and Materials Payment Bond. Each bond shall equal one hundred (100%) percent of the contract amount, and shall be with a surety insurer authorized to do business in Florida and complying with section 255.05, F.S.
  - c. Where the contract amount does not exceed five hundred thousand dollars (\$500,000) the board shall accept a bonding company which meets the provisions of section 287.0935, F.S.
8. Insurance Requirements. The project shall be covered by the following insurance, with limits as required by law:
- a. Worker's compensation and employer's liability.
  - b. Public liability to include personal injury, bodily injury, and property damage.
  - c. Products and completed operations liability.
  - d. Owner's protective liability.
  - e. Business automobile liability, including owned, non-owned, and hired automobiles.
  - f. Property all-risks coverage to one hundred (100%) percent of the value at risk. This is subject to the deductibles acceptable to the board.
  - g. Boiler and machinery insurance as required.
9. General Conditions and Supplementary Conditions including, but not limited to, the following:
- a. Alternates for materials, systems, or methods shall be listed in the bidding documents and taken in the order listed. Deductive alternates must be used if bidding is to take place within two (2) months of reversion of state funds.
  - b. Notice of time limit and method of payment to the contractor including final payment.
  - c. Time limit in which the construction is to be completed.
  - d. The rate of liquidated damages to be paid by the contractor for failure to comply with the time limits of the contract.
  - e. Federal wage rates and hourly scabs shall be used where required by federal fund source. Federal wage rates shall be secured from the Federal Department of Labor. When using a Federal wage rate, Federal, workers compensation must also be used. Federal wage rates are not required for construction projects financed totally from local or state funds.
  - f. Where projects include trenching, which exceeds a depth of five (5) feet reference shall be made to the trench safety standard as required by Section 553.63 and 553.64, F.S.
  - g. For projects including threshold buildings, the shoring and reshoring plans shall be submitted by the contractor, through the board, to the office for review and approval prior to beginning the structural portions of the construction.
  - h. For projects including asbestos abatement, a board may indemnify and hold harmless an asbestos consultant against acts of omission or release of contaminants during asbestos

- abatement activities in accordance with section 255.551 through 255.565, F.S.
- i. A provision setting forth who shall pay for standard tests of concrete, plumbing, electrical steel and others as required by industry standards
  - j. A provision setting forth who shall pay for the testing of questionable installations, procedures, products, or materials in the construction phase.
  - k. Test and balance services for HVAC systems shall be provided by a company employed by the board.
  - l. Commissioning of the HVAC, controls, electrical and plumbing systems shall be provided by a company employed by the Board.
  - m. Threshold building inspectors, when required, shall be employed by the board
  - n. Identification of sole source specifications approved by the board.
10. Specifications. Written requirements for materials, equipment, construction systems, standards, workmanship, and performance of related services.
11. Addenda.
- (d) Resubmit a revised, corrected hardware schedule to Office of Emergency Management (OEM) prior to issuance of the final Phase III-100% CD for building permit review.

Y		?		N				
0		0		0		Credit	Integrative Process	1
0		0		0		<b>Location and Transportation</b>		<b>16</b>
0		0		0		Credit	LEED for Neighborhood Development Location	16
0		0		0		Credit	Sensitive Land Protection	1
0		0		0		Credit	High Priority Site	2
0		0		0		Credit	Surrounding Density and Diverse Uses	5
0		0		0		Credit	Access to Quality Transit	5
0		0		0		Credit	Bicycle Facilities	1
0		0		0		Credit	Reduced Parking Footprint	1
0		0		0		Credit	Green Vehicles	1
0		0		0		<b>Sustainable Sites</b>		<b>10</b>
Y						Prereq	Construction Activity Pollution Prevention	Required
0		0		0		Credit	Site Assessment	1
0		0		0		Credit	Site Development - Protect or Restore Habitat	2
0		0		0		Credit	Open Space	1
0		0		0		Credit	Rainwater Management	3
0		0		0		Credit	Heat Island Reduction	2
0		0		0		Credit	Light Pollution Reduction	1
0		0		0		<b>Water Efficiency</b>		<b>11</b>
Y						Prereq	Outdoor Water Use Reduction	Required
Y						Prereq	Indoor Water Use Reduction	Required
Y						Prereq	Building-Level Water Metering	Required
0		0		0		Credit	Outdoor Water Use Reduction	2
0		0		0		Credit	Indoor Water Use Reduction	6
0		0		0		Credit	Cooling Tower Water Use	2
0		0		0		Credit	Water Metering	1
0		0		0		<b>Energy and Atmosphere</b>		<b>33</b>
Y						Prereq	Fundamental Commissioning and Verification	Required
Y						Prereq	Minimum Energy Performance	Required
Y						Prereq	Building-Level Energy Metering	Required
Y						Prereq	Fundamental Refrigerant Management	Required
0		0		0		Credit	Enhanced Commissioning	6
0		0		0		Credit	Optimize Energy Performance	18
0		0		0		Credit	Advanced Energy Metering	1
0		0		0		Credit	Demand Response	2
0		0		0		Credit	Renewable Energy Production	3
0		0		0		Credit	Enhanced Refrigerant Management	1
0		0		0		Credit	Green Power and Carbon Offsets	2
0		0		0		<b>Materials and Resources</b>		<b>13</b>
Y						Prereq	Storage and Collection of Recyclables	Required
Y						Prereq	Construction and Demolition Waste Management Planning	Required
0		0		0		Credit	Building Life-Cycle Impact Reduction	5
0		0		0		Credit	Building Product Disclosure and Optimization - Environmental Product Declarations	2
0		0		0		Credit	Building Product Disclosure and Optimization - Sourcing of Raw Materials	2
0		0		0		Credit	Building Product Disclosure and Optimization - Material Ingredients	2
0		0		0		Credit	Construction and Demolition Waste Management	2
0		0		0		<b>Indoor Environmental Quality</b>		<b>16</b>
Y						Prereq	Minimum Indoor Air Quality Performance	Required
Y						Prereq	Environmental Tobacco Smoke Control	Required
0		0		0		Credit	Enhanced Indoor Air Quality Strategies	2
0		0		0		Credit	Low-Emitting Materials	3
0		0		0		Credit	Construction Indoor Air Quality Management Plan	1
0		0		0		Credit	Indoor Air Quality Assessment	2
0		0		0		Credit	Thermal Comfort	1
0		0		0		Credit	Interior Lighting	2
0		0		0		Credit	Daylight	3
0		0		0		Credit	Quality Views	1
0		0		0		Credit	Acoustic Performance	1
0		0		0		<b>Innovation</b>		<b>6</b>
0		0		0		Credit	Innovation	5
0		0		0		Credit	LEED Accredited Professional	1
0		0		0		<b>Regional Priority</b>		<b>4</b>
0		0		0		Credit	Regional Priority: Specific Credit	1
0		0		0		Credit	Regional Priority: Specific Credit	1
0		0		0		Credit	Regional Priority: Specific Credit	1
0		0		0		Credit	Regional Priority: Specific Credit	1
0		0		0		<b>TOTALS</b>		<b>Possible Points: 110</b>
Certified: 40 to 49 points, Silver: 50 to 59 points, Gold: 60 to 79 points, Platinum: 80 to 110								

Page 2 of 2

**PROCUREMENT AND CONTRACTING REQUIREMENTS**

To be provided by Miami Dade College based on project specific requirements.

**END OF DIVISION**

**DIVISION 00**

**PROCUREMENT  
AND CONTRACTING  
REQUIREMENTS**

**GENERAL REQUIREMENTS**

To be provided by Miami Dade College based on project specific requirements.

**END OF DIVISION**

**DIVISION 01**

**GENERAL  
REQUIREMENTS**



## 02 00 00 EXISTING CONDITIONS

### 02 01 00 GENERAL

- A. Verification and documenting of existing conditions is critical for successful project planning.
- B. All participants (Planners, Architects, Engineers, and Contractors) are required to provide accurate verification and documentation of surface and subsurface features and all objects within proposed project limits including Buildings and Buildings interiors.
- C. The survey is the basis of information supporting all project documentation. MDC has existing as-built information available; **however, it is the responsibility of the A/E team and the Contractor to verify ALL existing conditions.**

### 02 20 00 ASSESSMENT

#### 02 21 13 Site Surveys

- A. For site surveys, the following procedures shall be followed:
  1. A complete survey shall be performed for each building/project site by a registered land surveyor who is duly licensed in the State of Florida. Survey shall be provided by MDC and or if requested A/E to provide as a reimbursable.
  2. Surveyors shall have Errors and Omission Insurance at the level specified by MDC.
  3. The vertical datum shall be NAVD (North American Vertical Datum) of 1988. The use of assumed elevations for benchmarks is prohibited.
  4. The horizontal datum shall be referenced to the Florida State Plane Coordinate System. The use of local or assumed coordinate systems is prohibited.
  5. The survey shall indicate the limits of any flood zone located within the project area, as well as reference map number, to show the limits of each flood zone as it affects the FEMA Flood Insurance Rate Map (FIRM) number.
  6. For the main campus, the survey shall note the boundaries of MDC Protected Lands Document.
  7. Surface features/objects shall be 3D AutoCAD Civil 2010 or later, and all subsurface pressurized systems shall be in AutoCAD MEP 2010 or later. All underground utilities and structures shall be 3D objects in a

## DIVISION 02

### EXISTING CONDITIONS

This section contains the following:

#### 02 01 00 GENERAL

#### 02 20 00 ASSESSMENT

- 02 21 13 Site Surveys
- 02 21 16 Building Surveys  
(Measured Drawings)
- 02 22 00 Existing Conditions  
Assessment
- 02 24 00 Environmental  
Assessment
- 02 26 00 Hazardous Material  
Assessment

#### 02 30 00 SUBSURFACE INVESTIGATION

- 02 32 00 Geotechnical  
Investigation



separate file that is XREF into the survey file. Survey information shall be separated using the layer system included in the United States National CAD Standards.

- 8. CAD data shall be in Engineering units (decimal feet), and CAD files shall include all external reference files. AutoCAD drawing files shall be produced at a scale of 1:1 in model space, i.e., drawing measurements between two objects to be equal to the actual physical distance measured in the field in decimal feet. All symbols, lettering, fonts, shapes, and blocks shall be saved with each drawing.
- B. The scope of work for surveys shall include: property lines, topography, buildings, roads, sidewalks, subsurface, and above- and below-ground utilities, including the closest point of utility system tie-in if not on site, easements, significant vegetation, and any zoning or covenant requirements, such as setbacks, etc. A preliminary copy of any survey shall be reviewed with the MDC Project Manager before final survey is issued.
- C. Prior to the start of construction, all existing utilities shall be field verified and shown on 100% construction documents.

**02 21 16 Building Surveys (Measured Drawings)**

- A. For Building surveys, the following procedures shall be followed:
  - 1. A/E to request from MDC as-built drawings for existing building (s) to be remodeled or renovated as part of the scope of work. **All as-built information shall be field verified by A/E team.**
  - 2. If as-builts for existing building (s) are not available, A/E team shall provide a full survey of building (s) conditions. Building Survey As-built verification to be negotiated separately with MDC.
  - 3. A/E to request from MDC a building certification for all buildings that are forty (40) years or more. If a forty (40) year certification has not been provided, A/E team shall provide a full certification. Certification to be negotiated separately with MDC.

**02 22 00 Existing Conditions Assessment**

- A. The following existing conditions shall be fully assessed based on Project requirements, and a report shall be either obtained and/or provided to MDC as part of Design Development Phase I. Assessments verification to be negotiated separately with MDC.
  - 1. Movement and Vibration Assessment
  - 2. Acoustic Assessment
  - 3. Traffic Assessment
  - 4. Accessibility Assessment

<b>02 40 00</b>	<b>DEMOLITION AND STRUCTURE MOVING</b>
02 41 00	Demolition
<b>02 50 00</b>	<b>SITE REMEDIATION</b>



**02 24 00 Environmental Assessment**

- A. The following environmental conditions shall be fully assessed based on Project requirements and a report shall be either obtained and/or provided to MDC as part of of Design Development Phase I. Assessments verification to be negotiated separately with MDC.
1. Natural Environment Assessment
  2. Air Assessment
  3. Water Assessment
  4. Land Assessment
  5. Soil Assessment

**02 26 00 Hazardous Material Assessment**

- A. The following environmental condition reports shall be provided by MDC as part of of Design. Development Phase I. Request “Hazardous Materials Phase I Assessment Report” for each of the materials below:
1. Asbestos Assessment
  2. Lead Assessment
  3. Polychlorinated Biphenyl Assessment
  4. Biological Assessment
  5. Mold Assessment
  6. Hazardous Waste Drum Assessment
- B. Abatement of hazardous materials identified in the “Hazardous Materials Phase I Assessment Report” except for underground storage tanks, contaminated soil or underground water requires coordination with MDC Environmental Health and Safety (EH&S).
- C. If any hazardous material, such as Asbestos, Lead, (PCB) Polychlorinated Biphenyl or any other hazardous material will be disturbed during renovation activities, abatement of such materials shall be coordinated with MDC Environmental Health and Safety (EH&S).
- D. All electrical transformers, switches, ballasts, or other electrical equipment that contains polychlorinated biphenyls (PCB), or other equipment which has come in contact with PCB, shall be properly disposed of in coordination with EH&S.
- E. Any hazardous or toxic material, such as asbestos that is discovered during the course of a project, shall be

reported immediately to the MDC Project Manager. All work involving suspected asbestos, or hazardous or toxic materials, shall halt immediately and must not resume until the notice to resume work has been issued by the Project Manager.

- F. The Contractor shall review the Environmental Health and Safety Checklist and ensure that the construction site under their control is fully compliant.
- G. Less toxic alternatives shall be used wherever possible. A complete list of hazardous substances to be used on the project shall be submitted prior to the substance's arrival on MDC property, using the Contractor Hazardous Material/Waste Inventory form. Material Safety Data Sheets shall be made available when requested.
- H. All containers of hazardous substances and waste, including new and used petroleum products, shall be stored in a covered area on an impervious surface. Outside storage shall be in rain-tight, secondary containment. Hazardous substance or waste storage shall be secured.
- I. Hazardous substances used in occupied spaces shall require the Contractor to prepare and follow a ventilation plan. The plan shall be submitted to an MDC EH&S representative for approval prior to use of the substance.
- J. An MDC representative shall verify that all hazardous waste is properly managed prior to its transportation off campus. The MDC EPA ID number shall be used on all manifests. Transportation and disposal facilities shall be pre-approved by a MDC EH&S representative and shall be done by a State registered "Hazardous Waste Hauler". Alternatively, approved waste may be disposed through the University hazardous waste program at a charge to the project.
- K. All spills shall be cleaned up immediately. Discharges to pervious surfaces, sanitary or storm water conveyances, or bodies of water shall be reported to a MDCF EH&S representative.

### **02 30 00 SUBSURFACE INVESTIGATION**

- A. The Contractor shall inspect work areas prior to commencement of construction activity.
- B. The Contractor shall provide inspection for existing damage and document in a key plan along with a list and photographs.
- C. The Contractor shall evaluate possible interruptions to ongoing operations resulting from noise or vibration as a result of construction activities. All interruptions shall be reviewed with the MDC Project Manager prior to

commencement of construction activities.

**02 32 00 Geotechnical Investigation**

- A. A/E team shall provide sketch indicating proposed location (s) of all required geotechnical investigation including but not limited to borings. Boring locations and sections through borings shall show all depths and soil conditions.

**02 40 00 DEMOLITION AND STRUCTURE MOVING**

**02 41 00 Demolition**

- A. A/E team shall provide demolition plans for the following elements, plans shall show the following items:
  - 1. Selective Site Demolition
  - 2. Paving Removal
  - 3. Utility Line Removal
  - 4. Structure Demolition
  - 5. Building Demolition
- B. A/E team to indicate all Selective Site Demolition and Paving Removal.
- C. For site utilities demolition show required removal scope, disconnect, capping or sealing and all removal of site utilities point of connection to the interim housing point of connection.
- D. A/E team to indicate all utilities serving existing buildings or areas, these lines shall remain operational until the new service has been provided.
- E. Plans for Structure and Building Demolition shall clearly show scope of demolition including but not limited to Structural, Plumbing, Electrical and HVAC. Plans shall show adjacent areas to be protected.

**02 50 00 SITE REMEDIATION**

- A. For soil and water remediation refer to Division 31 Earthwork and Division 33 Utilities.



**NOTE:** This division of the design criteria shall be included as part of Project Manual in the Construction and Contract Documents.

**END OF DIVISION**

**03 00 00 CONCRETE****03 01 00 GENERAL**

- A. Comply with the latest editions of the Florida Building Code, Florida Fire Prevention Code and all other required Codes and regulations.
- B. Investigate structural systems and methods for ease and speed of erection, cost effectiveness, life cycle cost, low maintenance, use of local materials, maximum flexibility and adaptation for future expansion.
- C. The following, but not limited to, applicable codes and standards shall be used if lacking specific reference in FBC regarding concrete:
1. American Concrete Institute (ACI)
  2. American Society for Testing and Materials (ASTM).
  3. Concrete Reinforcing Steel Institute (CRSI).
  4. Pre-stressed Concrete Institute (PCI).
  5. Portland Cement Association (PCA).
  6. Wire Reinforcement Institute (WRI)
  7. American Welding Society (AWS)
  8. Factory Mutual (FM)
  9. For existing buildings, consider International Concrete Repair Institute (ICRI)
- D. The A/E shall provide the geotechnical engineer contracted by MDC or the design builder, the following information to adequately determine the location and the number of borings and test pits:
1. Location of building(s)
  2. Type of construction.
  3. Typical column and wall loads.
  4. Any other information pertinent to the foundation design of the building(s).
  5. Determine and design the foundation system and ground floor slab based on the geotechnical engineer's recommendations and test results.
- E. Provide evaluations and construction cost estimates for Phase 1 Design submittals of at least two different

**DIVISION 03****CONCRETE**

This section contains the following:

**03 01 00 GENERAL****03 30 00 CAST-IN-PLACE CONCRETE**

03 33 00 Architectural Concrete

**03 40 00 PRECAST CONCRETE**

03 41 00 Precast Structural Concrete

03 47 13 Tilt-Up Concrete

**03 50 00 CAST DECKS AND UNDERLAYMENT**

03 52 00 Lightweight Insulating Concrete

**03 60 00 GROUTING**

structural systems applying to the proposed building. Program requirements, schedule and construction items affected by each system shall be noted and the A/E's recommendation of a structural system shall be clearly stated.

- F. For all new construction, the structural drawings shall note the design loads for all floors, roofs and exterior walls.
- G. Design floors to be within the "not perceptible" range of vibration as defined by the modified Reiher-Meister Scale.
- H. The A/E shall design and provide expansion joints, control joints, construction joints, and isolation joints to prevent uncontrolled stress cracks in the structure according to the latest engineering standards. Use joint assemblies designed for applicable locations and install according to manufacturer's requirements.
- I. Wind loading design shall comply with Florida Building Code (FBC). Submit to the Building Code Consultant (BCC) calculations, signed and sealed by a Florida registered professional engineer, establishing wind velocity pressure values in accordance with FBC ASCE 7.
- J. A pre-installation meeting for each phase of construction shall be conducted.
- K. Mix Designs shall be submitted for each class of concrete or precast concrete by primary supplier. It is highly recommended to have secondary supplier's mix designs approved in the event the primary supplier can't accommodate the schedule. Additionally, use of higher/early strength mix design if requested by Contractor to accelerate construction schedule (ie. early removal of forms/shoring, stressing of PT tendons, etc.) shall be approved by EOR.
- L. The Design Professional shall identify materials and/or assemblies that need to be tested and indicate which testing agency is responsible for the testing. General Contractor shall retain services of independent third-party testing agency. MDC reserves the right to retain services of testing agency for the project.
- M. Testing Agency shall be an independent agency qualified in accordance to ASTM C1077 and ASTM E329 for testing indicated and other applicable agencies.
- N. Shoring shop drawings and calculations shall be signed and sealed and prepared by or under the supervision of a professional engineer registered in the State of Florida.
- O. Where required, contractor shall provide documentation indicating percentages by weight of postconsumer and pre-consumer recycled content for products having recycled content. Include statement indicating cost for each

product having recycled content for projects pursuing LEED certification.

- P. All exposed concrete to be specified by A/E to be of architectural grade.
- Q. Any new concrete work at existing campuses with exposed concrete finishes to be specified by A/E to match existing concrete in color, texture and finish.
- R. Architect/Engineer to specify mockup sample of exposed concrete to demonstrate reveals, surface finishes, texture, color and standard workmanship.

### 03 30 00 CAST-IN-PLACE CONCRETE

- A. Steel reinforcing shop drawings shall include placing drawings.
- B. Reinforcement fabrication shall be in compliance with CRSI's Manual of Standard Practice.
- C. Formwork shop drawings shall be prepared by or under the supervision of a professional engineer registered in the state of Florida.
- D. Informational submittals shall include current welding certificates, material certificates and material test reports.
- E. The Design Professional shall provide a floor flatness and levelness schedule based on structure type and finish material.
- F. Where required, Contractor shall provide Product Data for liquid floor treatments and curing and sealing compounds documentation including printed statement of VOC content for projects pursuing LEED certification.
- G. Where required, Contractor shall provide Product Data for each concrete mixture containing fly ash and/or slag as replacement for Portland cement or other Portland cement replacements, and for equivalent concrete mixtures that do not contain Portland cement replacements for projects pursuing LEED certification.
- H. Design Professional shall indicate control joint pattern for all slabs-on-grade. For exposed concrete applications, joints need to be cleaned and filled with approved joint filler compound for specific application. Location of all expansion/control joints shall be shown on plans.
- I. Waterstops shall be provided as follows:



1. Flexible Rubber Waterstops: CE CRD-C 513.
  2. Chemically Resistant Flexible Waterstops: Thermoplastic elastomer rubber waterstop.
  3. Flexible PVC Waterstops: CE CRD-C 572.
- J. Provide polyolefin system sheet vapor retarders in compliance with ASTM D 4397, not less than 15 mils with taped joints. Provide complete system from single source. Documents to include all penetration details.
- K. Coordinate curing compound with concrete finish requirements for compatibility.
- L. Expansion and Isolation Joint Filler Strips shall comply with ASTM D 1751, asphalt-saturated cellulosic fiber or ASTM D 1752, cork or self-expanding cork. Confirm compatibility of sealant with expansion joint filler material. Joint shall be covered with an approved flexible sealant.

### **03 33 00 Architectural Concrete**

- A. Plyform shall be used on all formwork for exposed vertical surfaced. Bush Hammer finish is not allowed.
- B. All snaptie cone holes shall be filled and finished smooth with adjacent surfaces.
- C. All exposed concrete is considered a structural material and is to be finished with a surface coating.
- D. All exposed concrete to be specified by A/E to be of architectural grade.
- E. Any new concrete work at existing campuses with exposed concrete finishes to be specified by A/E to match existing concrete in color, texture and finish.
- F. Architect/Engineer to specify mockup sample of exposed concrete to demonstrate reveals, surface finishes, texture, color and standard workmanship.

### **03 40 00 PRECAST CONCRETE**

#### **03 41 00 Precast Structural Concrete**

- A. The project specifications and drawings shall include information regarding structural performance of precast structural concrete, including loading criteria and fire resistance rating. It shall also include finish type, profile and reveals.

- B. Structural precast shop drawings shall include member locations, plans, elevations, dimensions, sections, openings, support conditions, reinforcement and fabrication and installation of precast structural concrete units, signed and sealed by the professional engineer registered in the state of Florida responsible for their preparation.
- C. Delegated structural design calculations for precast structural concrete shall comply with performance requirements and design criteria, including analysis data, signed and sealed by the professional engineer registered in the state of Florida responsible for their preparation.
- D. Informational submittals shall include qualification data for installer, fabricator and testing agency, welding certificates, material certificates, material test reports, source quality control reports and field quality control reports.
- E. Fabricator qualifications shall require a firm experienced in the type of precast structural concrete in the project. In addition, fabricator's participation in PCI's Plant Certification and Erectors Certification programs will be required.
- F. Welding qualifications shall include qualification of procedures and personnel in accordance to AWS D1.1, "Structural Welding Code - Steel" and AWS D1.4, "Structural Welding Code - Reinforcing Steel". The Design Professional shall specify criteria for visually inspected and/or tested welding connections, frequency and type of tests.
- G. Comply with the latest and/or adopted edition of ACI and PCI publications.
- H. Concrete, admixtures, grout and steel reinforcement shall comply with ASTM standards.
- I. Architect/Engineer to specify mockup sample to demonstrate reveals, surface finishes, texture, color and standard workmanship.

### 03 47 13 Tilt-Up Concrete

- A. Tilt-up concrete shop drawings shall include panel locations, plans, elevations, dimensions, shapes, reveals, cross sections, reinforcing, details of steel embedment, MEP embedded items, additional steel reinforcement to resist hoisting and erection stresses, location and details of hoisting points and lifting devices, and fabrication and installation of tilt-up concrete units. It shall also include finish type, profile and reveals.
- B. Shop drawings and/or calculations for the lifting, erection and temporary bracing of the panels, signed and sealed by the Professional Engineer registered in the State of Florida responsible for their preparation shall be required.



- C. Informational submittals shall include qualification data for installer, manufacturer and testing agency, welding certificates, material certificates, material test reports and field quality control reports.
- D. Tilt-up contractor qualifications shall require a firm with 10 years (min) experienced in the type of tilt-up concrete the project requires. In addition, confirm that certification according to NRMCA's "Certification of Ready Mixed Concrete Production Facilities" is also required.
- E. Installer qualifications shall include providing a qualified installer who employs a supervisor on the Project who is an ACI-certified Tilt-up Supervisor.
- F. On new additions projects for existing Facilities, the use of tilt-up wall construction shall be evaluated by the A/E, and submitted to MDC for their review and approval. The A/E shall verify that the proposed site has enough space for the required concrete casting beds. The A/E shall specify that once the tilt-up wall panels have been erected, the Contractor shall remove all casting bed materials and restore the area to an acceptable condition. When these areas are intended to become playfields or landscaping areas, the A/E shall direct the contractor to scarify the compacted soil to ensure that the ground percolates properly. When feasible, the removed concrete from the casting beds should be recycled.
- G. Form liners and reveals are permitted for use to create patterns on the tilt-up wall panels with written approval from MDC on a per project bases. The overall patterns and form liners shall be submitted to the A/E and MDC for written approval.
- H. The A/E shall specify and locate a sample tilt-up wall panel to be built on-site by the Contractor. The sample wall shall be a minimum 8'-0" long x 8'-0" high by the full wall thickness and shall incorporate all proposed form liners, reveals, panel edge and joint conditions. In addition, the sample wall shall incorporate a 3'-0" x 3'-0" window opening featuring the head, jamb and sill conditions. Once approved by the A/E, the sample wall panel shall remain in place for the duration of the project to serve as the standard for appearance and quality for the construction of the tilt-up panels. The Contractor shall remove the sample wall only at the direction of the A/E.
- I. Joint sealers, fillers and related materials used in the installation of the tilt-up panels shall be compatible with one another and with other adjacent materials and finishes.
- J. Slope top of tilt-up wall panel parapets 1 inch per foot down to interior face and provide metal parapet coping cap and full flashing at interior face. See Division 7 for roofing material requirements.
- K. See Division 8 for other requirements regarding windowsill, head and jam profiles.



**03 50 00 CAST DECKS AND UNDERLAYMENT**

**03 52 00 Lightweight Insulating Concrete**

- A. The Design Professional shall indicate Design Mixtures required for each lightweight insulating concrete mix and testing schedule.
- B. Provide an average insulation value of R-20 minimum and/ or more as required to meet the project's energy performance goals and code requirements.
- C. Material thickness shall be coordinated with roof drains, curbs and parapets.
- D. Material thickness shall be accounted for in the structural design.
- E. Lightweight insulating concrete shall comply with all the requirements in Division 7 of the Design Criteria.

**03 60 00 GROUTING**

- A. Cementitious grout shall be non-metallic, non-corrosive, and non-staining.
- B. Non-shrink grout shall be used for the setting of base plates and railing posts. Non-shrink grout used for setting railing posts shall fill the area around each post and be crowned to prevent water from ponding against the post. Non-shrink grout shall not contain gypsum.

**NOTE: This division of the design criteria shall be included as part of Project Manual in the Construction and Contract Documents.**

**END OF DIVISION**

**04 00 00 MASONRY****04 01 00 GENERAL**

- A. Comply with the latest editions of the Florida Building Code, Florida Fire Prevention Code and all other required Codes and regulations.
- B. Investigate structural systems and methods for ease and speed of erection, cost effectiveness, life cycle cost, low maintenance, use of local materials, maximum flexibility and adaptation for future expansion.
- C. The following, but not limited to, applicable codes and standards shall be used if lacking specific reference in FBC regarding masonry:
1. American Concrete Institute (ACI) 530 and 530.1.
  2. American Society for Testing and Materials (ASTM).
  3. Concrete Reinforcing Steel Institute (CRSI).
  4. Portland Cement Association (PCA).
  5. ASTM C91 Standard Specification for Masonry Cement
  6. ASTM C144 Standard Specification for Aggregate for Masonry Mortar
  7. ASTM C150 Standard Specification for Portland Cement
  8. ASTM C270 Standard Specification for Mortar for Unit Masonry
  9. ASTM C207 Standard Specification for Hydrated Lime for Masonry Purpose
  10. ASTM C94 Standard Specification for Ready-Mixed Concrete
- D. The A/E shall provide the geotechnical engineer contracted by MDC or the design builder, the following information to adequately determine the location and the number of borings and test pits:
1. Location of building(s)
  2. Type of construction.
  3. Typical column and wall loads.
  4. Any other information pertinent to the foundation design of the building(s).
  5. Determine and design the foundation system and ground floor slab based on the geotechnical engineer's recommendations and test results.

**DIVISION 04****MASONRY**

This section contains the following:

**04 01 00 GENERAL****04 20 00 UNIT MASONRY**

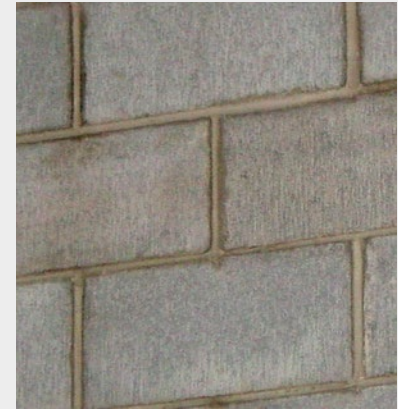
- 04 21 00 Clay Unit Masonry (Brick)
- 04 22 00 Concrete Unit Masonry
- 04 23 00 Glass Unit Masonry

- E. Provide evaluations and construction cost estimates for Phase 1 Design submittals of at least two different structural systems applying to the proposed building. Program requirements, schedule and construction items affected by each system shall be noted and the A/E's recommendation of a structural system shall be clearly stated.
- F. For all new construction, the structural drawings shall note the design loads for all floors, roofs and exterior walls.
- G. Design floors to be within the "not perceptible" range of vibration as defined by the modified Reiher-Meister Scale.
- H. The A/E shall design and provide expansion joints, control joints, construction joints, and isolation joints to prevent uncontrolled stress cracks in the structure according to the latest engineering standards. Use joint assemblies designed for applicable locations and install according to manufacturer's requirements.
- I. Wind loading design shall comply with Florida Building Code (FBC). Submit to the Building Code Consultant (BCC) calculations, signed and sealed by a Florida registered professional engineer, establishing wind velocity pressure values in accordance with FBC ASCE 7.
- J. Cementitious grout for load-bearing courses shall be non-metallic, non-corrosive and non-staining.

#### 04 20 00 UNIT MASONRY

##### 04 21 00 Clay Unit Masonry (Brick)

- A. General: Provide shapes indicated and as follows, with exposed surfaces matching finish and color of exposed faces of adjacent units.
  - 1. For ends of sills and caps and for similar applications that would otherwise expose unfinished brick surfaces, provide units without cores or frogs and with exposed surfaces finished. On Drawings, show details of special conditions and special shapes required.
  - 2. Provide special shapes for applications where stretcher units cannot accommodate special conditions, including those at corners, movement joints, bond beams, sashes, and lintels.
  - 3. Provide special shapes for applications where shapes produced by sawing would result in sawed surfaces being exposed to view.
  - 4. For consistency, use face of brick. Saw cut is needed. Avoid turning and using end of brick to eliminate color



variations (zipper effect).

- B. Provide Facing brick complying with ASTM C216, Grade SW, Type FBX or HBX subject to the College's Approval.
  - 1. Initial Rate of Absorption: Less than 30 g/30 sq. in. (30 g/194 sq. cm.) per minute when tested per ASTM C67.
  - 2. Efflorescence: Provide brick that has been tested according to ASTM C67 and is rated "not effloresced."
  - 3. Surface Coating: Brick with colors or textures produced by application of coatings will not be allowed.
  - 4. Color and Texture: Size and color of Brick shall be coordinated with adjacent buildings and Campus standards. Where shown to "match existing," provide face brick matching color range, texture, and size of existing adjacent brickwork.
  - 5. A stand-alone 5'x5' minimum Mockup shall be provided from a mixed sample of bricks.
- C. Plastic/vinyl weep with cotton wick and stainless-steel insect screen shall be used.
- D. Only brick manufacturer's approved cleaning chemical shall be used. Specify final cleaning to be performed at completion of construction.

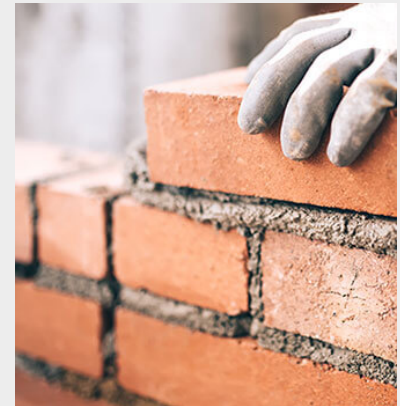
#### 04 22 00 Concrete Unit Masonry

- A. The A/E shall specify and locate a sample masonry wall to be built on-site by the Contractor. The sample wall shall be a minimum of 8'-0" long x 8'-0" high by the full wall thickness and shall incorporate all proposed stucco reveals and patterns (See Division 9 of this Design Criteria for requirements for stucco). In addition, the sample wall shall incorporate a 3'-0" x 3'-0" window opening featuring the head, jamb and sill conditions. Once approved by the A/E, the sample wall shall remain in place for the duration of the project to serve as a standard for appearance and construction of the masonry work. The contractor shall remove the sample wall only at the direction of the A/E.
- B. Concrete masonry units in a fire-resistive assembly shall not be cut or channeled in any way that reduces the approved assembly's fire resistance rating.
- C. Exposed concrete masonry units may be used only when approved by MDC on a per condition basis. In these cases, the block wall shall be designed to meet the required insulation value and must comply with the following:
  - 1. Use of the proper composition and weight of block to achieve the insulation value required.
  - 2. In-core Styrofoam insulation inserts, or loose-fill insulation shall not be used.
  - 3. Exposed masonry wall elevations provided with block coursing, reinforcing, doors, windows, lintels, tie



beams, tie columns, plumbing lines, louvers, electrical switches, fixtures, and receptacles clearly as shown and dimensioned for all conditions.

4. Channeling the wall face is not allowed.
  5. UL masonry assembly rating provided to comply with applicable fire-resistive requirements.
  6. Weeps are provided to at the bottom course of each block core, at exterior walls.
  7. Use of an accepted vapor barrier, at exterior walls.
  8. Contractor shall submit samples for verification for each type and color of exposed masonry units and colored mortars.
- D. U-block is not allowed.
- E. See Division 8 for other requirements regarding precast or cast-in-place windowsills, head and jambs profiles
- F. Provide the following minimum requirements at all exterior and interior masonry walls:
1. Horizontal wall reinforcement shall be provided at:
    - a. Every horizontal joint when masonry wall contains concrete filled cores.
    - b. Every second course and at first joint above and below an opening.
    - c. Use standard No. 8 “ladder” type reinforcement at all reinforced masonry walls, and “truss” type reinforcement at all other type masonry construction.
  2. Minimum vertical wall reinforcement shall be one #5 at 48 inches on center.
  3. Provide dovetail anchors whenever masonry walls and partitions abut cast-in-place or precast concrete. Dovetail anchors shall be provided at every second block course and shall be secured to a continuous dovetail channel properly fastened to the concrete structure.
  4. Where dovetail anchors cannot be provided, provide corrugated buck anchors in every second course of block. Secure each upturned end of buck anchor to concrete structure with 2 heavy-duty screws in drilled shields.
- G. Informational submittals shall include material certificates for each type and size of product.
- H. Contractor shall provide submittal of design mixes for each type of mortar and for grout.
- I. Miami-Dade College requires blocks to be saw-cut only. Architect/Engineer to indicate in the project's specification.





- J. Do not use defective units (chips, cracks, etc.)
- K. Exterior face of CMU cavity wall shall be fully coated with appropriate barrier to prevent moisture and water intrusion. Architect to provide complete specification.
- L. Bituminous damp-proofing shall be specified as a troweled, rolled or sprayed-on application. If a sprayed-on application is considered acceptable, it shall be specified to be applied in no less than three separate coats per approved manufacturer's recommendations and verified to the Owner's satisfaction. Specify mill thickness in addition to number of coats (tolerances).
- M. All exterior brick support angles where the underside of the angle is exposed (i.e., lintels, windows, etc.) shall be specified to be hot dipped in galvanized or stainless steel.
- N. All control/expansion joints shall be shown on the plans. Architect to show brick joints and engineer to show CMU joints. Engineer to provide all locations for control joints and expansion joints on approved documents.
- O. Through-wall flashing systems shall be detailed on the drawings.
- P. Split-face block shall be used as veneer only, not solid unit load bearing walls.

#### 04 23 00 Glass Unit Masonry

- A. Glass block may be used in limited applications, and only when approved by MDC on a per condition basis.
  1. Glass block at exterior wall location shall be solid glass block.
  2. Glass block at interior locations shall have a wall face thickness of at least 3/4".
  3. Glass block installation shall comply with FBC.
- B. Glass block walls shall be set in a continuous stainless-steel channel, 18 gauge minimum.

**NOTE: This division of the design criteria shall be included as part of Project Manual in the Construction and Contract Documents.**

**END OF DIVISION**



**05 00 00 METALS****05 01 00 GENERAL**

- A. Comply with the latest editions of the Florida Building Code, Florida Fire Prevention Code and all other required Codes and regulations.
- B. Investigate structural systems and methods for ease and speed of erection, cost effectiveness, life cycle cost, low maintenance, use of local materials, maximum flexibility and adaptation for future expansion.
- C. The following, but not limited to, applicable codes and standards shall be used if lacking specific reference in FBC regarding metals:
1. American Institute of Steel Construction (AISC).
  2. American Iron and Steel Institute (AISI).
  3. American Welding Society (AWS).
  4. Steel Deck Institute (SDI).
  5. Steel Joist Institute (SJI).
  6. American Society for Testing and Materials (ASTM).
  7. Steel Structure Painting Council (SSPC)
- D. The A/E shall provide the geotechnical engineer contracted by MDC or the design builder, the following information to adequately determine the location and the number of borings and test pits:
1. Location of building(s)
  2. Type of construction.
  3. Typical column and wall loads.
  4. Any other information pertinent to the foundation design of the building(s).
  5. Determine and design the foundation system and ground floor slab based on the geotechnical engineer's recommendations and test results.
- E. Provide evaluations and construction cost estimates for Phase 1 Design submittals of at least two different structural systems applying to the proposed building. Program requirements, schedule and construction items affected by each system shall be noted and the A/E's recommendation of a structural system shall be clearly

**DIVISION 05****METALS**

This section contains the following:

**05 01 00 GENERAL****05 10 00 STRUCTURAL METAL FRAMING**

05 12 00 Structural Steel Framing

**05 20 00 METAL JOISTS**

05 21 00 Steel Joist Framing

**05 30 00 METAL DECKING**

05 31 00 Steel Decking

**05 40 00 COLD FORMED METAL FRAMING****05 50 00 METAL FABRICATIONS**

stated.

- F. For all new construction, the structural drawings shall note the design loads for all floors, roofs and exterior walls.
- G. Design floors to be within the “not perceptible” range of vibration as defined by the modified Reiher-Meister Scale.
- H. The A/E shall design and provide expansion joints, control joints, construction joints, and isolation joints to prevent uncontrolled stress cracks in the structure according to the latest engineering standards. Use joint assemblies designed for applicable locations and install according to manufacturer’s requirements.
- I. Wind loading design shall comply with Florida Building Code (FBC). Submit to the Building Code Consultant (BCC) calculations, signed and sealed by a Florida registered professional engineer, establishing wind velocity pressure values in accordance with FBC ASCE 7.
- J. Roof designs shall comply with Factory Mutual (FM) requirements for Class I rated assembly and FM uplift classifications in accordance with FBC ASCE-7.
- K. Products made of aluminum, aluminized or otherwise treated with aluminum to a significant extent shall not be used on the facility’s grounds or at the exterior building perimeter, unless approved by MDC on a per condition basis.
- L. Specify isolation coatings where dissimilar metals are in contact or where aluminum is in contact with concrete, mortar, grout, stucco, or other material surfaces containing lime.
- M. Exposed exterior steel shall not be hot dip galvanized.
- N. Pre-installation conference shall be conducted for all structural steel and joist framing installations.
- O. Contractor shall submit documentation indicating percentages by weight of postconsumer and pre-consumer recycled content for products having recycled content. Include statement indicating cost for each product having recycled content for projects pursuing LEED certification.

**05 10 00 STRUCTURAL METAL FRAMING****05 12 00 Structural Steel Framing**

- A. Steel members exposed to the exterior and weather shall be specified as receiving hot-dipped galvanized G-90 min. coatings.
- B. Contractor shall be responsible for scheduling all weld testing per plans/specs and manufacturer's recommendations.

**05 20 00 METAL JOISTS****05 21 00 Steel Joist Framing**

- A. Where primer is required, it shall be shop applied. Joists that are permanently exposed to view shall be specified to be painted.
- B. Provide camber as recommended by Steel Joist Institute (SJI).
- C. Seat depth bearing conditions for steel joists shall be at least 4 inches or greater to comply with design requirements or SJI.
  - 1. In concrete construction, steel joists and steel beams with spans less than 40 feet shall bear on and be welded to steel bearing plates embedded and anchored into reinforced concrete beams.
  - 2. In steel construction, steel joists with spans less than 40 feet shall bear on and be welded to the top flange of the steel beam or girders.
  - 3. Long span joists 40 feet and longer shall not be welded to the bearing plates.
    - a. Joists shall be bolted to the bearing plates using slotted holes to allow for expansion and contraction of the long span steel member.
    - b. The end support shall rest on bearing pads to accommodate movement due to expansion or contraction using a 60° F temperature variation as a constant.

**05 30 00 METAL DECKING****05 31 00 Steel Decking**

- A. Design of steel deck and connections shall comply with FBC ASCE-7.
- B. Submit to the Building Code Consultant (BCC) calculations, signed and sealed by a Florida registered professional engineer, establishing compliance with FBC ASCE 7.
- C. Roof deck configuration shall comply with SDI - "Specifications and Commentary for Steel Roof Deck".

**05 40 00 COLD-FORMED METAL FRAMING**

- A. Cold-formed metal framing shop drawings shall include layout, spacings, sizes, thickness, and type of cold-formed steel framing; fabrication; fastening and anchorage details, including mechanical fasteners; reinforcing channels; opening framing; strapping, bracing, bridging, splices, accessories, connection details and attachment to adjoining work.
- B. Cold-formed metal framing calculations for all exterior applications that are subject to dead, live, and/or wind loads, shall be signed and sealed by the Florida registered Professional Engineer responsible for the preparation and following the design criteria indicated in the structural drawings.
- C. Contractor shall submit product data for each type of cold-formed steel framing product and accessory required for installation.
- D. Informational submittals shall include welding certificates, product test reports, and research reports.
- E. Miscellaneous materials shall be in compliance with the following:
  - 1. Galvanizing Repair Paint: SSPC-Paint 20 or MIL-P-21035B.
  - 2. Cement Grout: Portland Cement, ASTM C150, Type I; and clean, natural sand. ASTM C404.
  - 3. Nonmetallic, Non-shrink Grout: Premixed, nonmetallic, noncorrosive, non-staining, grout containing silica sands, Portland cement, shrinkage- compensating agents, and plasticizing and water-reducing agents, complying with ASTM C1107, with fluid consistency and 30-minute working time.
  - 4. Shims: Load bearing, high-density multimonomer plastic, and non-leaching; or of cold-formed steel of same grade and coating as framing members supported by shims.
  - 5. Sealer Gaskets: Closed-cell neoprene foam, ¼ inch thick, selected from manufacturer's standard widths to



match width of bottom of exterior track or rim track members.

- F. Provide two beads of acoustical sealant under bottom tracks of interior sound partition walls.

## 05 50 00 METAL FABRICATIONS

### A. Ladders:

1. Access to roof scuttles shall be by ship's ladders complying with ANSI A14.3 fixed ladder requirements.
2. Provide 63 to 75-degree metal ship's ladders with handrails at both sides.
3. Fixed external transfer ladders are allowed only between adjacent roof decks. They shall not be anchored to the roof deck nor shall they rest on the roof surface. The lowest ladder anchor shall be at least 18 inches above the roof surface. The transfer ladders shall extend down both sides of the parapet that separates the two roofs whether the roofs are at different levels or the same. The ladder shall terminate 1 foot above the roof surface. At the roof surface below the termination of each ladder, a walkway pad shall be provided that is large enough for setting down tools and allow the user to get on or off the ladder. The transfer ladder shall have a platform at the point of transfer over the top of the parapet large enough to set down tools and allow the user to pass over unencumbered to the opposite side. Transfer ladders may be used as a roof-access only when the height differential between the two adjacent roofs is less than 42 inches.
4. Direct access by a roof scuttle or access door is required when the height differential between the two adjacent roofs exceeds 42 inches. See Division 7 for additional details.

### B. Stairs:

1. Exterior stairs shall be cast-in-place sealed concrete with recessed full-length metal anti-slip nosing at least 3 in. wide, anchored the full-width of each tread and landing. The nosing shall be installed aligned with the finished edge of the concrete tread.
2. Interior stairs shall be concrete filled metal- pan stairs or cast-in-place sealed concrete, with recessed full-length metal anti-slip nosing at least 3" wide, anchored the full-width of each tread and landing. For cast-in-place stairs, the nosing shall be installed aligned with the finished edge of the concrete tread. Interior metal-pan stairs shall be design with 100 pounds per square feet (psf) minimum live load.

### C. Railings:

1. Railings and guardrails shall be designed to meet FBC loading requirements.
2. Railing systems utilizing post, cables, glass, metal mesh, etc. will be reviewed on a case by case basis and will required MDC prior approval.



3. The inner railing of stairs or ramps shall be continuous. The outer railing of stairs or ramps does not have to traverse the entire intermediate landing, unless required for safeguards.
  4. Handrails, posts and brackets for interior and exterior steps and stairs shall be aluminum with an integral satin clear anodized finish. Aluminum handrails shall not be painted or organic coated under any circumstances. All exterior handrails, when mechanically fastened to walls, shall be attached utilizing vandal resistant anchors.
- D. Provide self-drilling type concrete anchors where cast-in-place anchors are not practical.
- E. Stainless steel corner guards shall be installed at all exposed wall corners in the food service areas and custodial receiving areas.
- F. Equipment Framing Supports:
1. Roof mounted equipment framing systems shall be supported by round vertical pipe sections to accommodate round roof flashing components.
    - a. Exposed steel shall be hot dip galvanized.
    - b. Coordinate with Division 7.
  2. The clearances from the finished roof to the bottom of the supporting steel equipment frames shall be at least 18 inches for roof maintenance or greater if required by Code.
  3. Equipment supports for rooftop mechanical and electrical equipment shall require that the height, member sizing, and layout of each supporting structure be designed by the equipment manufacturer, using a registered Florida Professional Engineer to calculate loads, including overturning moment of support and superimposed equipment according to FBC ASCE-7.

**NOTE: This division of the design criteria shall be included as part of Project Manual in the Construction and Contract Documents.**

**END OF DIVISION**



**06 00 00 WOOD, PLASTICS, AND COMPOSITES****06 01 00 GENERAL**

- A. Elements of this division shall comply with Florida Building Code (FBC) and any other applicable building, fire, or safety codes.
1. Termites, moisture, and heat are factors to be considered in the use, selection, and treating of woods.
  2. Deal with environmental issues. Emissions of volatile organic compounds (VOCs) are a concern to MDC and shall be properly addressed. Adhesives containing formaldehyde or other VOCs are harmful and prohibited from use.
  3. Do not specify types of woods coming from rain forest areas of the world or other environmentally sensitive regions.
  4. Laminated plastics shall not contain toxic adhesives. Recycled materials are preferred over virgin materials.
  5. Some treatments of wood may be dangerous to health and the environment. Toxic materials may result when exposed to combustion. Do not specify these types of products.
  6. Oriented strand board and particleboard are not allowed for use.
  7. Wood construction shall be limited to miscellaneous blocking, trim, stage and gymnasium flooring, casework, and paneling.
  8. Structural wood products shall not be used for floor, wall, or roofing systems at new construction projects except at designated historical buildings or other locations as may be specifically required and as approved by MDC
  9. Wind loading design shall comply with FBC applicable to the project
  10. Roof design shall comply with Factory Mutual (FM) requirements for Class I rated assembly and FM uplifts classifications as determined by FBC ASCE-7.

**06 10 00 ROUGH CARPENTRY**

- A. Wood material shall not be used for any structural element.
- B. All lumber in contact with concrete, masonry or steel shall be arsenic-free, pressure treated and fire rated (when applicable).
- C. When wood is allowed to touch concrete or masonry, it shall be back-painted before setting.

**DIVISION 06****WOOD, PLASTICS  
AND COMPOSITES**

This section contains the following:

- 06 01 00 GENERAL**
- 06 10 00 ROUGH CARPENTRY**
- 06 40 00 ARCHITECTURAL  
WOODWORK**
- 06 42 00 Wood Paneling
- 06 60 00 PLASTIC FABRICATIONS**



- D. Wood for rough carpentry may be used only for the following applications.
1. Blocking for installation of cabinets, shelving and wall-hung equipment such as marker boards, tack boards and metal shelving.
  2. Nails strips for installation of chair rails. Also, for wood base and crown molding in buildings matching existing conditions only.
- E. When allowed in Division 07 Thermal and Moisture Protection, nailers and cant strips shall be pressure-treated and certified.
- F. In all electrical, voice and data backboards use  $\frac{3}{4}$ " fire-treated plywood.

#### 06 40 00 ARCHITECTURAL WOODWORK

- A. Wood cabinet design should use industry standard modules as much as possible. Refer to Division 11 for laboratory casework
- B. Comply with accessibility requirements of FBC, program requirements, and ADA.
- C. Design and specify architectural woodwork according to Architectural Woodwork Institute (AWI) custom grade standards for quality of labor and materials.
- D. The following, but not limited to, applicable codes and standards shall be used if lacking specific reference in the FBC regarding Architectural Woodwork:
1. American Society for Testing and Materials (ASTM)
  2. American National Standard Institute/American Hardboard Association ANSI/AHA A135.4 – Basic Hardwood.
- E. Specify plywood, any closed grain hardwood, or closed grain softwood except flat grain Douglas fir, yellow pine, flat grain redwood, or sitka spruce.
- F. Cabinet counter top shall have radius edge and corners. Sharp edges or corners are not permitted.
- G. Upper cabinets shall be the standard type, sloped type only if indicated in Program requirements.
- H. Cabinet fillers shall not be more than 2".



- I. Cabinets in public, staff, or student occupied spaces shall be constructed of birch, red oak, white oak, or plastic laminate covered wood. Storage rooms, utility rooms, shops, food storage, and custodial closets should receive natural finished southern yellow pine, gum, poplar, birch, or beech.

SPACE	CABINET WORK EXT. FINISH	CABINET WORK INT. FINISH INCLUDING SHELVING	COUNTER TOPS
Classroom	Plastic Laminate	Plastic Laminate	Solid Surface
Science Lab/ Art lab	Solid Oak (Wood)	Solid Oak (Wood)	Epoxy (black matte finish) Acid resistant, monolithic
Research Labs	Solid Oak (Wood)	Solid Oak (Wood)	Epoxy (black matte finish) Acid resistant, monolithic
Music Lab	Plastic Laminate	Plastic Laminate	Solid Surface
Storage	Plastic Laminate	Plastic Laminate	Solid Surface
Food Preparation	Plastic Laminate	Plastic Laminate	Granite, Plastic Laminate with MDC approval
Reception	Wood Veneer	Wood Veneer	Stone or Solid Surface
Staff Office	Wood Veneer or Plastic Laminate	Wood Veneer or Plastic Laminate	Solid Surface
Executive Offices/ Faculty Offices/ Conference	Wood Veneer or Plastic Laminate	Wood Veneer or Plastic Laminate	Stone or Solid Surface
File Storage/ Supplies	Plastic Laminate	Plastic laminate	Solid Surface
Faculty Lounge/ Work Rooms/Dining/Multi Purpose Rooms	Plastic Laminate	Plastic Laminate	Stone or Solid Surface
Living Areas	Plastic Laminate	Plastic Laminate	Solid Surface
Toilet Room	-----	-----	Solid Surface

- J. For paint finishes, specify medium density overlay exterior plywood on both faces complying with AWI section 200



for custom grade edge treatment.

- K. Transparent finishes and paint finishes shall comply with AWI custom grade finishes.
- L. Cabinets to receive plastic laminate finish shall have 3/4" thick 7 ply closed grain hardwood plywood with Type II water-resistant glue for case members, tops, bottoms, sides, backs, dividers, shelves, doors, and drawer fronts.
- M. Design and detail cabinets, blocking, fasteners, and supports for an assumed load of each shelf stacked to full paper capacity.
  - 1. Provide minimum 3/4" thick plywood construction at shelving and shelving divider walls at intervals not to exceed 3 feet on center.
  - 2. Provide minimum 1" thick plywood construction at shelving and shelving divider walls at intervals exceeding 3 feet on center.
- N. **The use of particleboard in casework or millwork is prohibited in MDC projects.**
- O. Provide marine grade plywood at all sinks and wet locations.
- P. Wood handrails are prohibited in MDC projects unless it is to match an existing condition and requires MDC prior approval.
- Q. Caulk between exposed cabinet surfaces and adjacent walls.
- R. All undersurfaces at semi-exposed counters shall be sealed. Finished to be smooth with no raw materials exposed.
- S. All surface counter to backsplash joint shall be provided with epoxy to match counter color (particularly at sinks and wet locations)
- T. All freestanding millwork to have power/data access panels under counter.
- U. No overhead storage above refrigerators due to ergonomics and fall risks.
- V. Coordinate hardware with the MDC Project Manager, the MDC locksmith and the MDC master keying system.
  - 1. Provide disc tumbler type locks at doors and drawers at locations according to program requirements.
  - 2. To coordinate keying system, provide locks with two sets of five primary tumblers and one set of four secondary tumblers.

3. Specify controlled key blanks and registered key plan to maintain security.
4. Grand-master department locks with each room sub-mastered.
5. Cabinet locks within a room shall be keyed as instructed by MDC.
6. All doors and drawers to have silencers

W. Metal support brackets shall receive power coat finish when exposed

#### **06 42 00 Wood Paneling**

- A. Pre-finished wall paneling is not allowed at new construction, except at addition or renovation work required to match existing conditions or as approved by MDC.

#### **06 60 00 PLASTIC FABRICATIONS**

- A. Plastic laminate shall conform to NFPA, UL, and NEMA LD3-1993 for high pressure laminate.
- B. Plastic laminate minimum material thicknesses shall be as follows:
  1. 0.050" - Exposed surfaces and edges of drawer fronts, door fronts, counter tops, backsplash, and all other remaining exposed exterior horizontal and vertical surfaces.
  2. 0.027" - Exposed interior surfaces of door backs, cabinet sides, backs, and shelving and all other remaining exposed interior horizontal and vertical surfaces.
- C. Solid plastic laminate counter tops are accepted for use. However, stainless steel is required in food preparation areas. All kitchen counter tops and equipment to be stainless steel.
- D. Recycled plastics may be used for site furnishings in place of prohibited wood products and conditional uses of aluminum materials. Provide adequate bracing and support to minimize deflection.

**NOTE: This division of the design criteria shall be included as part of Project Manual in the Construction and Contract Documents.**

**END OF DIVISION**

**07 00 00 THERMAL AND MOISTURE PROTECTION**

**07 01 00 GENERAL**

- A. This chapter identifies criteria for the design of thermal and moisture protection systems in Miami-Dade College Buildings with the purpose of establishing minimum standards to be used as a basis of design for Miami Dade College (MDC) Buildings. **All new buildings shall receive a Styrene-Butadiene-Styrene Modified Bituminous Membrane Roofing (SBS), all other roofing system will require MDC approval. All existing Buildings to be re-roofed shall receive (SBS) roofing system unless structurally unfeasible and/or previously approved by MDC.** The thermal and moisture protection systems/products provided under this division must be selected to provide weather tight and thermally efficient building envelope work environment for the occupants in a sustainable and reliable design.
  
- B. The thermal and moisture protection system products must be designed to comply with the following objectives:
  - 1. Sustainable Design and products under the criteria to meet LEED standards as a minimum to reduce the total building energy consumption.
  - 2. Reflectivity for energy conservation.
  - 3. Longevity.
  - 4. Weather tight and watertight building envelope. Hurricane and puncture resistance and the ability to comply high velocity wind zone (HVWZ) requirements.
  - 5. Users comfort.
  - 6. Ease of maintenance.
  - 7. Compatibility with all adjacent materials both new and existing.
  - 8. Solutions with the best value considering a life cycle cost analysis to account for total project cost.
  
- C. These objectives are in line with the objectives of all Divisions and should be coordinated with requirements in Division 1 Section “SUSTAINABLE DESIGN REQUIREMENTS” and or as Program Requirements
  
- D. Thermal and moisture protection systems/ products shall comply with the requirements of the applicable authorities having jurisdiction including but not limited to the following:
  - 1. Florida Building Code (FBC)
  - 2. State of Florida and/or Miami-Dade County Product Approval (NOA).
  - 3. Florida Building Code - Roofing Application Standards (RAS) and Testing Application Standards (TAS).

**DIVISION 07**

**THERMAL AND MOISTURE PROTECTION**

**This section contains the following:**

- 07 01 00 GENERAL**
- 07 01 50 Maintenance of Membrane Roofing
- 07 01 50.19 Preparation for Re-Roofing
  
- 07 10 00 DAMP PROOFING AND WATERPROOFING**
- 07 11 13 Bituminous Damp proofing
- 07 13 26 Self-Adhering Sheet Waterproofing
- 07 14 13 Hot Fluid Applied Rubberized Asphalt Waterproofing
- 07 14 16 Cold Fluid Applied Waterproofing  
*(Continues)*



4. National Roofing Contractors Roofing and Waterproofing Manual (NRCA).
  5. American Society of Civil Engineers (ASCE-7) Building Component and Cladding Calculations.
  6. United Laboratories (UL) Standards.
  7. ASTM Standards.
  8. Factory Mutual requirements for a Class I rated assembly.
  9. Energy Star materials and components for materials and evaluation by the Design Professionals.
  10. Standards included under each section.
- E. Minimum Design Standards for MDC Thermal and Moisture Protection is to provide general guidelines on the design and provisions for new and re-roofing of existing buildings. These standards shall not supersede code and or regulations nor relieve the Architects from their professional responsibility. Standards as follows:
1. LEED submittals shall comply with the required credits for compliance with Silver, Gold or Platinum as indicated on Division 01 or under the Project requirements. Document that all roof materials comply with Solar Reflectance Index requirements.
  2. Provide Product Data for Credits for adhesives and sealants used in the weatherproofing system including printed statement of VOC content.
  3. Provide Laboratory Test Reports with the required Credits for adhesive and sealants used in the weatherproofing system comply with the testing and product requirements of California Department of Public Health’s “Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emission from Indoor Sources Using Environmental Chambers.

**07 01 50 Maintenance of Membrane Roofing**

**07 01 50.19 Preparation for Re-Roofing**

- A. The intent of these standards is to provide general guidelines on the design and provision for re-roofing of existing building. These standards shall not supersede code and regulations nor relieve the Architects from their professional responsibility.
- B. LEED requirements:
1. LEED submittals shall comply with the required credits for compliance with Silver, Gold or Platinum as indicated on Division 01 or under the Project requirements. Document that all roof materials comply with Solar Reflectance Index requirements.
  2. Provide Product Data for Credits for adhesives and sealants used in the weatherproofing system including printed statement of VOC content.
  3. Provide Laboratory Test Reports with the required Credits for adhesive and sealants used in the

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07 52 16	Styrene-Butadiene- Styrene Modified Bituminous Membrane Roofing
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<b>07 60 00</b>	<b>FLASHING AND SHEET METAL</b>
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weatherproofing system comply with the testing and product requirements of California Department of Public Health’s “Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emission from Indoor Sources Using Environmental Chambers

- C. Unless otherwise required by Miami Dade College existing roofing system(s) scheduled to be replaced must be completely removed, including insulation, down to the structural substrate.
- D. Limit roofing materials to one roof system, preferred system to be (SBS) as indicated above. Use of a different roofing system shall require MDC approval on a per condition basis.
- E. Comply with local and state building code provisions.
- F. If reroofing work is being performed either above or adjacent to an existing roof not requiring replacement, specify protection requirements for the existing roof to remain. If the existing roof is determined to currently be under warranty coverage, contact the warrantor to determine if it has protection recommendations and requirements during the roof scope assessment phase and if roofing system needs to be inspected after the construction of adjacent new roofing has been completed
- G. Install access ladders at roof-to-roof transitions exceeding 24" inches in height.
- H. All roof penetrations (i.e. roof drains, vent through roofs, electrical conduits, lightning protection conduits, mechanical equipment curbs and supports, roof hatches etc.) shall be located no less than 16" away from each other penetrations, parapet walls, roof edges and roof mounted equipment and curbs.
- I. Ponding, for any period longer than 48 hours on any roof surface, is not allowed.
- J. Products containing hazardous materials such as asbestos, lead paint or other identified HAZMAT materials are not allowed.
- K. It is recommended that an experienced, qualified professional roof consultant be hired to evaluate the existing conditions of the roof system and to provide written recommendations for re-roofing procedures and roofing products. The evaluation should contain and include but not be limited to:
  1. Roof assembly system components to determine materials, thickness and moisture contents.
  2. Structural Assessment of the structural integrity of the deck.
  3. Fastener Pull-out values.
  4. Investigation of existing primary and secondary drainage capacity and calculations.
  5. ASCE-7 component and cladding wind pressure calculations

07 71 29	Roof Expansion Joints
07 72 33	Roof Scuttles/Hatches/Skylights
<b>07 80 00</b>	<b>FIRE AND SMOKE PROTECTION</b>
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6. Impact and changes as a result of current building code requirements.
  7. Investigation and testing for the presence of asbestos-containing roofing materials or other hazardous materials.
  8. Access condition of Sheet metal flashing to determine if existing sheet metal flashing can be reused and if it complies with Florida Building Code High Velocity Hurricane Zones Requirements.
- L. At all existing still under guarantee roof systems or assembly that indicate signs of premature failure or reduced service life. The consultant shall perform forensic testing as needed to determine reasons from failure. Determine if areas other than the roof is attributable to the causes of leakage, including but not limited to building envelop, exterior wall finishes, sealant failure at windows and other openings. Recommendations shall be submitted in writing to include if roof repairs or remedial scope will be sufficed or if a new roof system is necessary to avoid further leakage.
- M. Specify only products and systems allowed by Miami Dade College in the Design and Specifications Criteria Standards.
- N. General re-roofing requirements:
1. Re-roofing Conference
  2. Compliance with governing EPA notification regulations before beginning membrane roofing removal.
  3. Compliance with hauling and disposal regulations of authorities having jurisdiction.
  4. Compliance with FM Global Loss Prevention Data is required, specifically those related to re-roofing on FM insured building only and only when approved by MDC.
- O. Request that removal of portions of existing roofing system scheduled be removed. Shall be replaced with the new system and made watertight that same day. In some special cases due to specific job conditions an installation of temporary roof membrane(s) may be required; in such cases the Roofing Contractor together with roofing manufacturer should submit a temporary roofing membrane report to Miami Dade College for review; the report shall include recommendations from roofing manufacturer as to whether temporary roofing should remain in place. All temporary roofing when used shall to local building code requirement.
- P. Consider in the design the upgrading roofing insulation R-value whenever possible and MDC budgets permitting. Contact Florida Power and Light (FPL) to verify if scope qualifies for the roofing insulation rebate program. Verify that the increased insulation will not affect the roofing system fire performance and/or roofing heights in reference to drains, parapet walls and other roof edge/termination conditions.
- Q. Request inspection of deck after removing existing roof system down to deck. Request inspection of wood nailers to verify that they are in good condition and that nailer's attachment meets current wind-uplift loads. Require that



wood nailers be replaced with new pressure treated wood nailers if conditions listed above are not met.

- R. Request inspection of existing roof penetrations and drains; Roofing consultant to be present during these inspections. Seek advice from roofing consultant as to raising equipment on roof that is too low for proper flashing.
- S. Request water testing of existing roof drains during each stage of reroofing, and roof drain plugging and plug removal requirements.

### 07 10 00 DAMP PROOFING AND WATERPROOFING

- A. The intent of these standards is to provide general guidelines on the design and provisions for building damp proofing waterproofing systems. These standards shall not supersede code and regulations nor relieve the Design professional from their professional responsibility.
- B. The Design Professional shall specify the damp proofing covered in this section.
  - 1. Select all waterproofing products that have Miami-Dade Product Approval (NOA) approvals or State of Florida Product Approvals.
  - 2. Comply with applicable building codes.
  - 3. On complex Projects hiring an independent waterproofing consultant will be required.
- C. Where the term “Manufacturer Technical Representative” is used, the term means an employee of the manufacturer who is trained and licensed by manufacturer to provide technical advice to architect on material, systems and installation methods, and to provide field observations. Manufacturer Technical Representative is not the product installer.
- D. Installers must be authorized, certified, or licensed by the waterproofing manufacturer.

### 07 11 13 Bituminous Damp proofing

- A. Damp proofing treatments are intended to resist the passage of water if no hydrostatic pressure is present.
- B. Use bituminous damp proofing on exterior cavity walls. Select bituminous damp proofing with a maximum VOC content of 100 g/L. Recommended Type: Cold Applied Emulsified Asphalt Damp proofing. Other types of damp proofing may be required to meet condition requirements. Consult with waterproofing consultant and system manufacturers' best suited system for site conditions and building components.

**07 13 26 Self-Adhering Sheet Waterproofing****07 14 13 Hot Fluid Applied Rubberized Asphalt Waterproofing****07 14 16 Cold Fluid Applied Waterproofing**

- A. Self-adhering sheet waterproofing and hot or cold fluid applied waterproofing require surface preparation, moisture testing, and priming.
- B. Listed systems are for concealed application and require protection board.
- C. Use of self-adhering sheet waterproofing is required in vertical below grade areas, including but not limited to elevator pit walls. Seek assistance from waterproofing manufacturer to determine if selected waterproofing is suitable to site conditions.
- D. In other areas, Architect should determine, based on specific conditions and recommendations from waterproofing expert/consultant, which waterproofing, whether self-adhering sheet, hot or cold or fluid applied, will perform best.
  - 1. VOC content for self-adhering sheet waterproofing membrane: 0g/L.
  - 2. Maximum VOC content of system primer and sealer: 200 g/L
  - 3. Maximum VOC content for cold fluid applied waterproofing system: 220 g/L.
  - 4. Maximum VOC content for hot fluid applied waterproofing system: 220 g/L.
- E. For exposed waterproofing system, use system best suited for application and exposure. Refer to Traffic Coating Section included in this section.

**07 18 00 Traffic Coatings**

- A. These guidelines describe the minimum physical requirements for traffic coatings.
- B. When desiring greater control, the Design Professional must determine if the specific project conditions require additional physical properties. Requirements may include minimum tensile strength, hardness, permeability, hydrolytic stability, water absorption, intercoat adhesion, and tear resistance.
- C. Minimum recommendations for traffic coatings include the following:
  - 1. Moisture in concrete adversely affects coating adhesion. Request that manufacturer's recommendations must be followed regarding preparation and application.

2. Lightweight insulating aggregate concrete is always an unsuitable substrate.
3. Directly applying traffic coatings to untopped structural precast concrete decks is not recommended.
4. Durability: The service life of traffic coatings varies from 5 to 7 years. The service life is affected by many variables including quality of the substrate, type of deck, workmanship quality, traffic loading severity, and degree of exposure of the traffic coatings to the ultra violet ray's sun and the weather. The Design Professional must consider the above variables as they applied to the specific project conditions for the selection of the appropriate product.
5. VOC content for Traffic Deck Coatings: 100 g/L or less.

#### 07 19 00 Water Repellent

- A. Use clear, penetrating water-repellent sealer, either silane or siloxane system. Choose best system suitable for surfaces indicated to receive water repellent coating. Select water repellent with a maximum VOC content of 600 g/L.

#### 07 20 00 THERMAL PROTECTION

- A. The intent of these standards is to provide general guidelines on the design and provision for thermal insulation. These standards shall not supersede code and regulations nor relieve the Design Professional for their professional responsibility. Roof insulation should not be included in this section. Sound Insulation should not be included in this section.
- B. Do not indicate thickness of insulation; indicate required thermal resistivity (R) value in specifications. Required R values should be determined by the mechanical engineer and energy modeling program as required by FBC.
- C. Selection of insulation should be preceded by a careful analysis of applicable building codes and building regulations, including but not limited to combustion, flame spread, and smoke development.
- D. Where insulation is faced on one side of board, the location of vapor retardant facing should be determined by the mechanical engineer.
- E. Select products that have recycled content.
- F. Specify building insulation system that are compliant with FBC, MDC Design Criteria and FPL's roofing insulation rebate program, if available.

**07 21 00 Thermal Insulation**

## A. Acceptable thermal insulation material to include:

## 1. Boards

- a. Polyisocyanurate insulation, foil faced on both sides of board with no HCFC blowing agents.
- b. Glass Fiber Board Insulation, foil faced on one side of board.
- c. Extruded-Polystyrene Board Insulation for application between slabs: 60 psi compressive strength maximum flame-spread and smoke-developed indexes of 75 and 450, respectively, per ASTM 84.
- d. Basement Wall Insulation Drainage Panels: extruded-polystyrene board insulation drainage panels for application at exterior face of basement wall: 25 psi compressive strength.

## 2. Blankets

- a. Foil-Faced, Glass-Fiber Blanket Insulation. Maximum flame-spread and smoke-developed indexes of 75 and 150, respectively, per ASTM E84.
- b. Foil-Faced Mineral Wool Blanket Insulation: Maximum flame-spread and smoke-developed indexes of 25 and 0, respectively per ASTM E84.

## B. Insulation Fasteners and adhesives: Specify insulation fasteners and adhesives recommended in writing by manufacturer and as required to suit conditions.

## C. Ceiling insulation:

1. Do not place thermal blankets insulation directly above suspended acoustical ceilings with recessed lighting fixtures or within 3 inches of the recessed lighting fixture enclosures, wiring compartments or ballasts unless those fixtures are identified for such contact with insulation.

**07 26 00 Vapor Retarders**

## A. Comply with FBC-Florida Standard for Radon-Resistant New Commercial Building construction and EPA handbook for Sub-Slab Depressurization for Low Permeability Fill Material, both obtained from Department of Health Bureau of Environmental Toxicology, Radon and Indoor Air.

## B. Use a puncture resistance single-layer extruded polyolefin membrane, minimum fifteen (15) mils thick and maximum of 0.018 perms, to provide a continuous barrier between compacted fill and the building's ground floor slab. Indicate on the construction documents details of perimeter, penetrations, and joint conditions.



Lap edges a minimum of 6” and seal with self-adhering joint tape. Ten (10) mil polyolefin sheets and tape may be used at exterior slabs.

## 07 50 00 MEMBRANE ROOFING

- A. Miami Dade College experiences with various materials and installations have led to the procedures and practices noted in this Division with an emphasis that no hot kettles or tankers be used on any facility. Miami Dade College is striving to standardize roofing systems, all new buildings shall receive **SBS Heat-Weld Modified Bitumen membrane systems, all other roofing systems will require MDC approval. All existing Buildings to be re-roofed shall receive SBS Heat-Weld Modified Bitumen membrane systems roofing system unless structurally unfeasible and/or previously approved by MDC. In the event that SBS roofing system is not feasible** then roofing materials shall match the roof system at each Campus facility as indicated below. Use of an additional roofing system will require Miami Dade College for review, consideration and possible approval prior to designing or installation.
- B. SBS Heat-Weld Modified Bitumen membrane is the preferred system for new or re-roofing, if (SBS) system is not feasible for existing buildings, then Designer shall provide system as per MDC Campus list below:
1. MDC North Campus-SBS Heat-Weld Modified Bitumen membrane systems.
  2. MDC Kendall Campus- Thermo-Plastic Single-Ply membrane systems.
  3. MDC Wolfson Campus- Thermo-Plastic Single-Ply membrane systems.
  4. MDC Medical Campus- SBS Heat-Weld Modified Bitumen membrane systems.
  5. MDC Homestead Campus- Thermo-Plastic Single-Ply membrane systems.
  6. MDC InterAmerican Campus-SBS Heat-Weld Modified Bitumen membrane systems.
  7. MDC Hialeah Campus-- Thermo-Plastic Single-Ply membrane systems.
  8. MDC West Campus- Thermo-Plastic Single-Ply membrane systems.
  9. MDC Entrepreneurial Education Center- Thermo-Plastic Single-Ply membrane systems.
  10. MDC New Worlds School of the Arts-- Thermo-Plastic Single-Ply membrane systems.
  11. MDC Tamiami Aviation Center--- Thermo-Plastic Single-Ply membrane systems.
- C. The Design Professional shall use the following criteria as minimum requirements for the low slope roof systems. The low slope roof design shall include a 20 year, no dollar limit (NDL) manufacturer guarantee.

- 07 52 16 Styrene-Butadiene-Styrene Modified Bituminous Membrane Roofing**  
**07 54 16 Ethylene Interpolymer (KEE) Roofing**  
**07 54 19 Polyvinyl-Chloride Roofing**

- A. Heat Weld, Styrene-Butadiene-Styrene (SBS) fiberglass or polyester reinforced mineral surfaced cap sheet modified bituminous membrane roofing (One base ply + One Interply and One cap sheet) with a minimum 2-ply Styrene Butadiene Styrene (SBS) Modified Bitumen Mineral Surfaced roofing base flashings membranes specification. The Styrene-Butadiene-Styrene (SBS) modified bituminous membrane roofing shall be the Standard Basis-of-design.
- B. Ethylene Interpolymer (KEE) roofing system is also an approved and authorized system by Miami Dade College for use. The low slope roof design shall include a 20 year, no dollar limit (NDL) manufacturer guarantee; installed in the preferred fully adhered configuration or mechanically attached after review, evaluation and approval by MDC. Basis of Design Thermo-plastic membrane systems shall not be used at areas that are exposed to vandalism, traffic of corrosive atmospheres.
- C. Polyvinyl-Chloride (PVC) Roofing system is also an approved and authorized system by Miami Dade College for use. The low slope roof design shall include a 20 year, no dollar limit (NDL) manufacturer guarantee; installed in the preferred fully adhered configuration or mechanically attached after review, evaluation and approval by MDC. Basis of Design Thermo-plastic membrane systems shall not be used at areas that are exposed to vandalism, traffic of corrosive atmospheres.
- D. Roof systems designs shall comply with the following:
1. Florida Building Code (FBC), including FBC - Roofing Application Standards (RAS), and FBC - Test Application Standards (TAS).
    - a. The entire roofing assembly shall be tested to comply with the missile impact requirements of SSTD 12-99.
  2. Miami-Dade County Product Control (NOA) or State of Florida product Approval (NOA) methodology.
  3. Underwriters Laboratories UL-790 and ASTM E-108 requirements for Class "A" fire rating for roof coverings.
  4. American Society of Civil Engineers (ASCE) 7.
  5. Uplift requirements based on the basic wind velocity pressures for the project according to the following:
    - a. Provide calculations, signed and sealed by a Florida registered professional engineer, establishing wind velocity pressure values for the specific project according to ASCE 7.
    - b. Use ASCE 7 Exposure Category "C" for wind design at Miami Dade College additions and new construction.
  6. Roofing project specific manufacturer's specifications.
- E. Limit roofing materials to one roofing system and one manufacturer at a facility when possible. Use of an additional roofing system requires Miami Dade College (MDC) approval on a per condition basis.

- F. Different roofing systems shall be separated by a parapet, change of elevations, or any other means of termination to define warranty/liability limits and maintenance concerns.
- G. Provide proper disposal of rainwater watershed from roofs by the use of primary and secondary drainage scuppers, working, overflow scuppers, gutters, and downspouts complying with FBC - Plumbing requirements.
  - 1. Ponding water is not allowed.
- H. Products containing asbestos are not allowed.
- I. Design and locate traffic pads from roof scuttles and access doors to roof mounted equipment requiring maintenance or repair. Provide a fully adhered nonskid surface of a suitable Miami Dade College accepted product with a different color than the roof deck.
- J. See Division 05 and FBC - Roof Assemblies and Rooftop Structures for equipment framing support requirements.
- K. Membrane lap seams shall be positioned to expel or shed water. No water laps are allowed.
- L. Specify the Roofing Subcontractor, at project completion, to furnish roofing material to Miami Dade College-Facilities Maintenance Department for 100 square feet of replacement roof for each type of system installed.
- M. Provide secure anchorage with continuous cleats and fastenings at edge drip and parapet coping flashing conditions according to the most stringent applicable code requirements.
- N. Parapets.
  - 1. Limit parapet heights so parapet wall flashing felt shall not exceed a height maximum of 48 inches above the finished roof deck.
    - a. Roof membrane flashing shall cover the interior face of the parapet, wrap wood nailers secured to the top of the parapet, and be covered by a metal coping cap of stainless steel or aluminum and cleats as required by FBC requirements. All coping caps shall be constructed of stainless steel or kynar finished aluminum.
    - b. Use roofing systems manufacturer's recommendations for primer at all required areas for roof membrane applications areas.
    - c. Coping shall have outer hold-down cleats and be face fastened at inward facing parapet components with removable neoprene grommet type fasteners.

- d. Slope top of parapets, nailers, and copings 1 inch per foot down to interior face.
  - e. Provide termination bars at the upper felt flashing vertical edge according to RAS 111 where required.
2. Existing parapet walls over 48 inches shall have roof membrane flashing between 8 to 24 inches in height above the finished roof deck and supplemental flashing or waterproofing/felt installation beginning from new metal counter flashing with a flat profile flange and cover the interior face of the parapet, wrap wood nailers secured to the top of the parapet, and be covered by a metal coping cap.
    - a. Seal membrane flashing according to manufacturer's requirements and membrane system used.
    - b. Provide term bars at the upper felt flashing vertical edge according to RAS 111.
  3. Parapets at precast and tilt wall construction shall comply with required parapet flashing and the following.
    - a. Tilt wall panel joint sealant if used shall be in place before parapet wall flashing or waterproofing/felt installation.
    - b. For existing parapet walls over 24 inches in height, use roofing sealants compatible with the tilt wall sealants for closure at the tilt wall joints and counter flashing flange before waterproofing/felt installation.
    - c. Provide wood nailers and coping between panel joints and allow for expansion/contraction.
    - d. Slope top of precast parapets 1 inch per foot down to interior face.
  4. Provide 24-inch-high maximum roof membrane flashing when flashing is required at adjacent vertical building walls.
    - a. Waterproofing is required for remaining interior roof side vertical and horizontal parapet wall exposed concrete or stucco or precast surfaces.
  5. No roof system shall be directly to a concrete deck.
  6. A concrete primer and a vented base ply or insulation over interior or exterior spaces shall be included in the manufacturer's systems and (ASCE) 7.
  7. Cellular insulating concrete roof decks when specified shall receive a nailed vented base sheet.
  8. Provide metal roof vents, according to roofing system manufacturers Recommendations, on cellular insulating concrete roof decks at a rate of 1 vent per 900 square feet for any roofing membrane or as approved by the roofing system manufacturer.
- O. Vegetated Green Roof Assemblies Standards requires approval by Miami Dade College prior to use.
- P. Trafficable roofing for roof top activities requires approval by Miami Dade College.



- Q. Provide substrate waterproofing at all roof / terrace tile applications.
- R. Low Slope Roofing (Low Sloped Roofs Not Exceeding 2-1/2:12).
1. Low Slope Roofing at new construction shall be approved roof membrane system per the Campus indication. Where SBS heat-weld system is identified. The following shall criteria shall be used. A fiberglass or polyester reinforced membranes of the granular mineral surfaced cap sheet over two modified polyester reinforced smooth surface inner ply all plies heat welded. A base sheet shall be included if required by substrate and manufacturer's recommendations.
    - a. Roof slopes shall not exceed 2-1/2:12 (1/4" per foot). Verify Class "A" fire rating for proposed slope and comply with FBC
    - b. Comply with FBC, and roofing manufacturer's specifications. SBS roof slopes minimum 1/4" per foot, including crickets, which shall be at least 1/2" per foot.
  2. Slopes at re-roofing solutions shall be a minimum at 1/8" per foot of SBS or single-ply materials, including crickets, shall be at least 1/4" per foot to existing drains or scuppers. Ponding shall be corrected according to FBC High Velocity Hurricane Zones – Re Roofing Considerations unless otherwise noted.
  3. Where thermo-plastic sheet roofing membranes system is identified for specific campus the following criteria shall be used. Thermo-Plastic Single-Ply membranes fully adhered with heat-welded seams and over proper substrates can be used at re-roofing projects with structural dead load concern and weight limitations concerns and written acceptance from Miami Dade College Facilities and Maintenance Department.
  4. Thermo-plastic Single-Ply membrane roof slopes, including crickets, shall be 1/4" per foot for new construction and 1/8" per foot on re-roofing applications.
  5. When both SBS modified bituminous membrane and single ply roofing systems are present on a facility such is where new construction abuts an existing building. Separate systems with a curb, expansion joint or other means of terminations to define warranty/liability limits and maintenance concerns.
  6. Membranes with rubberized composition or membranes applied with hot asphalt are not accepted or allowed by Miami Dade College.
  7. Coal-tar roofing systems and membranes will not be accepted by Miami Dade College.
  8. Repair membrane for fleece backed membrane systems when used shall be without fleece backing.
  9. Substantially completed roof systems shall be turned over to Miami Dade College clean and free of any construction debris and stains. Roof membrane patches or repairs shall not exceed 9 sq. ft. per every 100 sq. ft. area, or the entire roof membrane system and insulation will be removed and re-roofed.
  10. Base sheets are required for the following conditions:
    - a. At cellular insulating concrete roof decks and other nailable substrates, provided a mechanically

attached channel vented base sheet is specified.

11. At all use of granular mineral surfaced cap sheets, provide additional matching granules to cover any exposed heat weld "bleed-out".
12. An SBS mineral surfaced cap sheet used with other than a mineral granule topping as the as the last finished cap sheet requires prior acceptance by Miami Dade College on a per condition basis.

## 07 60 00 FLASHING AND SHEET METAL

### 07 62 00 Sheet Metal Flashing and Trim

- A. Comply with RAS 111 and FBC High Velocity Wind Zones - Weather Protection and Materials.
- B. Flash sheet metal for new and existing roofs shall comply with FBC RAS and TAS Standards Perimeter Flashing.
- C. PVC/Teflon for single-ply membrane roof systems shall be specified with the membrane roof specification when used in compliance with FBC requirements.
- D. Flashing metal shall comply with SMACNA, latest standards:
  1. New and re-roofing installations: Type 302 or 304 – 20 gage, 22 gage and 24 gage stainless steel or aluminum with kynar finished
  2. Historical buildings: Type 302 or 304 – 20 gage, 22 gage and 24 gage stainless steel or historical metal to match existing as accepted by Miami Dade College on a per condition basis.
- E. Flashing shall have an 8-inch minimum vertical height above finished roof system surface and be at roof openings, parapet walls, curbs, mechanical equipment, and any other surfaces intersecting the roof plane. Except at curbs and other roof mounted items designed to receive 8-inch-high flashing, extend other surfaces intersecting the roof plane at least 14 inches from the finished roof membrane.

**07 70 00 ROOF AND WALL SPECIALTIES AND ACCESSORIES****07 71 23 Gutters and Downspouts**

- A. Comply with RAS 111 and FBC High Velocity Hurricane Zones - Weather Protection.
- B. Provide downspouts for rainwater disposal from roofs.
- C. Provide gutters and downspouts at edge of roof perimeters when needed. Built-in gutters behind parapets and parapet top gutters are not allowed.
- D. Gutters, downspouts, scuppers, and conductor heads shall be stainless steel. Comply with SMACNA - Architectural Sheet Metal Manual, latest edition.
- E. Downspouts within 9 feet of finish grade or a slab shall be ductile iron or Schedule 80 PVC. Coordinate connections to stainless steel components.
- F. At all tilt-wall construction, scuppers and downspouts when used shall be offset a minimum of 12 inches from any tilt-wall panel joint.
- G. Connect downspouts to storm drain systems and shall contain a clean-out at 18" above grade level. Collector heads if used shall have provisions for overflow capacity apportion at the top of the collector shall be lower than the top of the scupper draining into it, or an overflow relief opening shall be provided in the collector head near it top, so that water draining off the roof would spill off of or out of the collector, and not be able to back up into the scupper and roof surfaces under instances of heavy precipitation.
- H. Downspouts shall be connected to a drainage system. Downspouts discharging on grade require Miami Dade College acceptance on a per condition basis. At ground surface, use poured in place concrete pads, not precast splash blocks.
- I. Paint downspouts to match adjacent wall color.
- J. Solder lap joints. Sealant at joints is not allowed. Provide expansion joints for thermal expansion and contraction.
- K. Provide strap reinforcement with hemmed edges and no sharp edges.

**07 71 29 Roof Expansion Joints**

- A. Comply with FBC High Velocity Wind Zones - Roof Coverings with Slopes less than 2:12.
- B. Allow for expansion and contraction to minimize cracking and deterioration of building component materials and roofing membrane and systems.
- C. Design and locate flexible, weather tight, and durable expansion joints to allow for movement and to relieve stresses.
- D. Roof expansion joints shall be compatible and according to the roofing manufacturer's specifications and recommendations.
- E. Expansion joints shall be high profile.

**07 72 33 Roof Scuttles/Hatches/Skylights**

- A. At new facilities, provide safe and secured access by scuttles or access doors to each flat roof if the roof deck or parapet exceeds 13 feet above adjacent finish grade or ground floor exterior slabs.
- B. Access, by scuttle or access door, is required to adjacent roofs if more than 42 inches above accessible roofs.
- C. Fixed external ladders are not allowed. Only between roof decks and shall not be anchored to the roof deck or rest on the roof membrane surface.
- D. Locate roof scuttles, at least 30 inches wide by 54 inches long, over Miami Dade College accepted means of roof access in mechanical rooms, electrical, custodial storage rooms, or other custodial controlled lockable spaces.
- E. See Division 5 for ladders.
- F. Coordinate with roof framing for unobstructed access.
- G. Roof scuttles shall be connected to the building security system and have a hasp at the Interior.
- H. Skylights
  - 1. Skylight use is not allowed unless review and approved in writing from Miami Dade College.
  - 2. Existing skylights shall be removed at re-roofing projects unless otherwise directed by Miami Dade College. Provide and match existing structural deck and substrate.

3. See Division 05 - Metals for equipment framing supports and clearances.

## 07 80 00 FIRE AND SMOKE PROTECTION

- 07 81 00 Applied Fireproofing
- 07 84 13 Penetration Fireproofing
- 07 84 43 Joint Firestopping

- A. The intent of these standards is to provide general guidelines on the design and provision for applied fireproofing. These standards shall not supersede code and regulations nor relieve the Design Professional for their professional responsibility.
- B. Selection of applied fireproofing should be preceded by a careful analysis of applicable building codes, building regulations and authorities having jurisdiction. Select approved fire-resistance designs from Underwriters Laboratories (UL), based on the following types of applied fireproofing: cementitious fire-resistive materials and mastic or intumescent fire-resistive coating.
- C. VOC content for Applied Fireproofing: 0.
- D. Compliance with tested fire-resistance designs requires strict adherence to the materials and design details as indicated in UL's Fire Resistance Directory.
- E. Specify products only after carefully considering each for its properties, tested performance, serviceability, and appearance, when exposed to view, and cost.
- F. Specify cementitious fireproofing of density of not less than 15 lb./cu. ft for interior concealed air-conditioned areas.
- G. Specify medium density Portland cement based cementitious fireproofing of not less than 22 lb/cu. Ft. for interior exposed air conditioned or non-air-conditioned spaces where appearance is not important and where unexposed to human touch.
- H. Specify high density Portland cement based cementitious fireproofing of not less than 40 lb./cu. Ft for exterior concealed and exposed fireproofing where appearance is not important and where not exposed to human touch.
- I. The use of mineral-fiber is not allowed.

- J. Specify mastic or intumescent fire-resistive coatings for interior and exterior exposed fireproofing where appearance is important and where exposed to human touch. This type of fireproofing can be finished to a smooth texture.
- K. Indicate types and extent of fire-resistant assemblies and their corresponding fire-resistance design identifications on drawings; do not this information in the specifications.
- L. Verify with fireproofing manufacturers if steel primer is allowed under fireproofing; verify compatibility of primer with fireproofing manufacturer if primer is required. Address this issue in specifications regarding coordination with steel preparation, compatibility testing, etc.
- M. For spaces above ceilings where space is used as air plenum may erode softer formulations of fireproofing. Consult with fireproofing manufacturers for their recommendations. Fireproofing in air plenums required flame-spread and smoke density indexes not exceeding 25 and 50 per NFPA 90A.
- N. Architect to request the following submittals:
  - 1. Product Data. Include VOC data.
  - 2. Shop Drawings showing extend of each type of fire proofing, applicable fire resistance U.L. design designations, thicknesses and treatment after application.
  - 3. Qualification data from installer.
  - 4. Finish samples where appearance is important.
  - 5. Mockup sample where appearance is important.
- O. Require pre-installation conference at the site.
- P. Applicator Qualifications:
  - 1. Applicator shall be qualified by a third-party qualification program established by UL. In addition, applicator must be approved by fireproofing manufacturer, and have a minimum of five ten years of experience applying specified fireproofing.
- Q. Manufacturer's field service: The Architect shall request the services of manufacturer technical representative to inspect the preparation and application of materials. The manufacturer's technical representative must visit the site before the installation, one visit during installation, and one visit after completion.
- R. Require special inspections of applied fireproofing as mandated by the International Building Code. Require special inspections as mandated by local codes.

- S. Testing to be performed by an independent qualified testing laboratory paid by Owner.

### 07 90 00 JOINT PROTECTION

- A. This section contains the criteria for the design and materials selection of joint protection, including but not limited to joint sealants for traffic joints; non-traffic joints; mildew resistant and acoustical joints; latex sealant/caulking compounds; backer rods, sealant filled foam strips; bond breaker tapes; and primers.

### 07 92 00 Joint Sealants

- A. Detail and specify the appropriate joint sealer and backing for the following interior and exterior conditions. For exterior vertical conditions use silicone sealant. For horizontal traffic and non-traffic joints, use urethane sealants. Refer to current manufacturers' sealant guide. Joint Sealant applications include but are not limited to:
1. Joints in Vertical and horizontal surfaces.
  2. Vertical Expansion and Control Joints.
  3. Sealants exposed to physical abuse.
  4. Joints in Glass, ceramics, steel, aluminum and plastic applications.
  5. Joints in Precast panels joints; and joints between curtain walls and precast panels.
  6. Joints within Structural and non-structural glazing.
  7. Joints in Tub and Shower enclosures, sinks, and countertops.
  8. Joints in slabs with tiles as per Tile Council of North America (TCNA) guidelines.
- B. VOC content for Joint Sealants: 150 g/L or less. Consider the joint dimension and expected movement to specify the proper sealant. Good architectural practice calls for joint design four times the anticipated movement due to construction tolerances and material variations.
- C. Consider if the application is for new construction or remedial/remodeling projects.
- D. Compatibility: Provide joint sealers, joint fillers and other related materials that are compatible with one another and with joint substrates under conditions of service and application, as confirmed demonstrated by sealant manufacturer based on testing and field documented experience. Confirm with joint sealant manufacturers if primer is required/recommended on surfaces receiving joint sealant. Specifications to include requirement for following testing:
1. Preconstruction Compatibility and Adhesion Testing performed by sealant manufacturer.

2. Preconstruction Field-Adhesion Testing as recommended by sealant manufacturer.
3. Field Testing as recommended by sealant manufacturer.

E. Latex Joint Epoxy Sealants Compound:

1. Use latex joint epoxy sealants for interior non-moving joints on and between fields painted surfaces.
2. Use mildew resistant interior joint sealant products wherever humid conditions and high temperature exist.
3. Use latex acoustical sealant for exposed and concealed locations of acoustical joints.

F. Joint Backing:

1. Provide backer rod joint filler in horizontal joints subject to foot and vehicular traffic, at a distance beneath slab surface of 1/2 the joint width. Sealant manufacturer's recommendations as to type of backer rod joint filler must be followed.
2. Joint backing shall be omitted from joints in ceramic tile floors, which are less than 1/2-inch-deep if the joints are filled fully with sealant and if the sealant's manufacturer approves it. Provide backer rod in all other sealed joints at a depth that will permit application of sealant in an hourglass profile with a depth at neck 1/2 the joint width, but in no case more than 1/2 inch. All tile floor installations to follow Tile Council of North America (TCNA) guidelines.
3. Whatever the joint size or substrate, provide backer rod or bond breaker tape as necessary at back of sealant to prevent bonding. Exceptions: Sawed concrete joints; items bedded in sealant such as thresholds.
4. Backer rod: Closed cell foam rope of polyethylene, butyl neoprene or other material that will not bond to sealant, 25 to 50 percent larger in diameter than joint width, unless otherwise recommended by sealant manufacturer.

G. Bond Breaker Tape:

1. Polyethylene type of widths to suit joints. Provide over joint fillers other than polyethylene type, unless otherwise recommended by sealant manufacturer.

H. Primers:

1. Include requirement for priming of surfaces based on manufacturer's preconstruction compatibility and adhesion testing. Primer type to be as recommended by sealant manufacturer.

I. Applications:

The following guidelines address typical conditions where sealants and related components must be applied. The



Design Professional shall complete the following non all-inclusive list for each specific project:

1. Joints Requiring Sealants:

- a. Joints around window frames, mullion ends, door frames and wall louvers.
- b. Exterior thresholds, front edges, rear edges and ends.
- c. Exterior and interior exposed and concealed joints between precast wall panel units and interior joints between backs of panels and concrete floor slabs at each level above first floor on fill.
- d. Exterior and interior wall and floor expansion joints including joints between concrete columns in concrete walls, between concrete columns and steel columns and between pre-finished metal wall panels and abutting materials.
- e. Outer perimeters of sheet metal scupper between sheet metal and masonry or concrete and between pre-finished sheet metal scuppers and metal wall panels.
- f. Joints at top of parapet cap flashings including lap joints in flashings.
- g. Joints at top of counter flashings including lap joints in flashings.
- h. Joints at top of pipe and conduit roof penetration counter flashings including lap joints.
- i. Joints at perimeters and splice joints for built-in gutters over pivoted glass panels.
- j. Metal-to-metal joints and metal to concrete joints in skylights.
- k. Joints between building walls and concrete walks and concrete paving. Joints in exposed concrete floors.
- l. Expansion joints, control joints, penetrations and perimeter joints in mechanical equipment room wearing slabs, patio slabs, and balcony slabs.
- m. Expansion joints at perimeter of ceramic floor tile areas and joints at interior corners in tiled wall and base areas.
- n. Perimeter joints at electrical and mechanical items penetrating walls, floors, ceilings and roofs.
- o. Expansion joints in quarry tile and paver tile areas 12 feet to 16 feet 0.c. both ways in field and at perimeter.
- p. Expansion joints at all exposed decks and surfaces.
- q. Joint at perimeter of flagpole.
- r. Joints where Portland cement plaster/stucco and cement plaster abut other materials.
- s. Joints between walk-in refrigerators, freezers, food service equipment and other building surfaces using sanitary, mildew resistant silicone type sealant.
- t. Joints between sink and vanity countertops/backsplashes and other building surfaces. Joints in countertops. Use mildew resistant sealant or epoxy chemical bond if solid surface.
- u. Joints between walls and plumbing fixtures such as sinks, lavatories, urinals and prefabricated shower stalls, using mildew resistant sealant.
- v. Joints around piping in shower stalls and bathtub areas, using mildew resistant sealant.
- w. Bedding of metal accessories and fastenings in shower stalls and bathtub areas, using mildew resistant sealant.

- x. Locations indicated on the drawings and where required to make joints weathertight.
2. Joints Requiring Latex Joint Sealants/Caulking
- a. Joints between interior hollow metal door and window frames and gypsum board, cement-plaster, masonry.
  - b. Non-moving non-traffic joints between painted interior surfaces.
- J. Colors
- 1. Select colors from standard manufacturer's color chart.
- K. Manufacturer's technical services:
- 1. Consider using the manufacturer's technical service centers:
    - a. To assist in selecting the proper building sealant, properly designed joints and review of joint sealant specification.
    - b. To assist in testing such as:
      - 1) Compatibility and adhesion tests.
      - 2) Preconstruction field adhesion test to determine preparation and installation methods.
      - 3) Stain tests to confirm that joint sealant will not stain surfaces to be sealed.
    - c. To assist in interpreting test results. To assist in product recommendations, surface preparation and primer.
    - d. To assist in reviewing shop drawings and other pertinent technical information.
- L. Applicator/Installer Qualifications: The Architect shall require:
- 1. An affidavit from the manufacturer approving applicator prior to installation.
  - 2. Applicator shall have a minimum five years documented experience installing specified joint sealants and shall have successfully completed at least five projects of similar size and complexity.
- M. Contractor Submittal requirements:
- 1. Submit for project records, sealant manufacturer's letter stating that substrates are acceptable, have been reviewed with the applicator; indicate if primers are required and if so the types of primers required for the

various surfaces.

2. Submit for review, properly identified manufacturer's product data, with names, catalog numbers, specifications, surface preparation, primers required for each different type of surface, mixing and application directions for each product.
3. LEED requirements, including VOC contents.
4. Samples
  - a. Sealant manufacturer's full color range charts for selection by Architect and approval by MDC.
  - b. Small samples of each type of joint backing rod, sealant and bond breaker tape.

N. Preparation and Limitations: Per sealant manufacturer's recommendations.

O. Application of Sealants

1. Sealant Installation Standard: Comply with recommendations of ASTM C1193 for use of joint sealants as applicable to materials, applications, and conditions indicated.

P. Field Testing

1. Water infiltration test will be performed, at the owner's option, at every exterior joint including but not limited to window, storefront and curtain wall.

Q. Warranty

1. Be aware that some warranties will require prior inspection and testing. Review warranties with manufacturer before preparing specifications.
2. Silicone Sealants:
  - a. 10 years manufacturer's written warranty.
3. Urethane Sealants:
  - a. 5 years manufacturer's written warranty.
4. Applicator/Installer: 2-year warranty covering sealant materials and workmanship covering joint failure should be required. Joint failure is defined as leaks of air or water; evidence of loss of cohesion; cracking or splitting; fading of sealant material; migration of sealant; evidence of loss of adhesion between sealant and joint edge. The sealant manufacturer and the sealant applicator shall sign this warranty.

**07 95 00 Expansion Control**

- A. This section contains the criteria for the design and materials selection of building expansion joint covers, including building expansion joint covers for interior and exterior application. Roof expansion joints are not part of this portion of standards.

**07 95 13 Expansion Joint Cover Assemblies**

- A. Detail and specify the appropriate joint cover and backing material.
- B. Characteristics and locations of expansion control systems/joint covers are determined by the structural engineer in consultation with the Architect.
1. Location, size and movement characteristics of expansion joints are of key importance in the selection of expansion control systems/joint covers.
- C. Fire resistant rated expansion control systems are required by building code in fire-rated construction. Most expansion covers can be fire rated by addition of fire barrier.
- D. Exterior expansion covers must be provided with a watertight seal.
- E. Design parking structures requiring joint covers so that joints are located away from turning lanes, breakovers, and acceleration areas. Verify with MDC anticipated speed, weight of anticipated vehicles and loading requirements. Confirm with system manufacturer if selected system meets project requirements. Information/recommendations from manufacturers must be submitted in writing.
- F. Obtain expansion control systems from single source from single manufacturer.
- G. Manufacturer's technical services:
1. Consider using the manufacturer's technical service centers to assist in selecting the proper building expansion control system/joint covers.
- H. Specify products only after carefully considering each for its characteristics to accommodate contraction and expansion, joint width, load capacity, fire rating and water-tightness where required.
- I. Joint Cover Materials/Types for Interior Application:

1. Floors: Flush mounted floor systems fabricated with extruded Aluminum Covers, mill finish; other finishes and types must be approved by Miami Dade College.
  2. Walls and Ceilings:
    - a. Extruded Aluminum Cover Plate System anodized or baked enamel finish. Color as selected by Architect.
    - b. Elastomeric extrusions of color as selected by Design Professional.
  3. Provide fire resistance-rated joint covers in fire rated construction. As tested per UL 2079 and ASTM E1966
- J. Joint Cover System for Parking Expansion Covers
1. Specify system that supports moving vehicle loads, provides smooth walking surfaces for pedestrians, resists damage from dirt, environment exposure and function in weather extremes. The use of rubber pad systems is preferred.
  2. Use moisture barriers /gutter systems under joint covers.
- K. Joint Cover Systems for Open Air Expansion Covers
1. Slabs/Floors: Specify systems that can provide smooth walking surfaces for pedestrian, withstand environment exposure, resist damage from dirt and function in weather extremes. Select from Aluminum plate systems, mill finish, similar to interior but for heavy duty use and with moisture barrier.
  2. Exterior Walls and Soffits: Specify vertical cover plate system or flat seal system, subject to Miami Dade College approval. Provide moisture barrier behind/under cover. Use Fire barrier where required by conditions.
- L. Fasteners
1. For exterior application specify Type 316 stainless steel.
  2. For interior application specify Type 304 stainless steel.
- M. Installer Qualifications: The Architect shall require:
1. An affidavit from the manufacturer certifying applicator prior to installation.
  2. Applicator shall have a minimum five years documented experience installing specified expansion control covers and shall have successfully completed at least five projects of similar size and complexity.

**NOTE:** This division of the design criteria shall be included as part of Project Manual in the Construction and Contract Documents.

**END OF DIVISION**

**08 00 00 OPENINGS****08 01 00 GENERAL**

- A. Wind loading design shall comply with the FBC edition designated for the project. Submit to the Building Code Consultant (BCC) calculations, signed and sealed by a Florida registered professional engineer, establishing wind velocity pressure values in accordance with FBC - ASCE-7.
- B. Fire resistance ratings for exterior doors, windows and other opening protectives shall meet FBC.
- C. Before Phase III – 50% submittal, consult with personnel from MDC Facilities Operations Maintenance, Office of Emergency Management (OEM), and MDC Police, to identify final locations to receive Access Control System, motion detectors and other security measures.
- D. Submit plans, specifications, and preliminary hardware schedule to Office of Emergency Management (OEM) at least four (4) weeks before Phase III – 90 %. Resubmit a revised, corrected hardware schedule to Office of Emergency Management prior to issuance of the Final Phase III – 100 % construction documents for bidding or for building permit review.
- E. Entrances and Passageways shall comply with the following:
1. **Exterior doorways shall be designed against water intrusion into the building. Adequate positive slope away from the doorway, with trench drains and/or overhangs shall be provided. Public entry doors shall be recessed or located under and overhang at a minimum of five (5') to prevent water intrusion.**
  2. Doors opening out into corridors or other pathways of pedestrian traffic shall be recessed.
  3. Door shall be installed so that the gap tolerance around the edges and at center of pair of doors does not exceed 1/8", except when code requires more stringent tolerance as in rated openings.
  4. All doors widths shall provide adequate clearance for moving larger equipment such as fume hoods and FFE. Maximum width of single doors shall not exceed 36". Use paired doors with removable mullion for larger openings.
  5. **Coordinate door opening force and closer timing with ADA requirements.**
  6. **Doors equipped with an opening device must be in full compliance with current ANSI and ADA.**
  7. **Perimeter of building openings shall receive sealant, sealant and backer rod, or weather-stripping.**

**DIVISION 08****OPENINGS**

This section contains the following:

**08 01 00 GENERAL****08 10 00 DOORS AND FRAMES**

08 13 00 Metal Doors (Exterior)

08 14 00 Wood Doors (Interior)

**08 30 00 SPECIALTY DOORS AND FRAMES****08 40 00 ENTRANCES, STOREFRONT AND CURTAIN WALLS****08 50 00 WINDOWS****08 60 00 ROOF WINDOWS AND SKYLIGHTS**

*(continues)*

8. All building pedestrian entrances shall be designed with interior, recessed floor entry mats.
9. Openings in renovation projects shall match the finish of adjacent floors openings whenever possible.

## 08 10 00 DOORS AND FRAMES

### 08 13 00 Metal Doors (Exterior)

- A. Steel doors shall be provided at all exterior locations. All exterior and service doors shall be galvanized, solid core flush steel. All exterior doors shall be insulated metal or aluminum storefront doors with adequate weather stripping to conserve energy.
- B. **Exterior wood doors are prohibited.**
- C. Glass shall be impact resistant.
- D. **Exterior building entrance doors shall have electronic card access, A/E to coordinate with Office of Emergency Management (OEM)**
- E. **Knock down frames are prohibited.**
- F. Doors, frames and their attachment/support system shall be designed to comply with the FBC designated for the project.
  1. Submit to Building Code Official calculations, signed and sealed by a Florida registered professional engineer, establishing wind velocity pressure values for the specific project in accordance with FBC ASCE-7.
  2. Construction drawings shall indicate complete information for all new doors and frames (including doors and frames being replaced in renovation projects), and all doors and frames being altered, including, but not limited to the following:
    - a. Doors receiving new hardware, such as the material, height, width, thickness, direction of swing and fire-rating in minutes/hours (if required by FBC Building, Table 715.3 - "Fire Door and Fire Shutter Fire Protection Ratings")
    - b. All new hardware.
    - c. Indicate installation details for new and replacement door frames (a detail for each frame type/profile

### 08 70 00 HARDWARE

### 08 80 00 GLAZING

08 81 00 Glass Glazing (Interior and Exterior)

08 83 00 Mirrors

### 08 90 00 LOUVERS



and for each applicable wall/partition condition and interior and exterior finish condition), showing, at a minimum, the anchorage of the frame to the wall or partition framing (the type and minimum number of anchors per jamb), finishes extending around the wall opening and their termination at the frame, caulking around the door frame (both sides), and grouting of the frame in accordance with MDC requirements of this Division.

- d. Indicate complete dimensions for masonry openings for new and replacement doors.
  - e. A complete hardware schedule for new and replacement door hardware, or a reference for each door to its hardware set when such is noted in the specifications.
3. The Project Specifications shall include complete specifications for the new doors, frames and hardware, as well as for related conditions, such as partition framing and finishes that would be affected by the installation of new or replacement doors and frames.
- G. Steel doors require hardware reinforcement. – Doors and Hardware. **Doors with dimensions larger than 3'-0" in width and 7'-0" in height require additional hinges and special closers.**
- H. All exterior doors at Kitchens or areas with Food Preparation to receive vermin proof gaskets.

#### 08 14 00 Wood Doors (Interior)

- A. The use of wood doors shall be provided for all interior spaces including classrooms, labs, staff interior offices, administration areas and student services areas, the A/E shall specify the following:
1. Wood doors shall be solid core (without a cardboard layer between veneer and core). Particleboard, hardboard or fiberboard are not allowed in door construction or any other type of "In-Contract" building component.
  2. Frames shall be 16-gauge A60 hot-dip zinc-iron alloy coated steel.
  3. Doors shall have a painted finish, natural finish, or a plastic laminate, with exposed edges smoothed or rounded.
  4. Wood doors are not allowed as fire rated doors.
- B. Door and Frame Types:
1. All doors and frames shall be 16-gauge A60 hot-dip zinc-iron alloy coated steel unless otherwise indicated.
  2. Door frames for the following doors shall be securely anchored and grout filled in place by hand-troweling, using low-moisture grout. Grouting with slurry is not allowed:
    - a. All exterior doors.

- b. All door frames located in masonry, concrete and tilt-up concrete construction.
  - c. Perimeter doors to Band room, Vocal Music room, Piano/Guitar Lab, CCTV rooms, Production Studio, Auditoriums, and other acoustically sensitive areas.
3. Provide double metal studs around all doorframes located in drywall partitions.
  4. Provide steel picket gates with security grilles and protective guards to prevent access to activate exit device. – Doors and Hardware for details. Provide with 24-inch minimum width side panels or other means to prevent access to locking devices.
  5. Doors to acoustically sensitive areas shall be constructed to meet the STC rating set forth by MDC Design Standards. In addition, these doors shall be provided with the following:
    - a. Sound seals and drop seals.
    - b. When the Educational Specifications require a vision-panel be provided on a door to an acoustically sensitive area, the vision panel shall be double-glazed with 1/4" and 3/8" tempered glass and be resiliently mounted, except when other glazing is required to comply with fire rating requirements.
  6. At doors of food service areas, provide 6-inch high stainless-steel spats at doorframes with or without stops.
  7. Door frames shall be double rabbeted.
  8. Provide steel doors at mechanical equipment rooms. Include sound seals and aluminum thresholds at mechanical room locations accessed by interior corridors or adjacent to sound sensitive spaces.
  9. Fire and smoke doors shall have door closers.
  10. Interior fire and smoke doors serving stairs and corridors shall be provided with electro- magnetic hold-open devices activated to release by the fire alarm. At these locations, provide adjacent to the hold-open device, a "fin-shaped" partition or recess, the full height of door, to protect occupants from the exposed edge of the door when the door is in the hold-opened position. Center mullions for double-leaf doors are not allowed.
- C. Pedestrian doors shall be a minimum of 3'-0" wide, 7'-0" high and 1-3/4" thick or larger according to program requirements.
- D. Doors shall accommodate the largest piece of equipment or furniture scheduled for the space. A/E shall coordinate door size for large equipment such as hoods and with FFE for each room.
- E. Kitchen receiving door shall be 4'-0" wide, 7'-6" high, and 1-3/4" thick with a 180-degree out-swing. Provide 4 hinges at all doors that are greater than 3'-0" wide

- F. Satellite wiring closets that are less than 3 feet in depth and more than 5 feet in width shall be provided with a pair of 3'-0" wide by 7'-0" high steel doors with head and foot bolts.
- G. Flammable storage rooms shall have a pair of 3'-0" wide by 7'-0" steel doors with a key operated removable center mullion.
- H. Security door contacts:
1. Provide all exterior doors, except the FPL transformer vault doors, a security door contact for connection to the Facility's intrusion alarm.
  2. Provide all interior and exterior doors controlled by the Access Control System (ACS) as indicated by Office of Emergency Management (OEM). See Division 13 of MDC Design Criteria for details on these door locations.
  3. All doors that are both exterior and are controlled by the (ACS) shall be provided with two (2) independent door contact switches; one for the intrusion alarm and the other to the ACS.
  4. Clearly identify on the Door Hardware Schedule, all doors requiring security switch preparation and how many switches are required at each location.
- I. Door Swings and Recessed Doors:
1. Doors shall swing in the direction of exit travel. When permitted by Code, in-swing doors may be used at occupied spaces.
  2. All doors to occupied spaces that swing into a corridor or covered walkway, shall be recessed the full width of the door leaf. There shall be no exceptions to this requirement. The depth of the recess shall not exceed the width of the widest door leaf and the width of the recess shall comply with ADA approach-to-door requirements.
  3. Provide out-swing doors at mechanical rooms, electrical rooms, telecommunication rooms, satellite wiring closets, custodial closets and other service spaces with low traffic use. Doors shall be able to be held open against an adjacent wall without reducing the required corridor width or traffic pattern except by the door thickness and hardware.
  4. At double loaded corridors, stagger doors to instructional spaces by at least 8 feet.
  5. Provide maneuvering clearances at doors to comply with accessibility requirements.
- J. Doors at Multiple Openings:
1. All exterior pairs of doors shall have a removable 2" x 3", 11-gauge steel center hardware mullion that is

grout filled and has secured anchorage. Fixed mullions are not allowed.

2. Unless otherwise specified in the Program or required by Code, pairs of doors serving interior mechanical or storage rooms shall not be provided with a center mullion.
3. Pairs of double egress doors with each leaf opening in opposite directions shall not be used at auditoriums, media centers, locker rooms, corridors, stairwells and any other areas restricting student access or requiring security.

K. Vision Panels.

1. Provide vision panels at all doors serving classrooms, smoke stop doors, practice rooms and music suites and other locations required by Code and at all classrooms
2. Vision panel shall be at least 4 inches wide.
3. Locate bottom of vision panels at 30 or 42 inches above the floor and top at 72 inches above the floor.
4. Vision panels at smoke stop doors shall not exceed 1296 square inches
5. Exterior door transoms and sidelights are allowed. The transoms and sidelights shall be impact-resistant glass units that meet all of the requirements for impact-resistant windows. When exterior door transoms and sidelights are utilized, the A/E shall submit the proposed manufacturer/window type, with specifications, for review and possible approval by MDC Division of Facilities Design and Standards.
6. For security purposes, vision panels shall not allow interior locking devices to be visible from the exterior.
7. Polycarbonates, such as “Lexan”, are not allowed for glazing materials.

L. Peepholes.

1. Provide 1/2" diameter peepholes with 180-degree view, allowing for outward viewing from within a space in place of door vision panels at the following locations:
  - a. Kitchen receiving door.
  - b. Custodial receiving area.
2. Doors with peepholes shall comply with required fire ratings.

M. Door Ratings: Specify rating of doors according to FBC requirements.

N. For special security systems at doors, see Divisions 13 and 16.

**08 30 00 SPECIALTY DOORS AND FRAMES**

- A. Specialty folding egress doors, or overhead drop-down type shutters for rated opening protection, shall not be used for general area separation or convenience path.
- B. Provide folding doors, “door-within-a-door,” and overhead coiling doors or grilles, according to Program requirements. All specialty doors require prior MDC approval.
1. Comply with NFPA 101 for secondary exit access requirements in rooms using folding or movable partitions.
  2. Folding doors shall not contain particleboard.
  3. Provide all overhead coiling door and grilles an easily accessible padlock device to secure the operation of the door when not in use.
  4. All electric operated overhead doors shall be provided with obstruction sensors to stop and automatically change direction of the door travel.
  5. Overhead coiling doors located between an air-conditioned space and the exterior or a non-air-conditioned area, shall be provided with insulated slats.
  6. All exterior overhead coiling doors shall be provided with door contacts connected to the Facility's intrusion alarm system.
  7. Dutch doors are not allowed.
  8. Bi-fold doors shall not be used unless accepted by MDC on a per condition basis.
  9. Full louvered doors shall have center rails. Exterior louvered doors shall be provided with insect screens and with security grille on interior side to prevent access to locking device.
  10. Access doors and panels shall be at least 12" x 12" where hand access is sufficient. Provide larger sizes as may be necessary to access equipment located beyond the finish surface. All access panels at wet locations to be stainless steel.
  11. Accordion folding doors shall be rated with STC 40.
    - a. Specify vinyl or fabric clad steel panel folding doors at student spaces. Panel coverings shall comply with the flame spread and smoke development class requirements of FBC.
    - b. Accordion or non-steel panel folding doors may be used at administrative areas.
    - c. Above ceiling tracks, provide an acoustical barrier having a sound transmission class equal to or greater than the accordion/ folding door.
- C. Roof Access

1. Provisions shall be made for movement and servicing of rooftop equipment, depending on size of rooftop equipment, roof hatches may not be adequate. Review service access to the roof with the MDC Project Manager.

#### 08 40 00 ENTRANCES, STOREFRONTS AND CURTAIN WALLS

- A. Aluminum and glass “store front” entrance doors may be used for public entries. Any additional aluminum framing and glass shall be the same material and design as the door.
- B. Aluminum entrance doors shall have 5-inch stiles (minimum) to receive door-mounted closers.
- C. For hinge-type doors, only one power door opener, for ADA purposes.
- D. The use of aluminum storefronts and their related entrance(s) shall meet the following minimum requirements:
  1. Aluminum storefront components shall be heavy-duty, and framing member thickness shall be no less than 0.125 inch.
  2. Storefront doors shall be provided with MDC approved surface mounted hardware and may contain glass-lites or vision-panels as determined by use or location.
  3. Exterior storefront assemblies shall comply with the following:
    - a. Meet wind load requirements per FBC and ASCE 7.
    - b. Have current Miami-Dade Notice of Acceptance (NOA), or a State of Florida Product Approval, for use in a High Velocity Hurricane Zone (HVHZ).
    - c. Comply with the design pressures indicated on the drawings, but no less than 100 PSF for both negative and positive pressures.
    - d. Comply with large and small missile impact rating per FBC. Shall have no water intrusion at 15.0 PSF as per ASTM E331.
    - e. A/E shall specify that all steel framing on exterior storefront assemblies shall have a factory-applied corrosion resistant coating applicable to the location of the project (distance from salt-water coastline).
  4. Aluminum components shall have an anodized finish per National Association of Architectural Metal Manufacturers (NAAMM), AA-C2241, Class I, minimum 0.7 mils. If the facility is within one mile from a saltwater coastline, the finish shall be an AAMA 2605 PVDF (polyvinylidene fluoride) corrosion-resistant coating such as “Kynar” or “Hylar”.
  5. A “Storefront and Curtain Wall Field Leak Test” shall be conducted at no cost to MDC as per items Q in the Window Section 08 50 00 below.



**08 50 00 WINDOWS**

- A. **Operable Windows are not allowed at MDC unless it is to match an existing condition and with MDC previous approval.**
- B. **Operable windows are prohibited.**
- C. Accepted Window
1. Windows intended for use at MDC facilities required MDC evaluation and approval. The following window type are acceptable for MDC projects:
    - a. Fixed.
  2. Exterior Windows:
    - a. The A/E shall specify impact-resistant windows with current Miami-Dade NOA or a State of Florida product approval for use in a High Velocity Hurricane Zone (HVHZ).
    - b. Submit to the BCC calculations, signed and sealed by a Florida registered professional engineer, establishing wind velocity pressure values for the specific project in accordance with FBC ASCE-
    - c. Windows shall be flanged at all sides to bed against the 3/4-inch lip all around the rough opening with appropriate sealants.
    - d. The construction drawings shall show details covering the installation of each type of new or replacement window (a detail for the head, jamb and sill condition for each window type/profile at each applicable wall condition and interior and exterior finish condition), including but not limited to: the method of attachment of the window frame to the building structure, including the type, number and spacing of fasteners and required penetration into the structure; the exterior and interior finishes extending to and around the wall opening (including the stool) and their termination at the window frame; caulking at the joint around window frame (interior and exterior sides); and complete dimensions for masonry openings.
    - e. In addition, impact resistant windows shall meet the following requirements:



- 1) The impact-resistant windows shall be aluminum with a minimum 3/4-inch wide aluminum flange that runs around 100% of the perimeter. The unit shall be set in a full bed of sealant against the 3/4-inch lip in the concrete or masonry opening.
  - 2) The aluminum finish shall be per MDC Design Standards. When the project is located within one mile from a saltwater coastline, new aluminum windows shall have an AAMA 2605 PVDF (polyvinylidene fluoride) corrosion resistant finish such as Kynar 500 or Hylar 5000.
  - 3) The window unit shall be glazed and assembled in a factory; not built on site. All fastening holes shall be shop-drilled to follow the Miami-Dade NOA or State of Florida product approval requirements.
  - 4) Impact-resistant windows must pass AAMA 1302.5 forced entry test as well as the FBC and Miami-Dade County test.
  - 5) Windows shall be self-weeping to the exterior.
- f. The A/E shall select windows of standard architectural sizes for ease of replacement. The A/E shall minimize the use of decorative, unusually shaped, fixed windows.
- D. Windows shall be metal framed except as follows:
1. Renovation, remodeling or new additions projects at designated historical buildings where metal window frames would not be aesthetically acceptable. Prior approval from MDC Facilities Design and Standards is required for the type of window frame material to be used at these locations.
  2. MDC specific directive to use another window frame material.
- E. Steel windows with fire rated glass, fusible links and manually operated louvers may only be used at fire rated wall locations and shall be certified missile impact resistant.
- F. Indicate fixed window panels on construction document building elevations.
- G. Windows shall be provided proper security to prevent intruder access. For special security systems at windows, see Divisions 13 and 16.
- H. Maximum head height of windows shall not exceed required ceiling elevations.
- I. Clerestory windows require MDC Facilities Design and Standards acceptance on a per condition basis. Clerestory windows shall have sills at least 10 inches above adjacent roof surface.



- J. Do not provide windows in auditorium, stage, storage rooms, custodial rooms, restrooms, telecommunication rooms and electrical/mechanical equipment rooms.
- K. All windows shall be provided with devices to control sunlight and darken room during audiovisual presentations. Refer to “Window Treatment and Window Shades” section of Division 12 of these Design Criteria for details.
- L. Windowsills (at exterior of windows):
  - 1. Use precast or cast-in-place concrete sills at masonry construction. The innermost portion shall be level with a dimension of at least 4 inches and have a 3/4-inch plumb lip going down to the outermost portion with a slope down to the exterior. Bucks and jambs and head shall align with lip.
  - 2. At tilt-up wall construction, windowsills shall be cast integral with the wall panel, using a sill profile similar to the one used for masonry construction. The remaining three sides of the window opening shall have a 3/4-inch lip.
- M. Window stools (at interior of windows): Use non-flammable, non-decaying materials such as marble, slate, quarry tile or laboratory epoxy counter material. Window stools shall not be located below abutting built-ins.
- N. Muntins, if used may be flat or 3-Dimensional and properly adhered to glass surface. When utilizing muntins in historical buildings, the designer shall specify the placement/pattern of muntins and the cross-section profile that most closely resembles the original historical window.
- O. Storage rooms, telecommunication rooms and electric closets, mechanical equipment rooms, new toilet rooms, custodial closets and other similar spaces shall be windowless.
- P. Screens are not required on windows except at kitchen and food preparation areas, cafeterias, existing toilet rooms and other locations according to program requirements.
- Q. A “Window Field Leak Test” shall be conducted at no cost to MDC, by the Contractor and window installer with the A/E and the MDC Project Manager present. At the discretion of MDC and independent testing company can be contracted. The “Window Field Leak Test” sequence that shall be conducted as follows.
  - 1. The initial test series shall be performed after the first factory-glazed operable window assembly has been installed at the site. The window assembly and its installation shall follow all of the requirements in the Contract Documents. After the assembly and installation have met all of the requirements for the “Window Field Leak Test” and been approved, it shall be used as the “standard” window mock-up.
  - 2. The goal shall be to determine, as early as possible, if the installation is being done correctly and to let the

installer apply what is learned to succeeding window installations. The test will identify leaking within the window and leaking between the window and the surrounding construction. An outside consultant or an MDC Test Lab are not required to conduct the test. The Contractor and the installer shall conduct the Window Field Leak Test. The A/E and MDC Project Manager will witness and report the test results. A hose and a nozzle shall be utilized to conduct the test.

3. The Contractor shall conduct the initial test and as many re-tests of the initial window assembly as needed, until a leak-free assembly and installation are attained. After the second failed test, the Contractor may be back-charged for all MDC expenses generated by further tests, at the discretion of MDC Project Manager.
4. At the start of the initial test the glazed window assembly shall have been shimmed and fastened in the opening over blocking bedded in sealant as required by the window specifications. The flange at the perimeter of the window frame shall be set in a full bed of sealant. All interior finishes, such as the gypsum board and window stool, shall not yet have been installed against the window frame so that all water intrusions can be identified.
5. Representatives from the Contractor, window installer, window producer, MDC Project Manager and the A/E shall be present Project Manager and the A/E shall be present during the initial and all later testing. The Contractor or window installer shall operate the hose nozzle for the testing.
6. Initial and later tests will be performed in two 5-minute phases with a brief interval between phases. A 5/8-inch garden hose and straight, adjustable brass nozzle shall be used for the test. Set the nozzle to produce an 8 inch to 10-inch diameter pattern at 8 feet to 10 feet distance from the window. Ascertain and note the water pressure where water from a public source enters the hose, preferably 45 PSI to 55 PSI. If a permanent water source is not available at the time that the test needs to be conducted the contractor shall supply equipment to achieve the required 45 PSI to 55 PSI. The Contractor shall spray water against the window while the A/E monitors for leaks or other signs of water intrusion at the interior side of the window.
  - a. For two minutes, spray the perimeter of the window opening, moving slowly, for 2 circuits, directing slightly more than half of the hose stream just within the window perimeter.
  - b. For one minute, spray the joints within the window opening, moving slowly along the vent joints, and the mullion or muntin joints.
  - c. For one minute make another circuit around the perimeter and along all joints.
  - d. Shut off the nozzle while the MDC Project Manager and the A/E review what the test has revealed. If the test is inconclusive, it shall be repeated.
7. Initial and later tests shall be adjusted to meet the actual window size. The test procedure above is designed for window assemblies/units that are 24 square feet to 40 square feet. When the window is less than 24

square feet, reduce the 2 minutes to 1-1/2 minutes, and 1 minute to 45 seconds. If the window is 40 square feet to 70 square feet, expand 2 minutes to 3 minutes, and 1 minute to 1-1/2 minutes. If the window is 70 square feet to 120 square feet, expand the time to 3-1/2 minutes, and 1-3/4 minutes.

8. If the mock-up window unit in the initial test allows any water penetration the Contractor shall remove the unit completely and re-install the entire window assembly at no cost to MDC. The Window Field Leak Test shall be repeated as many times as required to produce a water intrusion-free result as determined by all parties.
9. The initial series of mock-up tests must prevent all water intrusion before the installation of the remaining windows is permitted.
10. The “Window Field Leak Test” shall be repeated when all window installations have been completed for a building elevation or section of a building. The A/E shall select 10% of the total window area from each building section or elevation on which to conduct the Window Field Leak Test. The 10% selected shall represent window assemblies from all of the floors and locations within the test zone. All of the procedures detailed above shall be followed when testing each window assembly selected by the A/E.

#### **08 60 00 ROOF WINDOWS AND SKYLIGHTS**

- A. Roof windows and skylights are prohibited unless previously approved by MDC Facilities Department.

#### **08 70 00 HARDWARE**

- A. All doors and associated hardware shall comply with the Florida Building Code, Chapter 11 Accessibility Code for Building Construction (Section 11-4.13).
- B. All Renovation or partial renovation projects, all new door hardware (except locksets and cylinders) shall match existing. Locksets and cylinders shall be upgraded to meet these standards. Finishes shall be selected to match existing, where practical.
- C. Hardware for fire-rated openings shall comply with A.I.A. (NBFU) Pamphlet No. 80, NFPA Standards NO. 101, UBC 702 (1997) and UL10C. This requirement takes precedence over other requirements for such hardware. Provide only hardware that has been tested and listed by UL for the types and sizes of doors required and complies with the requirements of the door and door frame labels.
- D. Where panic exit devices are required on fire-rated doors, provide supplementary marking on door UL label indicating Fire Door to be equipped with fire exit hardware and provide UL label on exit device indicating “Fire Exit Hardware”.

- E. All hardware shall conform to MDC standards per requirements and manufacturers indicated below:
1. To the greatest extent possible, obtain each kind of hardware from only one manufacturer.
  2. All numbers and symbols used herein have been taken from the current catalogues of the following manufacturers
  3. To use manufacturers other than those listed requires prior approval of Miami Dade College Emergency Management/Office of Fire & Security via Variance Form.
  4. If material manufactured by other than that specified or listed herewith as an equal, is to be bid upon, permission must be requested from the architect seven (7) days prior to bidding. If substitution is allowed, it will be so noted by addendum.

PRODUCT (Division Resp.)	ACCEPTABLE MANUFACTURER	ACCEPTABLE SUBSTITUTE
Hinges (8)	Hager	Ives
Locks & Latches (8)	Schlage ND-Series	None
Electronic Locks (8)	Schlage AD	None
Cylinders, Keys, Keying (8)	Everest Primus	None
Exit Devices (8)	Von Duprin	None
Door Closers (8)	LCN	None
Auto Operators (8)	LCN	None
OH Stops/holders (8)	Not Approved	None
Magnetic Hold Opens (8)	LCN	JCI
Wall Stops/Floor Stops, Flush bolts (8)	Ives	Rockwood
Kick Plates (8)	Ives	Rockwood
Threshold/Weather-strip (8)	Zero	Pemko, Reese, NGP
Silencers (8)	Ives	Rockwood
Power Supply (Exit Devices) (8)	Schlage PS900 Series	None
EPT's Hinges	Von Duprin	Hager
ETW Hinges (8)	Command Access	Hager

- F. Finish Hardware shall be as follows

1. Exterior Hinges:



- a. Exterior Hinges shall be Stainless Steel (32D), Interior Hinges to be Satin Chrome (26D). Door Closers to be Aluminum. Locks to be Satin Chrome (26D), Exit Devices to be Satin Chrome (26D). Overhead Holders to be Satin Chrome (26D), Flat Goods to be Satin Chrome (26D) or Stainless Steel (32D) and the Thresholds to be Mill Finish Aluminum.

2. Hinges and Pivot:

- a. Exterior butts shall be Stainless Steel. Butts on all out swinging doors shall be furnished with non-removable pins (NRP).
- b. Interior butts shall be as listed.
- c. Doors 5' or less in height shall have two (2) butts. Furnish one (1) additional butt for each 2'6" in height or fraction thereof. Dutch door shall have two (2) butts per leaf.

G. Keying:

1. All cylinders shall be Schlage Lock Company Everest Primus D. Miami Dade College shall issue all new bittings in order to maintain the integrity of the Miami Dade College Schlage grand master key system.
2. Provide Everest Primus Cylinders Level 9GU for all applications. Structure # 584233 Primus ID # P04998 is to be referenced for all Everest Primus cylinders and key orders.
3. Each Campus to be provided their individual keyway, with one side-bit milling for all facilities. Keyway and bitting to be determined by campus location, and subject to the approval of the Miami Dade College Emergency Management/Office of Fire & Security (OFS). Contact Miami Dade College Chief Locksmith (305) 237-2353 for keying information. All Engineering/Mechanical (all campuses) to be D345 Keyway.
4. Campus Keyway Standard:
  - a. Kendall Campus: D235 (1246- M/N Bldg, 1468- 1000-6000 Building, 1467- 1777- 9000/ L & K Building)
  - b. North Campus: D125 (1246, 1248, 1247)
  - c. Wolfson Campus: D135 (1456)
  - d. West Campus (D345)
  - e. Hialeah Campus (D125)
  - f. Homestead (D345)
  - g. Medical: D135 (1248)
  - h. IAC: D1454.
5. All keys and cylinders to be shipped directly to the Miami Dade College Office of Fire & Security. Restricted

Product Authorization form required for all orders. All orders must include project # and/or name.

6. Provide Three (3) each change keys per lock and Six (6) each grand master and master keys. Stamp “DO NOT DUPLICATE”.
7. All keys are to be provided in Everest Primus, in the proper keyway for all cylinders ordered.
8. Three control keys to be issued for all orders that include interchangeable core cylinders.
9. Keying meeting with Contract Hardware Distributor and Miami Dade College Office of Fire & Security to be held prior to any factory order being placed, in respect to keys and cylinders.

#### H. Locksets:

1. Locks shall meet these certifications:
  - a. Cylindrical Locks - ANSI A156.2 Series 4000, Grade 1 Strength and Operational requirements. Meets A117.1 Accessibility Codes. Cylinders are to be removable core type; TD designation, for either Primus or Everest Restricted final cores. Latch bolts shall be steel with minimum 1/2” throw, deadlocking on keyed and exterior functions. 3/4” throw anti- friction latch bolt on pairs of fire doors. Strikes: Provide manufacturer's standard wrought box strike for each latch or lock bolt, with curved lip extended to protect frame. Locksets to be tested to exceed 3,000,000 cycles. Lock case shall be steel. Lock shall incorporate one- piece spring cage and spindle. Provide 5/8” minimum throw of latch and deadbolt used on pairs of doors. Provide Seven Year Warranty.
    - 1) Locks shall be Schlage ND series, “RHO” design.
  - b. Mortise Locksets and Latchsets Provide heavy duty mortise locksets and latchsets that comply with ANSI A156.13, Series 1000, Grade 1 Operational. Functions as listed in Hardware Sets. Locksets shall be manufactured from heavy gauge steel, minimum lockcase thickness 1/8”, containing components of steel with a zinc dichromate plating for corrosion resistance. Locksets are to have a standard 2 3/4” backset with a full 3/4” throw. Deadbolt shall be a full 1” throw, constructed of stainless steel. Lock trim shall be through-bolted to door to assure correct alignment a proper operation.
    - 1) Locks shall be Schlage L9000 series, 06A lever.
2. Comply with UL requirements for throw of bolts and latch bolts on rated fire openings.
3. All locksets to be delivered to jobsite with temporary construction cores. Permanent cores to be installed by Miami Dade College's Office of Fire & Security.

#### I. Electronic Locksets:

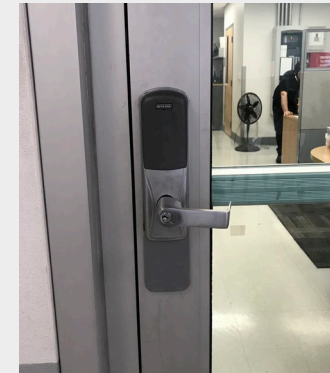
1. Electronic reader, hardware and access control shall be in compliance with Division 280500 design standard. All electronic hardware devices will be considered “card readers” and shall be furnished by a certified integrator.
2. Access Control shall be real time with complete monitoring capability provided by a Schlage hard-wired locking system that communicates to the Software House access control system. Locking system shall be comprised of a lock and trim that incorporates card reader, Request-to-Exit (REX) device, door position switch, and mechanical key override switch and, in the case of mortise locks, incorporate latch bolt position switch – all integral to the locking device. Locking device with integral card reader shall be available in proximity technology.
  - a. Acceptable substitutions: None for new construction. Retrofit will be designed based on existing conditions.

J. Exit Devices:

1. All devices shall be Von Duprin 98 Series in types and functions specified. All devices must be listed under “Panic Hardware” in accident equipment list of Underwriters Laboratories. All labeled doors with “Fire Exit Hardware” must have labels attached and be in strict accordance with Underwriters Laboratories.
2. All exit devices shall be tested to ANSI/BHMA A156.3 test requirements by a BHMA certified testing laboratory. A written certification showing successful completion of a minimum of 1,000,000 cycles must be provided.
3. All surface strikes shall be roller type and come complete with a plate underneath to prevent movement. And shall be provided with a dead-latching feature to prevent latchbolt tampering.
4. Power for Von Duprin “QEL” devices will be provided by Division 28. Power transfer; EPT-10 r ETW Hinge, to be supplied by Division 8.
  - a. Acceptable substitutions: None

K. Door closers:

1. All closers shall be LCN 4040XP Series having non-ferrous covers, forged steel arms separate valves for adjusting backcheck, closing and latching cycles and adjustable spring to provide up to 50% increase in spring power. Closers shall be furnished with parallel arm mounted on all doors opening into corridors or other public spaces and shall be mounted to permit 180 degrees door swing wherever wall conditions permit. Furnish with non-hold open arms unless otherwise indicated
2. Door closer cylinders shall be of high strength cast iron construction to provide low wear operating capabilities of internal parts throughout the life of the installation. All door closers shall be tested to





ANSI/BHMA A156.4 test requirements by a BHMA certified testing laboratory. A written certification showing successful completion of a minimum of 10,000,000 cycles must be provided.

3. Door closers shall utilize temperature stable fluid capable of withstanding temperature ranges of 120 degrees Fahrenheit to -30 degrees Fahrenheit, without requiring seasonal adjustment of closer speed to properly close the door. Closers for fire-rated doors shall be provided with temperature stabilizing fluid that complies with the standards UBC 7-2 (1997) and UL 10C.
4. Door closers shall incorporate tamper resistant non-critical screw valves of V-slot design to reduce possible clogging from particles within the closer. Closers shall have separate and independent screw valve adjustments for latch speed, general speed, and hydraulic backcheck. Backcheck shall be properly located so as to effectively slow the swing of the door at a minimum of 10 degrees in advance of the dead stop location to protect the door frame and hardware from damage.
5. Low energy operators to be LCN 9550/9540 series at exterior doors. 4630/4640 series acceptable at interior locations where door opening will be mainly mechanical

L. Trim and Plates:

1. Kick plates, mop plates, and armor plates, shall be .050 gauges with 32D finish. Kick plates to be 8" high, mop plates to be 4" high. All plates shall be two (2) inches less full width of door.
2. Push plates, pull plates, door pulls, and miscellaneous door trim shall be shown in the hardware schedule.

M. Door Stops:

1. Doorstops shall be furnished for all doors to prevent damage to doors or hardware from striking adjacent walls or fixtures. Wall bumpers equal to Ives WS407 Series are preferred, but where not practical furnish floor stops equal to FS436 or FS438 series. Drywall MUST be reinforced if receiving wall mounted stops.

N. Threshold and Weatherstrip:

1. Thresholds and weather-strip shall be as listed in the hardware schedule.

O. Door Silencers:

1. Furnish rubber door silencers equal to Ives SR64 for all new interior hollow metal frames, (2) per pair and (3) per single door frame.

P. Key Cabinet:



1. Set up and index one (1) Key Cabinet that allows room for expansion for 150% of the number of keys for the project.

Q. Hardware Schedule:

1. **Sample Hardware Schedules** are available to Designers and Contractors for whatever assistance it may afford; do not consider it as entirely inclusive, please request Sample Hardware Schedule from Project Manager.

## 08 80 00 GLAZING

### 08 81 00 Glass Glazing (Interior and Exterior)

- A. Exterior glass shall be impact resistant (thermal) and designed to comply with FBC. Submit to the Building Official calculations, signed and sealed by a Florida registered professional engineer, establishing wind velocity pressure values for the specific project in accordance with FBC ASCE 7.
- B. Glazing at MDC buildings shall be tempered, laminated, insulated and/or fire rated glass. Do not use wire glass, acrylic sheets or glass block (glass block allowed at interior areas only with MDC prior approval). All glazing shall meet the following criteria:
  1. Tempered glass shall be used for all standard interior glazing.
  2. Laminated glass shall comply with ASTM C 1172, and with all required testing as per 16 CFR 1201 for Category II materials and shall be used all exterior applications and in interior applications requiring security. Laminated glass shall meet the following criteria:
    - a. Laminated glass shall have a polyvinyl butyral interlayer in compliance with manufacturer's recommendations and minimum thickness requirements.
    - b. Butyral interlayer color to be as per designer's selection with prior approval from the Campus.
    - c. Low-E glass shall be used for all exterior applications. Each condition shall be evaluated by the Design Professional as options for energy considerations on exterior applications. Energy consideration such as visible light transmittance and solar heat gain shall be evaluated as best suited for the project and the targeted energy savings goal for all projects with a minimum goal of LEED Silver Certification. The color and tint shall be selected to reduce energy consumption as recommended in the calculation/analysis report provided by the mechanical engineer. The following are recommended values:

REQUIRED	RECOMMENDED
Overall unit thickness	1 inch (25mm)
Outdoor lite	Heat strengthened float glass
Interspace content	Air
Indoor lite	Heat-strengthened float glass
Low-E Coating	Pyrolytic on third surface
Visible light transmittance	0.62 percent minimum
Winter Nighttime U-Factor	0.29 maximum
Summer Daytime U-Factor	0.26 maximum
Solar Heat Gain coefficient	0.29 maximum

3. Insulated Laminated glass shall comply with ASTM E 2190 and it shall be used in interior areas where acoustical applications are required. Insulated laminated glass shall meet the following criteria:
    - a. Glass units shall consist of sealed lites of glass separated by a dehydrated interspace
    - b. Dual seal shall be provided with manufacturer's primary and secondary standards and standard spacer material
    - c. Dessicant shall be molecular sieve or silica gel or both as required
  4. Fire rated glass shall be used in interior or exterior applications in compliance with fire rated requirements
- C. All glass color and/or tint shall be selected by the Designer and shall be approved previously by the MDC Campus where the project is located.
- D. Polycarbonate glazing:
1. Polycarbonate glazing shall not be exposed to the interior of the building.
  2. Polycarbonate glazing is not allowed in door view panels or display cases

#### 08 83 00 Mirrors

- A. Mirrors in faculty/staff & student group toilet rooms shall be 1/4" tempered glass, electrolytically copper plated, in stainless steel frames with concealed theft-proof mountings. Refer to Division 10.

**08 90 00 LOUVERS**

- A. Louvers to be provided at exterior of buildings shall be “Horizontal Storm Resistant/Storm Class” aluminum louvers. Louvers to be provided with NOA or a State of Florida product approval for use in a High Velocity Hurricane Zone (HVHZ). Refer to Division 10.
- B. Mechanical louvers are prohibited in exterior building installations.

**NOTE: this division of the design criteria shall be included as part of Project Manual in the Construction and Contract Documents**

**END OF DIVISION**

**09 00 00 FINISHES****09 01 00 GENERAL**

- A. The selection of materials shall be assessed for long-range, life-cycle cost analysis.
- B. The Architect/Interior Designer shall provide a detailed interior color board including all paints, wall tiles, grouts, wood door finishes, millwork, cabinets/countertops, and any other publicly visible interior finishes. Preliminary finish options (paint, carpet, tile, toilet partitions, exterior materials etc.) shall be presented to Facilities at the end of Phase II Design Development. The final color board shall be submitted and approved by completion of Phase III 50% submittal.
- C. Samples of ALL finishes and finishing materials must be submitted to the Owner PRIOR TO ORDERING.
- D. Provide finish materials durable and able to cope with south Florida weather conditions. Finishes shall allow for cleaning of graffiti or stains with relative ease by the building's custodial staff. The design and selection of building finishes shall be based on the following:
1. Vandal resistance.
  2. Cost effectiveness.
  3. Durability.
  4. Resistance to cracking and peeling.
  5. Resistance to fading or discoloration from exposure to abrasion, cleaning, sunlight, weather, acids or other chemicals.
  6. Weather tightness under normal and hurricane conditions.
  7. Absence of excessively rough or sharp textures and features.
- E. Finish materials are major contributors to the "Sick Building Syndrome". MDC is greatly concerned about materials harming the occupants or the environment either by the manufacturing process or use in buildings.
1. Finish materials containing or able to emit harmful substances or particles into the air shall not be used.
  2. Building products shall not contain asbestos, lead, formaldehyde, mercury, volatile organic compounds (VOCs), or any other harmful products. Only non-toxic adhesives are to be used in MDC installations.

**DIVISION 09****FINISHES**

This section contains the following:

<b>09 01 00</b>	<b>GENERAL</b>
09 06 00	Schedules for finishes
<b>09 20 00</b>	<b>PLASTER AND GYPSUM BOARD</b>
09 21 00	Plaster And Gypsum Board Assemblies
09 29 00	Gypsum Board
<b>09 30 00</b>	<b>TILING</b>
<b>09 50 00</b>	<b>CEILINGS</b>
09 51 00	Acoustical Ceilings
09 54 00	Specialty Ceilings
<b>09 60 00</b>	<b>FLOORING</b>
09 64 00	Wood Flooring
09 65 00	Resilient Flooring
09 66 00	Terrazzo Flooring

*(Continues)*

F. Interior finish materials shall comply with:

1. NFPA 101 Chapters 6, 10, and 11 for interior finish flame spread general requirements.
2. Florida Building Code (FBC) – Building, Chapter 8, INTERIOR FINISHES.
3. Tile Council of America, Inc. – Handbook for Ceramic Tile Installation.

G. The A/E shall specify that HVAC systems shall be operational and shall maintain at 75 +/- 2 degrees Fahrenheit and a constant 55 +/- 2 percent relative humidity for a period of at least 3 days (72 hours) before beginning the installation of specified interior finishes. These conditions shall be maintained at all times until installation of interior finishes are completed and accepted by MDC. The A/E shall specify that the Contractor shall record conditions at least every 4 hours and provide supplemental temporary air-conditioning or dehumidification if HVAC is not operating at specified conditions. Exterior openings shall be kept closed during these periods by using temporary or permanent barriers.

H. When renovating existing spaces that contain ceramic tile and grout, in lieu of replacing tile and grout with new product, the A/E shall evaluate existing conditions and consider the option of refurbishment of the existing tile and grout with a product similar/equal to SaniGLAZE or MicroGuard. This option shall be submitted to the MDC for their approval on a per project basis.

**09 06 00 Schedules for Finishes**

A. Finishes shall be provided as per chart below

	<b>WALLS</b>	<b>FLOORING</b>	<b>BASEBOARD</b>	<b>CEILING</b>
Public Spaces and Lobbies	<ul style="list-style-type: none"> <li>• 5/8" high impact abuse resistant gypsum board. Type "X" if Fire rating is required</li> </ul>	<ul style="list-style-type: none"> <li>• Hard tile</li> <li>• VCT</li> <li>• Carpet tile</li> <li>• Luxury vinyl tile (LVT)</li> <li>• Polished concrete with MDC approval</li> <li>• Terrazzo with MDC approval.</li> </ul>	<ul style="list-style-type: none"> <li>• Tile</li> <li>• Rubber</li> <li>• Rubber</li> <li>• Rubber</li> <li>•</li> <li>• Rubber</li> <li>•</li> <li>•</li> <li>• Terrazzo cove</li> </ul>	<ul style="list-style-type: none"> <li>• Acoustical Tile*</li> <li>• Specialty Ceilings with MDC approval</li> </ul>

- 09 67 00 Fluid-Applied Flooring
- 09 68 00 Carpeting

**09 70 00 WALL FINISHES**

**09 90 00 PAINTING AND COATING**



	WALLS	FLOORING	BASEBOARD	CEILING
Classrooms	<ul style="list-style-type: none"> <li>• 5/8" high impact abuse resistant gypsum board. Type "X" if Fire rating is required</li> </ul>	<ul style="list-style-type: none"> <li>• VCT</li> </ul>	<ul style="list-style-type: none"> <li>• Rubber</li> </ul>	<ul style="list-style-type: none"> <li>• Acoustical Tile*</li> </ul>
Auditoriums	<ul style="list-style-type: none"> <li>• 5/8" high impact abuse resistant gypsum board. Type "X" if Fire rating is required</li> </ul>	<ul style="list-style-type: none"> <li>• Carpet Tile</li> </ul>	<ul style="list-style-type: none"> <li>• Rubber</li> </ul>	<ul style="list-style-type: none"> <li>• Acoustical Tile*</li> </ul>
Computer Labs	<ul style="list-style-type: none"> <li>• 5/8" high impact abuse resistant gypsum board. Type "X" if Fire rating is required</li> </ul>	<ul style="list-style-type: none"> <li>• Carpet Tile</li> <li>• Static dissipative VCT</li> </ul>	<ul style="list-style-type: none"> <li>• Rubber</li> </ul>	<ul style="list-style-type: none"> <li>• Acoustical Tile*</li> </ul>
Offices	<ul style="list-style-type: none"> <li>• 5/8" gypsum board. Type "X" if Fire rating is required</li> </ul>	<ul style="list-style-type: none"> <li>• Carpet Tile</li> <li>• LVT</li> </ul>	<ul style="list-style-type: none"> <li>• Rubber</li> </ul>	<ul style="list-style-type: none"> <li>• Acoustical Tile*</li> </ul>
Conference Rooms	<ul style="list-style-type: none"> <li>• 5/8" gypsum board. Type "X" if Fire rating is required</li> <li>• Chair rails as required</li> </ul>	<ul style="list-style-type: none"> <li>• Carpet Tile</li> <li>• LVT</li> </ul>	<ul style="list-style-type: none"> <li>• Rubber</li> </ul>	<ul style="list-style-type: none"> <li>• Acoustical Tile*</li> <li>• Specialty Ceilings with MDC approval</li> </ul>
Dining Facilities	<ul style="list-style-type: none"> <li>• 5/8" high impact abuse resistant gypsum board. Type "X" if Fire rating is required</li> </ul>	<ul style="list-style-type: none"> <li>• VCT</li> <li>• Sheet Vinyl</li> <li>• Hard Tile</li> <li>• Terrazzo with MDC approval</li> </ul>	<ul style="list-style-type: none"> <li>• Rubber</li> <li>• Rubber</li> <li>• Tile</li> <li>• Terrazzo cove</li> </ul>	<ul style="list-style-type: none"> <li>• Acoustical Tile* (Vinyl)</li> </ul>
Laboratories	<ul style="list-style-type: none"> <li>• 5/8" high impact abuse resistant gypsum board. Type "X" if Fire rating is required</li> </ul>	<ul style="list-style-type: none"> <li>• Polished concrete</li> <li>• Epoxy Coatings (non slip Finish)</li> <li>• Acid resistant rubber</li> </ul>	<ul style="list-style-type: none"> <li>• Acid resist. Rubber</li> <li>• Epoxy</li> <li>• Acid resist. Rubber</li> </ul>	<ul style="list-style-type: none"> <li>• Acoustical Tile*</li> </ul>



	WALLS	FLOORING	BASEBOARD	CEILING
Corridors	<ul style="list-style-type: none"> <li>• 5/8" high impact abuse resistant gypsum board. Type "X" if Fire rating is required</li> </ul>	<ul style="list-style-type: none"> <li>• Carpet Tile</li> <li>• LVT</li> <li>• Hard Tile</li> <li>• Terrazzo with MDC approval</li> </ul>	<ul style="list-style-type: none"> <li>• Rubber</li> <li>• Rubber</li> <li>• Tile</li> <li>• Terrazzo cove</li> </ul>	<ul style="list-style-type: none"> <li>• Acoustical Tile*</li> </ul>
Elevators	<ul style="list-style-type: none"> <li>• Refer to Division 14 Conveying System</li> </ul>	<ul style="list-style-type: none"> <li>• Refer to Division 14 Conveying System</li> </ul>	<ul style="list-style-type: none"> <li>• Refer to Division 14 Conveying Systems</li> </ul>	<ul style="list-style-type: none"> <li>• Refer to Division 14 Conveying System</li> </ul>
Stairs	<ul style="list-style-type: none"> <li>• 5/8" high impact abuse resistant gypsum board.</li> <li>• Paint concrete masonry walls with MDC approval</li> </ul>	<ul style="list-style-type: none"> <li>• VCT</li> <li>• Sealed Concrete with integral slip resistant tread</li> <li>• Hard Tile, Terrazzo (Only Monumental Stairs with MDC approval)</li> </ul>	<ul style="list-style-type: none"> <li>• Rubber</li> <li>• Rubber</li> <li>• Tile</li> <li>• Terrazzo Cove</li> </ul>	<ul style="list-style-type: none"> <li>• Exposed structure</li> <li>• Specialty Ceiling (Only Monumental stairs with MDC approval)</li> </ul>
Mechanical/Electrical Rooms	<ul style="list-style-type: none"> <li>• 5/8" high impact abuse resistant gypsum board.</li> <li>• Painted concrete masonry walls with MDC approval</li> </ul>	<ul style="list-style-type: none"> <li>• Sealed Concrete</li> <li>• Epoxy</li> </ul>	<ul style="list-style-type: none"> <li>• Rubber</li> <li>• Epoxy</li> </ul>	<ul style="list-style-type: none"> <li>• Exposed structure</li> </ul>
Telecommunications Rooms	<ul style="list-style-type: none"> <li>• 5/8" high impact abuse resistant gypsum board.</li> </ul>	<ul style="list-style-type: none"> <li>• VCT (anti-static)</li> </ul>	<ul style="list-style-type: none"> <li>• Rubber</li> </ul>	<ul style="list-style-type: none"> <li>• Exposed structure</li> </ul>
Restrooms or wet areas	<ul style="list-style-type: none"> <li>• ½" fiberglass reinforced cement board</li> </ul>	<ul style="list-style-type: none"> <li>• Ceramic tile</li> </ul>	<ul style="list-style-type: none"> <li>• Ceramic tile</li> </ul>	<ul style="list-style-type: none"> <li>• Plaster</li> </ul>
Showers	<ul style="list-style-type: none"> <li>• ½" fiberglass reinforced cement board</li> </ul>	<ul style="list-style-type: none"> <li>• Ceramic tile</li> <li>• Terrazzo</li> </ul>	<ul style="list-style-type: none"> <li>• Ceramic tile</li> <li>• Terrazzo cove</li> </ul>	<ul style="list-style-type: none"> <li>• Plaster</li> </ul>



	WALLS	FLOORING	BASEBOARD	CEILING
Gymnasium/Stage/ Dance Studio	<ul style="list-style-type: none"> <li>• 5/8" high impact abuse resistant gypsum board</li> <li>• Painted concrete masonry walls with MDC approval</li> </ul>	<ul style="list-style-type: none"> <li>• Hardwood</li> </ul>	<ul style="list-style-type: none"> <li>• Heavy duty ventilating type, molded Rubber cove.</li> </ul>	<ul style="list-style-type: none"> <li>• Acoustical tile</li> <li>• Exposed structure</li> </ul>

\* For all Acoustical ceilings provide NRC rating.

**09 20 00 PLASTER AND GYPSUM BOARD**

**09 21 00 Plaster and Gypsum Board Assemblies**

- A. Lath and plaster systems must use galvanized steel metal lath in conjunction with acoustic plaster to eliminate rust stains. All lathing accessories shall be made of zinc alloy.

**09 29 00 Gypsum Board**

- A. Gypsum Board shall be a minimum of 5/8" in thickness.
- B. Moisture-resistant gypsum board (green board) shall be installed within five feet (5') of wet areas.
- C. The substrate for shower walls tile shall be 1/2" minimum fiberglass-reinforced cement board.
- D. **Gypsum wall board shall not be installed until the building is adequately dried-in.**
- E. All drywall must be placed on metal channels or metal studs a minimum of 16" on center.
- F. Metal framing (non-structural) shall provide a true, flat system to receive gypsum board.
- G. Stainless steel outside corner guards must be used in high traffic areas and where mobile equipment is utilized. Corner guards shall be adhered with construction adhesive and not with screws or double stick tape. Size as follows:





- 1. Classrooms: 2" x 2" x 4'
  - 2. Labs: 3" x 3" x 4'
- H. Control joints shall be designed into the interior elevation.
- I. The following finish grade levels are required by space type:
- 1. Level 0 finish: Prohibited
  - 2. Level 1 finish: Plenum areas above ceilings and attic spaces
  - 3. Level 2 finish: Garages, storage and closets
  - 4. Level 3 finish: Mechanical rooms, electrical rooms and telecommunication rooms
  - 5. Level 4 finish: Classrooms, corridors, offices, conference rooms, atriums and dining rooms
  - 6. Level 5 finish: Laboratories, clinics, auditoriums, or as recommended by A/E
- J. Fire-rated Assemblies shall be provided incorporating materials and construction as indicated in the tested assembly. Products used shall carry a classification label from a testing laboratory acceptable to the authority having jurisdiction.
- K. STC Rated Assemblies shall be provided as per chart below incorporating materials and construction as indicated in the tested assembly.

SPACE DESCRIPTION	STC RATING	RC	RT (occupied)
Classrooms and Laboratories	48	25 - 30	
Music	57	30 - 35	1.3 max
Auditorium	52	20 - 25	1.0 - 1.5
Separation elements	48		
Language Arts Labs	52	25 - 30	0.5 - 0.8
Mechanical Rooms	50		
Administration	52	30 - 35	
Library	52	25 - 30	0.5 - 0.7
Production Studio, Control Room, Editing Rooms, Workshop	52	30 - 35	
Toilets (individual and group)	46		



SPACE DESCRIPTION	STC RATING	RC	RT (occupied)
Food Service areas including Kitchen, Food Prep and Serving Areas	46		
Resource rooms and skills labs	48	30 - 35	
Dining Rooms	48	30 - 40	0.6 - 0.8
Gymnasiums			2.0 max

- L. Provide interior wall finishes above ceilings meeting acoustical, fire resistance and thermal envelope requirements.
- M. All walls and partitions shall go all the way to the bottom of the structure above at all classrooms, labs, offices and conference rooms to prevent sound transmission from one space to the other
- N. Soffits:
  - 1. Provide all interior soffits with 5/8" gypsum board or 5/8" Type X gypsum board if rating is required.
  - 2. Provide exterior soffits with:
    - a. Two coats of stucco over concrete/masonry. Use stucco for exterior soffits if a finish is needed to protect above-ceiling utilities, equipment and other elements from potential damage by weather, vandalism or excessive wear.
    - b. Exterior half-inch concrete board systems reinforced with vinyl-coated, woven glass-fiber mesh for soffits and other decorative elements not part of the structural envelope, with MDC approval.
    - c. Exterior soffits shall be designed to meet FBC wind load requirements.
- O. Walls:
  - 1. Provide interior non-student and administrative areas with 5/8" gypsum board or 5/8" Type X gypsum board if rating is required.
  - 2. Provide interior student spaces and high traffic areas with 5/8" impact/abuse-resistant, mold/moisture gypsum board
  - 3. Provide exterior walls with:
    - a. Two coats of stucco over concrete/masonry.



- b. Half-inch concrete board systems reinforced with vinyl-coated, woven glass-fiber mesh only for decorative elements and with MDC approval.
  - c. At weather protected surfaces, provide stucco over expanded metal lath or paper-backed hot dipped galvanized welded wire fabric not part of the structural envelope.
- P. Walls and Ceilings at Showers drying, locker rooms, public and student toilets, and any other high moisture content spaces:
- 1. Shall receive ½” fiberglass reinforced cement board with tile, paperless gypsum board with glass fiber or other inorganic, mold/moisture resistant facings.
  - 2. Refer to “Tiling” for other requirements.
- Q. Electrical fixtures are not allowed on exterior walls or stairs exposed to the elements.**
- R. Provide access panels through plaster, stucco (cement plaster), veneer plaster and drywall ceilings in sufficient size, number and location to above ceiling electrical, mechanical or other elements requiring access. Access panels in areas with moisture such as restrooms, custodial rooms, labs etc. to be stainless steel.
- S. Prefabricated metal or plastic stucco reveals are not allowed. Strike final stucco coat to achieve score patterns. Slope bottom edge of horizontal score lines to dispel water.

### 09 30 00 TILING

- A. Tile work shall be designed and specified per project program requirements.
- B. It is preferred that all tile for a project be from one manufacturer.
- C. For existing areas, when patching tile is required, designer shall develop a pattern to incorporate the new tile.
- D. Trim units and special shapes shall be provided to match characteristics of adjoining flat tile and comply with the following:
  - 1. External corners, bullnose shapes with round out base and top trim special shapes or stainless-steel accessories.
  - 2. Internal corners, field-buttet square with square in-corner base and top trim special.

3. No visible cut tile edges are permitted.
4. Provide bullnose shape at top of non-full height wall applications.

E. Ceramic Floor Tile:

1. Floor slabs to receive tile shall be recessed the depth of the tile and setting bed to provide a level plane at access points. Slabs shall be appropriately sloped to floor drain and shall have steel trowel and fine broom finishes with no curing compounds used.
2. Friction coefficient to be minimum 0.42 in wet areas and breaking strength to be minimum 300 lb.
3. Floor tile in wet areas shall be not greater than 2-inch by 2-inch by ¼-inch.
4. Provide a tile cove wall base at areas with a ceramic tile floor.
5. Tile flooring shall be suitable for floor use and be easily maintainable.
6. Select color of tile and epoxy grout to conceal dirt for low maintenance. Avoid very light colors and very dark colors.
7. Provide marble thresholds at doorways or entrances to wet areas with ceramic tile flooring.
8. Installation of ceramic tile over existing ceramic tile is not allowed.

F. Ceramic Wall Tile:

1. Provide ceramic tiles from floor to ceiling, in all student group restrooms, restroom vestibules, shower areas, cafeteria kitchens, snack bars, salad bars, food serving areas, and other areas as required by Project Program Requirement.
2. Provide a ceramic tile wainscot, from floor to at least 7'-0" above finish floor, in whole tile increments, in all single use restrooms.
3. In custodial closets, walls adjacent to the custodial service sink shall be provided a ceramic tile wainscot from floor to at least 4'-0" above finish floor, in whole tile increments, extending a minimum of one-foot beyond the foot-print of the custodial service sink.
4. Apply tile over 1/2" waterproof concrete backer boards that is reinforced with vinyl-coated woven glass-fiber mesh.
5. Typical wall tile size: Nominal 4-inch x 4-inch and 5-16-inch minimum thickness.
6. Provide bullnose trim pieces at corners of tile walls and cove bases at floor line.
7. Installation of ceramic tile over existing ceramic tile is not allowed.
8. At existing custodial closets slabs that cannot be recessed provide epoxy finish flooring. In lieu of tile.
9. At new custodial closets provide industrial grade epoxy grout.

G. Porcelain Tile:

1. Provide 12-inch x 24-inch, non-glazed "through body" high-grade porcelain tile in lobbies and special areas.

2. Substrate shall be in accordance with MDC Design Criteria.

H. Quarry Tile:

1. Provide quarry tile in kitchen and other service/high traffic areas.
2. Floor slabs to receive quarry tile shall be recessed the depth of the tile and setting bed to provide a level plane at access points. Slabs shall be appropriately slope to floor drain and shall have steel trowel and fine broom finishes with no curing compounds used.
3. Quarry tile shall be flat, impervious and be easily cleanable.
4. Quarry tile size shall be 6 inches by 6 inches by 1/2 inch thick.
5. Specify dark gray, acid resistant, epoxy grout with pre-waxed quarry tile to avoid quarry tile staining.
6. Do not use thin set at quarry tile installations.
7. Provide 6-inch high quarry tile wall base to match floors except at walls with ceramic tile.
8. Slope floors down uniformly 1/8 inch per foot to floor drains located at low points. Ponding is not allowed.

### 09 50 00 CEILINGS

- A. Specify unobstructed minimum ceiling heights according to Code and Program Requirements.
- B. Lay-in Ceiling is the preferred ceiling type since it allows free access to above ceiling spaces offering flexibility for future needs.
- C. Central receiving, custodial closets, electrical, telecommunication and mechanical rooms, gymnasium floor, stage area and language arts labs shall have an exposed painted ceiling structure, unless otherwise required by Code to meet fire rating requirements.
- D. The use of exposed structure ceilings in instructional areas is not allowed without prior approval from MDC.

### 09 51 00 Acoustical Ceilings

- A. The typical interior ceiling shall be 2'-0" x 2'-0" lay-in acoustical panel suspended ceiling system.
- B. Grid installation shall have support wiring at 4 feet on center on main support runners and within 3 inches of each corner of each drop-in light fixture. Hanger gauge as required by manufacturer.
- C. Cafeteria kitchens, salad bars, snack bars, and serving areas shall receive 2'-0" x 2'-0" lay-in vinyl-faced gypsum

- panels with an aluminum-capped or aluminum suspension system. Tiles to be mildew and bacteria resistant.
- D. Ceilings less than 8'-0" above finish floor at ceiling retrofit projects shall receive a 2'-0" x 2'-0" suspended ceiling system with abuse resistant lay-in panels.
  - E. Existing Acoustical Ceilings:
    - 1. In remodeling and renovation projects, replace existing ceilings with 2'-0" x 2'-0" lay-in acoustical tile suspended ceiling.
  - F. Ceilings shall provide the required sound absorption (NRC), STC rating, light reflectance and fire rating for each specific area according to the Project Program Requirements.
  - G. The use of Metal ceilings and metal soffits requires MDC approval.
  - H. Reflected ceiling design shall coordinate all ceiling mounted elements and accessories.
  - I. Lay out ceiling tiles to avoid perimeter units of less than 1/2-unit width.

#### **09 54 00 Specialty Ceilings**

- A. Specialty Ceilings are only allowed in areas as provided in the finishes chart above with MDC prior approval.

#### **09 60 00 FLOORING**

- A. Flooring material locations shall be in accordance with the Educational Specification developed for each project.
- B. Select finishes based on durability, initial costs, and ease and cost of maintenance.
  - 1. Finish flooring shall be extended fully under all built-ins.
  - 2. Flooring shall have slip resistance coefficients of at least the following values:
    - a. 0.6 at level floors and walks.
    - b. 0.8 at ramps and inclined floors and walks.
- C. Areas to receive sealed concrete floors shall be provided with a smooth finish and according to program requirements.

- a. Seal with a translucent, non-yellowing and non-toxic sealer.
- b. Concrete slab must be tested for moisture content according to the flooring manufacturer's instructions.
- c. Use rubber cove wall bases at interior installations. Standard wall base height for resilient and carpet floor installation to be 4" unless previously approved by MDC.

**09 64 00 Wood Flooring**

- A. Floor slabs to receive wood shall be recessed the depth of the wood flooring system to provide a level plane at access points.
- B. Prior to installation all wood floors shall be acclimatized to the surrounding areas.**
- C. Provide 1-1/2" or 2-1/2" wide x 3/32" thick, grade no. 2 or better, tongue and groove, maple or other accepted MDC wood over wood sleepers on cushioning pads according to the following:
  1. Gymnasiums: 3/8" pads.
  2. Stage, Gymnastics/dance, and Little Theater: 5/8" pads.
- D. Wood flooring shall be installed in accordance with manufacturer recommendation. In addition, specify ventilated cove rubber bases or other type base as recommended by specific flooring system manufacturer.
- E. Expansion joint covers shall be stainless steel and flush with flooring.
- F. Provide mats or dirt gratings for the full width of gymnasium entrance doors. Mats shall be securely anchored to the floor.
- G. Include multi-color MDC logo at the center of the gymnasium floor.

**09 65 00 Resilient Flooring**

- A. Provide Vinyl Composition Tile (VCT) floors in classroom areas. An (VCT) tile to be bio-based.
- B. Provide Luxury Vinyl Tile (LVT) floors in corridors, entrances and special areas. LVT static load 2,000 psi and wear layer thickness 20 mil (.5mm). An (LVT) tile to be bio-based.
- C. Areas with Resilient flooring shall receive 4-inch rubber cove base.

- D. Interior stairs when applicable shall receive rubber nosing and treads, rubber risers and rubber stringers.
- E. Concrete slabs receiving resilient flooring must be tested for moisture content according to the flooring manufacturer's instructions. Relative Humidity (RH) and pH testing as per ASTM 2170 and 710.
- F. Only non-toxic adhesives shall be used for resilient flooring installations.
- G. Existing resilient flooring shall be removed, and floor prepared to manufacturer's recommendations when new resilient flooring is required.

**09 66 00 Terrazzo Flooring**

- A. Terrazzo flooring is only allowed in areas as provided in the finishes chart above with MDC prior approval. Follow requirements of the National Terrazzo Association for all installations.

**09 67 00 Fluid Applied Flooring**

- A. Epoxy flooring shall be used in areas according to program requirements.
- B. Concrete slabs receiving fluid-applied flooring must be tested for moisture content according to the flooring manufacturer's instructions.
- C. Specify a smooth orange peel surface.
- D. Slope floors down uniformly 1/8" per foot to floor drains located at low points. Ponding is not allowed.
- E. Provide a 4-inch high integral epoxy base with epoxy flooring unless directed otherwise by MDC.

**09 68 00 Carpeting**

- A. Carpet shall comply with FBC and ADA.
- B. Carpet type shall be carpet tiles to be used in areas designated by program requirements, tufted and vinyl backed, no rolled carpet unless with prior approval by MDC.
- C. Carpet fiber shall be high quality nylon with no olefin fibers, 100% solution dyed and shall have stain-resistant treatment.



- D. **Carpeting in stairways, break rooms and food service areas is prohibited except in Auditorium or Theater stairs.**
- E. Carpet selection shall be approved by campus upper management.
- F. Concrete slabs receiving carpeting must be tested for moisture content according to the flooring manufacturer's instructions.
- G. Specific Requirements:
1. Tufted carpet shall comply with the following as certified by an independent testing laboratory and:
    - a. Carpet installation: Glue-down applications for classroom/ assembly and egress. Adhesive strips are not allowed.
    - b. Backing: Unitary, 100 percent synthetic materials, resistant to shrinkage, decomposition, mildew, or supporting odor. Primary and secondary backings and organic materials are not allowed.
    - c. Description: Tufted level or textured loop, domestic manufacturer.
    - d. Binding Sites: 1/8 or 1/10 gage.
    - e. Yarn Ply: Multi-ply.
    - f. Pile Fiber Brand Name and Content: 100 percent branded (Federally registered trademark), with soil hiding, stain and static resistant continuous filament nylon, hollow or solid core, and shall not have been reclaimed from any textile fabric.
    - g. Permanent Static Resistance: Shall not exceed a peak electrostatic charge generated of 3 Kv maximum.
    - h. Average Pile Fiber Weight: Not less than 28 ounces per square yard.
    - i. Finish Pile Thickness: 0.195 inch maximum.
    - j. Tuft Bind: Not less than 20 pounds.
    - k. Minimum Radiant Flux: 0.45 watts per square centimeter.
    - l. Smoke Density: Not to exceed optical density of 450.
  2. Carpet shall also comply with the following minimum performance criteria:
    - a. Produced by a domestic manufacturer and be of inorganic composition.
    - b. Dye Method: Solution dyed.

- c. Total weight: Not less than 60 ounces per square yard.
  - d. Weight Density Factor: Not less than 125,000.
  - e. Microbial Resistance: Minimum 90 percent bacterial reduction and limited to maximum 20 percent fungal growth.
  - f. Flammability: Federal Flammability Standards DOC FF 1-70.
- H. Provide metal transition strips at changes of flooring materials.
- I. Carpeted spaces shall receive rubber cove wall base.
- J. Computer related areas shall receive anti-static carpet.

#### 09 70 00 WALL FINISHES

- A. Interior wall finishes are designated in the project program requirements and as per Schedule for Finishers Chart above.
- B. Vinyl wall covering and wallpapers are prohibited.
- C. Acrylic decorative panels and glass decorative panels may be used with MDC prior approval
- D. Select interior finishes based on fire resistance ratings, STC ratings, durability, initial cost, and ease and cost of maintenance compared with other systems. Refer to STC ratings under Plaster and Gypsum Board Section above.
- E. Chair rails to be provided at all conference rooms. A/E to coordinate height of rails with specified FFE.
- F. Provide corner guards at all corridors and classroom entrances.
- G. Interior wood paneling may be used only with prior written approval from MDC. Paneling shall comply with flame spread ratings, codes and standards. Provide proper backing and sealers.
- H. Acoustically Absorptive Wall Panels:
  - 1. Use to achieve acceptable NRC and reverberation characteristics in cafeteria dining rooms, auditoriums, music rooms, little theaters and gymnasiums.

2. Panels shall comply with flame-spread rating requirements.
  3. Panel attachments shall be concealed.
  4. Fabric covered panels or any other acoustical treatment susceptible to damage in cafeteria dining rooms, music rooms, or any other student occupied spaces shall be at least 7'-2" above finished floor.
  5. See General Considerations for acoustical ratings under "Schedules for Finishes" above
- I. Epoxy Resin Wall Finish:
1. Use in cafeteria food storage rooms, physical education locker rooms, chemical storage and other programmed spaces requiring impervious wall finishes and not receiving ceramic tile.
  2. Epoxy resin products shall be water based and free of solvents.

## 09 90 00 PAINTING AND COATING

- A. All paint shall meet LEED criteria for Low Volatile Organic Compounds (VOC)
- B. Paint submittals require acceptance by A/E before it is submitted for review and acceptance by MDC. Specify that the Contractor shall only proceed with painting with the A/E and MDC written approvals allowing painting to begin. Provide 8 1/2" x 11" drawdown on hard stock showing the brand, paint color and sheen.
- C. All interior paint shall be "**Snowberry**" as basis of Design. Paint to be ordered from Stein Paints, 545 W Flagler St, Miami, FL 33130 Phone (305) 545 8700 or other approved Manufacturers.
- D. Paint Color selection (interior and exterior) requires approval by MDC except for pre-approved colors. Pre-approved colors included at end of this Division. *Sample included at the end of this Division SK-09.1*
- E. In exterior areas with little circulation A/E to consider the use of Anti-Graffiti Paint".
- F. All paint materials shall be applied in accordance with manufacturers' directions at not less than the recommended spreading rate:
1. Over existing compatible painted finishes, apply at least two coats of paint to achieve a finished product, except where more durable finishes are required under the scope of work.
  2. Prime surfaces that have been prepared properly required two (2) coats of finish paint on top of primer.
  3. Finish to be smooth.

- G. All exposed exterior metal components and trim to be provided with a finish, applied or inherent to prevent corrosion.
- H. Exposed interior fire suppression piping shall be appointed in finished areas and stairwells
- I. Do not paint hardware or fire door labels
- J. Specify a mock-up of each wall surface condition, allowing space for a minimum of 100 square feet for each color of paint to be used for project wall surfaces. Mock-up walls shall be constructed and cured for a minimum of 28 days, the same as is required for the permanent walls.
- K. Specify a minimum of 28 days for concrete and stucco/plaster to cure, before painting. If scheduling does not allow the minimum 28 days, specify that the Contractor is to provide moisture and pH test results to the A/E for review and approval prior to starting painting.
- L. Specify a bonding type primer or acid etching for pre-stressed or other types of smooth concrete to obtain an adequate paint bonding profile.
- M. Specify that walls and ceilings of exposed structure in storage and mechanical and electrical rooms in new buildings and additions are to be painted.
- N. Lead-based paints or primers are not allowed for use.
- O. Specified paint shall have a 6-year manufacturer's warranty for labor and materials.
- P. Handling and disposal of solvents shall comply with applicable environmental agency requirements.
- Q. Wall paint shall be the following finish types:
  - 1. Classrooms, common areas, offices, corridors, service areas, custodial rooms, mechanical/electrical/telecom rooms shall be satin or eggshell finish.
  - 2. Restrooms, food service areas and break rooms shall be semi-gloss finish
  - 3. VIP offices and conference rooms must be eggshell or flat
  - 4. Ceilings shall be flat
- R. Coating System shall be as follows:
  - 1. Exterior concrete shall be painted with a flat acrylic finish, with primer and two coats of paint with a total dry

film thickness not less than 2.5 mils.

2. Interior concrete shall be painted with a semi-gloss enamel finish, with 3 coats of paint over primer with a total dry film thickness not less than 3.5 mils.
  3. Interior concrete masonry units shall be painted with a semi-gloss alkyd enamel finish, with 2 coats of paint over primed, filled surface, with a total dry film thickness not less than 3.5 mils, excluding filler coat.
  4. Gypsum bard wall systems shall be painted with a semi-gloss alkyd enamel finish with two coats of paint over primer, with a total dry film thickness not less than 2.5 mils.
  5. Ceilings shall be painted with a flat emulsion finish, with two coats of paint over primer, except restrooms which shall be painted with a semi-gloss alkyd enamel finish with two coats of paint over primer, with a total dry film thickness not less than 2.5 mils.
  6. Stained woodwork (trim, doors, etc) shall be stained with three coats: first coat polyurethane finish stain coat; second coat oil-type interior wood stain and third coat sating polyurethane finish.
  7. Ferrous metals shall be painted with two coats of semi-gloss enamel over primer, with a total dry film thickness not less than 6.0 mils.
  8. Exterior unpainted brick or concrete buildings shall be waterproofed with a professional-grade silane or siloxane water-repellent solution
  9. Service room floors at interior mechanical, electrical telecommunication/data rooms custodial closet and recycling rooms shall be sealed with a non-slip epoxy finish.
- S. Repainting of Existing Surfaces.
1. All existing areas receiving new paint shall be provided with pull test prior to proceeding with re-paint work. A/E to indicate rooms and spacing for Paint Manufacturer required pull test.
  2. Cleaning, proper treatment of mildewed areas, patching, and crack repair are required. Loose or deteriorated caulking at the perimeter of openings shall be replaced.
  3. Perform adhesion tests on existing surfaces to be repainted and issue specifications for latex paint based upon test results. Specify that the manufacturer is to assume responsibility for satisfactory surface preparation, conditions and adhesion to uphold required warranty.
  4. Determine if pressure cleaning, at suitable areas, is required to remove paint not well bonded. Complete removal of existing well-bonded paint is not always required.
  5. Specify that all new exposed conduit, junction boxes, outlets, etc., in student and staff occupied spaces, and in corridors, shall be painted.
  6. Specify that the Contractor shall patch and repaint existing wall and ceiling finishes where existing walls or ceilings are being altered, cut into, accessed, disturbed, damaged or soiled by or as a result of new work; define the extent of repainting –require repainting of the entire affected wall or ceiling plane; do not allow spot repainting.

**NOTE:** This division of the design criteria shall be included as part of the Project Manual in the Construction and Contract Documents.

**END OF DIVISION**

**Miami Dade College** DEAN OF ADMINISTRATION

**MDC STANDARD COLORS**

NEUTRAL	SHERWIN-WILLIAMS SNOWBERRY SPECIAL ORDER STEIN PAINTS 545 W. FLAGLER ST. MIAMI FL 33130 3055458700	BENJAMIN MOORE PLATINUM GRAY EXT. RM	BENJAMIN MOORE TECONDEROGA TAUPE 992
BLUE	SHERWIN-WILLIAMS CACHET CREAM SW 6365	BENJAMIN MOORE BLUE ICE 821	BENJAMIN MOORE STUNNING 826
GREEN	BENJAMIN MOORE KENNEBUNKPORT GREEN HC-123	BENJAMIN MOORE PISTACHIO 561	BENJAMIN MOORE CHROME GREEN EXT. RM
YELLOW	SHERWIN-WILLIAMS JONQUIL SW 6674 SW 6674 Jonquill	BENJAMIN MOORE (PPG) BEESWAX 113-3	BENJAMIN MOORE FRESH BUTTER 290
BROWN	SHERWIN-WILLIAMS FOLKSY GOLD SW 6360 SW 6360 Folksy Gold	BENJAMIN MOORE PALM DESERT 1123	BENJAMIN MOORE (PPG) CINNAMON STICK 323-7
RED	BENJAMIN MOORE CLASSIC BURGUNDY classic burgundy	BENJAMIN MOORE BAKED TERRACOTA 1202	
ORANGE	SHERWIN-WILLIAMS MARQUIS ORANGE SW 6650 SW 6650 Marquis Orange	BENJAMIN MOORE (PPG) CORAL BLUSH 229-5	
PURPLE	SHERWIN-WILLIAMS PLUMMY SW 6558 SW 6558 Plummy	BENJAMIN MOORE SPRING IRIS 1402	

SK-10.1



**10 00 00 SPECIALTIES****10 01 00 GENERAL**

- A. Comply with Florida Building Code (FBC).
- B. Coordinate specialties with other related divisions.
- C. Refer to specific requirements under each section included below.

**10 10 00 INFORMATION SPECIALTIES****10 11 00 Visual Display Units**

- A. Visual Display Units include markerboards, tack boards, horizontal sliding instructional boards and bulletin boards in cabinets.
- B. Develop a schedule listing sizes, types, mounting heights and methods, colors, number of markers, and other accessories. This schedule shall be used for coordinating design, program requirements, built-ins, and FF&E locations.
- C. The mounting heights (above finish floor) for the bottom edge of the writing surface (not the bottom of the frame) of instructional boards shall be:
  - 1. 2'-6" at instructional areas to tray.
  - 2. 3'-0" at staff areas
  - 3. For interactive whiteboard systems coordinate mounting heights based on selected equipment.
- D. Instructional boards shall be at least 24 inches from room corners.
- E. Instructional spaces (classrooms and labs) shall be provided with an interactive whiteboard system centrally located at the front wall of the classroom. **A/E to coordinate selection of interactive whiteboard with each campus.** Both equipment and related infrastructure to be included in the contract.

**DIVISION 10****SPECIALTIES**

This section contains the following:

**10 01 00 GENERAL****10 10 00 INFORMATION SPECIALTIES**

- 10 11 00 Visual Display Units
- 10 12 00 Display Cases
- 10 13 00 Directories
- 10 13 13 Electronic Directories
- 10 14 00 Signage
- 10 14 16 Plaques
- 10 14 19 Dimensional Letter Signage

**10 20 00 INTERIOR SPECIALTIES**

- 10 21 13 Toilet Compartments
- 10 21 16 Shower and Dressing Compartments
- 10 21 23 Cubicle Curtains and Tracks

*(Continues)*



- F. Size and location of instructional boards shall be according to the program requirements.
- G. Writing surfaces shall be of a continuous material. Seams are not allowed.
- H. Markerboard writing surfaces shall be white vitrified porcelain over enameled steel on MDF (medium density fiberboard) with aluminum backing and a satin finished aluminum trim.
- I. Tack boards shall be cork/fabric surfaces, burlap backed, over 1/4" hardboard with aluminum backing and a satin finished aluminum trim.
- J. Horizontal sliding instructional boards shall have a fixed tack board back panel and 2 tracks for a combination of 4 sliding chalk boards / marker boards
- K. Provide markerboard trays with protective edge guards.
- L. Bulletin board cabinets shall be surface mounted, lockable, with clear satin finish anodized aluminum frames and clear tempered glass doors. Lexan is not allowed. Locate only in secured and supervised areas.
- M. Provide proper wall construction/backing to support instructional board units.
- N. Provide shop drawings for each unit type.
- O. Particleboard and fiberboard backing are not allowed for instructional boards, unless noted otherwise above.
- P. Do not locate instructional boards on operable partitions unless no other walls are available.

**10 12 00 Display Cases**

- A. Display cases shall be integrated into the architectural design of the building and shall be located in public corridors and lobbies and or as required by program. **All display cases shall be coordinated with each campus prior to final development of the Construction Documents**
- B. Display cases may be either recessed or surface mounted and shall be factory fabricated. Recessed display cases shall have trim on face to cover edge of recessed opening. Shelves and sliding doors shall be tempered glass with cylinder locks with keys. All display cases to be weather tight.
- C. Develop a schedule listing sizes, types, mounting heights and methods, colors, number of markers, and other accessories. This schedule shall be used for coordinating design, program requirements, built-ins, and FF&E

10 22 13	Wire Mesh door and partitions
10 22 23	Movable Panel Systems
10 26 00	Wall and Door Protection
10 28 13	Commercial Toilet Accessories
<b>10 40 00</b>	<b>SAFETY SPECIALTIES</b>
10 41 00	Emergency Access and Information Cabinets
10 44 16	Fire Extinguishers
<b>10 50 00</b>	<b>STORAGE SPECIALTIES</b>
10 51 13	Metal Lockers
10 55 13	Central Mail Delivery Boxes
10 56 13	Metal Storage Shelving
<b>10 70 00</b>	<b>EXTERIOR SPECIALTIES</b>
10 71 13	Exterior Sun Control Devices
10 73 16	Metal Canopies
10 75 00	Flagpoles



locations.

#### 10 13 00 Directories

- A. Directories shall be integrated into the architectural design of the building and shall be located at main entrances and or lobbies and or as required by program. **All directories shall be coordinated with each campus prior to final development of the Construction Documents.**
- B. Develop a schedule listing sizes, types, mounting heights and methods, colors, number of markers, and other accessories. This schedule shall be used for coordinating design, program requirements, built-ins, and FF&E location.
- C. The Contractor shall install a glass-enclosed, non-illuminated Building Directory near the main entrance of each building, location to be determined by Architect and approved by MDC. The Directory shall include:
  - 1. Building Name
  - 2. MDC Logo
  - 3. Major room names
  - 4. Room numbers
  - 5. Changeable, individual message strips.

#### 10 13 13 Electronic Directories

- A. Electronic Directories shall be integrated into the architectural design of the building and shall be located at main entrances and or lobbies and or as required by program. **All electronic directories shall be coordinated with each campus prior to final development of the Construction Documents.**
- B. Electric Marquee Sign:
  - 1. Provide as required by program only, a pole-mounted, two-sided electronic (digital) marquee sign meeting the following requirements:
    - a. The design and installation of the Marquee sign shall comply with FBC. Submit to the Building Official calculations signed and sealed by a Florida registered professional engineer, establishing wind velocity pressure values for the specific project in accordance with FBC ASCE-7.
    - b. The marquee sign shall be located in a prominent area by the front of the building. Exact location of sign as well as the color scheme for the sign shall be coordinated with MDC Project Manager.

- c. Lowest point of the display panel shall be a minimum of 8 feet above finish grade.
- d. Electrical power for the marquee sign shall be provided by means of an underground 120V- 20 Amp dedicated circuit in compliance with MDC Design Standards. The sign shall be provided with a disconnect switch, mounted on the support pole. The switch shall be NEMA 3R, lockable, and connected to the marquee's sign power entrance. Sign shall be properly grounded.
- e. Provide a 1" underground conduit, complete with CAT-5 wiring, from the Marquee sign to the nearest telecommunication closet located within the facility. Other MDC vendors will extend this CAT-5 wiring to a designated location determined by the School Administrator for operation of the Marquee sign display.
- f. *Sample included at the end of this section SK-10.1 and SK-10.2*

#### 10 14 00 Signage

A. Identifying signage shall comply with:

- 1. Florida Building Code (FBC).
- 2. ADA Accessibility Guidelines
- 3. NFPA

B. Construction Sign: At all new buildings and additions projects provide a 4' x 8' or an 8' x 8' construction sign prior to the start of construction. Obtain sample layout, applicable size and any additional requirements from MDC project manager.

#### 10 14 16 Plaques

- A. Provide all new building, additions and or renovated buildings with a dedication plaque located adjacent to the main entrance lobby or in the vestibule to the main lobby. Wall to receive plaque shall be architecturally designed to provide an aesthetic setting and shall be adequately illuminated.
- B. Donor recognition or memorial plaques shall be installed based on the space they are to be displayed and they shall be with MDC prior approval.
- C. All dedication plaques shall be 14-inch wide by 20-inch high and shall be made of cast aluminum or bronze. Dedication plaques shall include the following information:
  - 1. The name of the College.
  - 2. The awarded dated of the construction project.

3. The names of MDC Board Members in office the day the construction contract was awarded. Names shall include appropriate titles and “honorifics”
  4. The name of the President in office the day the construction contract was awarded.
  5. The name of the Chief Facilities Officer in office the day the construction contract was awarded.
  6. The name of the Project Architect (Design Criteria Professional if applicable).
  7. The name of the General Contractor (Construction Manager or Design Builder if applicable).
- D. All shop-drawings for dedication plaque shall be submitted to MDC Facilities for final Owner’s approval, prior to A/E’s approval of shop drawings.

#### 10 14 19 Dimensional Letter Signage

- A. MDC has a standardized system for all campus room numbering and signage. Follow requirements outline in the attached Design Criteria. A/E shall obtain signage package approval from each campus prior to completion of Phase 100% Phase III construction documents. General requirements as follows:
1. Exterior Signage to include: Building Name, Number and Logo:
    - a. Along the “front” elevation of the facility that faces the main street on the left right corner **as per attached photos at end of this Division**). Provide 36” inch high cast aluminum letters with the school letter or number. In addition, the A/E shall confirm with MDC Facilities Design and Standards the need to provide the school name and address on a per project basis. If required, the address shall be provided using 18”-inch high cast aluminum letters placed directly below the school name. The lettering for the school name and address shall be of a contrasting color from the wall on which they are mounted. Submit to MDC Facilities Design Standards the color scheme for all signs.
    - b. Logo shall be provided following the “Design Guide Standard Manual” as per attached link: <http://www.mdcedu/mktg/resources.html>
- B. Interior Signage to include:
1. Accessibility signage, room identification, and life safety signage shall contain raised characters, Logo, Braille and symbols and be in accordance with FBC **as per attached signage drawing at end of this Division**.
  2. Provide Gender neutral bathroom at each first floor of all new Buildings with Gender neutral signage as required by Florida Building Code.
  3. Provide a signage schedule and location plan in the 50% Phase III submittal for MDC review and approval. Final identification numbers for all rooms, spaces and buildings shall be coordinated with each campus prior to proceeding with final 100% Phase III construction documents.

4. Provide 1/32" raised image laminated plastic interior .19" thick minimum material for all rooms, according to FBC, program and code requirements. All new identification signage is to be fabricated with recycled aluminum frame material. Letters to be 1" high Helvetica Medium or 5/8" high letters only when previously approved by MDC.

**5. Adhere letters are not allowed**

6. Provide directional signage at inaccessible entrances indicating the route to accessible entrances.
7. Provide directional signage at entrances to inaccessible toilet and bathing facilities indicating the route to the accessible entrances to accessible toilet and bathing facilities.
8. Provide directional signage opposite each stairs and elevator indicating the direction to specific room numbers or subject areas.
9. Background Colors:
- a. Provide all spaces the following signage with a background color as approved by MDC and as required by FBC:
- 1) Identifying signage at all entrances and exits into all space shall contain room names, numbers, and Braille.
  - 2) Toilet room symbols with verbal text and Braille at each toilet room.
  - 3) Accessible egress signs.
  - 4) Directional signs at the end of each corridor, indicating the direction to specific room numbers or subject areas. Provide a minimum of one directional sign for every 5,000 square feet of building area.
  - 5) Provide building number signs adjacent to each building entry and exit, and on an exterior wall facing the emergency access paths for emergency responders. These signs shall be minimum 36 x 36 with high identifying the designated building number.
- b. Provide red background signage at the following locations and where required by code:
- 1) "FIRE EXTINGUISHER INSIDE" at the main entry door of a room containing a fire extinguisher.
  - 2) "FIRE ALARM PULL STATION INSIDE" at the main entry door of a room containing a pull station.
  - 3) "EMERGENCY EGRESS – KEEP AREA CLEAR" at emergency egress openings and not readily identifiable secondary egress doors.
  - 4) "EMERGENCY RESCUE – KEEP AREA CLEAR" at emergency rescue areas and windows.
  - 5) "ELEVATOR EMERGENCY" at the elevator emergency alarm bell.
  - 6) Emergency exit routes placed at appropriate locations.
  - 7) "IN CASE OF FIRE DO NOT USE ELEVATOR. USE STAIRWAYS" at elevator call stations.
  - 8) "STORAGE NOT PERMITTED" at mechanical, electrical, and kiln rooms.

- 9) Maximum occupant capacity signs at instructional or assembly spaces housing more than 50 occupants. The number of occupants shall be determined in accordance with FBC. Locate occupant signs within the space, next to the main entry door.

10. Attach signage with tamperproof screws, shields and/or double stick tape or adhesives at mounting heights of 60 inches above finish floor to sign centerline at locations according to FBC and accessibility requirements.

11. *Sample included at the end of this Division SK-10.3*

C. Area of Refuge Signage:

1. Area of Refuge shall be provided in compliance with Florida Fire Prevention Code 101 Part 7.2.12 and shall include signage to read as follows:

**AREA OF REFUGE**

2. Signs shall be located as indicated on Florida Fire Prevention Code

D. Evacuation Signage:

1. At each space with an occupant load of 6 or more, provide an evacuation floor plan sign, with related graphics and text, showing the primary and emergency evacuation routes from each space in accordance with FBC.
  - a. Sign shall be placed by the primary exit and shall be mounted on an 8-1/2" x 11" (landscape oriented whenever practical) in a metal frame with appropriate safety glazing.
  - b. Orient the map so when facing the mounting wall adjacent to the room exit.
  - c. Text and numbers shall read from left to right.
  - d. Drawing to be provided as follows:
    - 1) Reduce layers by moving all of the objects (except doors and door related layers) to layer 0 and then purge the drawings. Pen width is 10 for layer 0.
    - 2) The polyline for the egress path is 30" or 36" wide
    - 3) The phone number is for the security office of that particular campus which you can get from your MDC Project Manager
    - 4) Each room has a unique layer with all the arrows, paths and yellow shading and the room number listed in the legend residing on that layer. The name of the layer will be the room number given by MDC Facilities Planning; questions call Avid Barcus 305-237-2585

- 5) An entire floor should be on one drawing when plotted window style, all drawings, remain the same place and all you need to do is turn layers off and on.
- 6) The room number that is inside of the room may lay on top of the shading or have a boundary island, your preference.
- 7) The font is Arial in the Legend and Romans S in the smaller room numbers
- 8) If you leave the doors layer you can turn them on and off to constrain the yellow hatching to a particular room. We usually use the defpoint layer and run a single line down the hallway and block several doors with a single line. Pen width is 0 for doors, openings and swings layers if used.
- 9) Primary (red) and Secondary (blue) paths must be shown as well as the yellow hatching in the room
- 10) If there are any questions please email [facilitiesplanning@mdc.edu](mailto:facilitiesplanning@mdc.edu)

E. Traffic Signage:

1. Provide onsite signage as follows:

- a. Provide galvanized steel signage for traffic control, accessible parking spaces and accessible passenger loading zones. Aluminum components are not allowed.
- b. Locate signage away from traffic lanes to be clear of passing buses and car.

2. Provide offsite signage in accordance with FBC, ADA and Miami-Dade County Public Works Department (M-DCPWD).

F. Obstruction Warnings: Comply with FBC life safety potential hazards.

G. Safety Zone Lines:

1. Lines defining safety zones around machinery accessible to students shall be painted on the floor surrounding each piece of equipment. Indicate position of lines on the Phase III FF&E drawings.
2. Provide a continuous 2-inch wide yellow line, according to the following:
  - a. 36 inches from the machine from any side needed for operation or access.
  - b. 12 inches when machines are back to back, along a wall, or in other special positions.

G. Construction documents shall show the locations of all traffic signage, types, sizes and quantity of identifying devices

**10 20 00 INTERIOR SPECIALTIES**

**10 21 13 Toilet Compartments**

- A. At group toilet rooms, provide toilet partitions at each water closet stall and urinal screens between each urinal. Provide privacy screens at showers according to program requirements.
- B. Toilet stall partitions, privacy screens and urinal screens shall be solid plastic high density polyethylene (HDPE) resin, with non-corrosive panels, doors, pilasters, and accessories of polymer resins, providing a waterproof, non-absorbent, self-lubricating surface resistant to marking with pens, pencils, or other writing instruments.
- C. Panels shall have a 1" minimum thickness.
  - 1. Color shall be uniform throughout.
  - 2. Edges shall be machined to a 1/4" radius with sharp corners removed.
- D. Toilet partitions, privacy screens and urinal screens shall be ceiling mounted for ease of cleaning floors. All installations to be properly braced at ceilings, and walls with full length wall brackets. **No floor mounted toilet partitions will be acceptable unless previously approved by MDC on a per condition basis.**
  - 1. Wall brackets shall be solid plastic when available from the manufacturer.
    - a. Stainless steel wall bracket alternate may be accepted on a per condition basis.
    - b. Wall brackets shall be continuous the full length of the panel and through-bolted at panel and pilasters.
  - 2. Overhead bracing shall have a metal anti-grip design.
- E. Top edges of compartment panels and doors shall be at least 69 inches above finish floor and mounted not more than 14 inches above finish floor. Pilasters shall be 82 inches high minimum.
- F. Door hardware, anchorages and accessories shall be manufacturer's heavy-duty series.
  - 1. Doors shall be self-closing.
  - 2. Hinges shall be continuous 316 stainless steel, mounted at doors and pilasters with fasteners as specified at 8 inches on center. Gravity/cam or integral hinges are not allowed.
  - 3. Doors shall be furnished complete with necessary wall bumpers, door pulls 6-inch heavy-duty door strikes, keepers, and latch housings.
  - 4. Provide accessible door pulls and doorstops.
  - 5. Verify accessibility requirements for door widths and stall sizes.



6. Fasteners shall be stainless steel, tamperproof one-way hex bolts, or anti-theft torx screws throughout installation. Wall connections shall be plastic anchors or toggle bolts as required by field conditions.

**10 21 16 Shower and Dressing Compartments**

- A. At showers and dressing rooms, provide partitions at each shower stall and or dressing compartment meeting ASTM E 84 Class III flame spread rating Index 25.
- B. Shower and dressing compartments shall be solid High-Density Polyethylene (HDPE) resubs; solid panel material min 1/2" thick, seamless with eased edges and with homogeneous color and pattern throughout thickness of material. Unit shall contain a shower compartment and matching dressing compartment using floor and ceiling anchors. Unit shall contain heat sink strip at exposed bottom edges.
- C. Shower receptor shall be manufactured from terrazzo

**10 21 23 Cubicle Curtains and Tracks**

- A. To be provided as per Program Requirements.

**10 22 13 Wire Mesh Door and Partitions**

- A. Wire Mesh Doors and Partitions only as required by Program. Provide Wire type constructed of 10 gage steel wire woven into 1-1/2" diamond mesh, fastened to door frames.
- B. Provide swing doors with cylindrical mortise locks.
- C. Door and partition components shall be constructed of cold rolled channels.

**10 22 23 Movable Panel System**

- A. Movable Panel System only as required by Program. At classrooms, provide maximum opening widths with panels stacked parallel or perpendicular to overhead tracks and with enclosures to secure panels when not in use.
- B. Panel Types:
  1. Single Panels:

- a. Use at single or multiple wall configurations of any height with manual operation and side or remote stacking.
  - b. Provide automatic indexing or stacking with switching curve for panels over 12 feet high.
  - c. Use multi-directional carriers for panels less than 12 feet high or 4-wheeled trolleys for taller applications.
2. Hinged Paired Panels:
- a. Use at straight runs of heights less than 18 feet with manual operation and center stacking.
  - b. Provide 4-wheeled trolleys.
3. Continuously Hinged Panels:
- a. Use with one-way or bi-parting electric operation and center stacking.
  - b. Provide 4-wheeled trolleys.
- C. Construction:
1. Operable partitions shall be of steel panel and welded frame construction.
  2. Particleboard construction is not allowed.
  3. Panels finishes shall be one of the following:
    - a. High-pressure decorative laminate without splices or joints. Edges shall be straight and sealed.
    - b. Vinyl.
  4. Panel finish shall not exceed a flame-spread index of 25 and a smoke-developed index of 450.
  5. Provide partition Sound Transmission Coefficient (STC) ratings of not less than 55 at auditoriums and 48 at other spaces.
  6. Provide interlocking vinyl sound seals between panels and drop seals between panels and floor.
  7. Above ceiling tracks, provide an acoustical barrier having an STC at least equal to the operable partition.
  8. Provide manual operation for partitions.
  9. Operable partitions shall be suspended from an overhead track and without a floor track or guides.
  10. Egress Doors:
    - a. Provide egress doors within operable panels when required by code or program.
    - b. At auditoriums, do not provide egress doors within operable panels. Use alternate means of egress when required by code.

11. Do not locate instructional boards on operable partitions.

#### 10 26 00 Wall and Door Protection

- A. Provide chair rails at all Conference Rooms and or areas that have seats/chairs close to adjacent walls. A/E to coordinate height of chair rails with specified FFE.
- B. Provide stainless steel kick plates at all doors. Plastic kick plates can be provided with MDC facilities approval only.
- C. Provide corner guards at all corridors and entrances.

#### 10 28 13 Commercial Toilet Accessories

- A. Toilet accessory components, mounting heights, and locations shall comply with FBC requirements for accessibility to the disabled.
- B. **Provide all Toilet Accessories as per requirements of approved Vendor. Copy of Vendor Accessories to be requested from MDC Project Manager at commencement of Project.**
- C. At group restrooms, provide electric hand dryers in lieu of paper towel dispensers. Provide one electric hand dryer to serve two (2) lavatories, one (1) for those located within ADA accessible stalls. A/E shall review quantity and location with MDC Facilities Design and Standards staff for approval during Schematic Design Phase. Hand dryers shall be located preferably in the same wall as lavatories to avoid people slipping due to water spills.
- D. Provide toilet paper holder at each water closet, at the highest accessible height and location as per MDC Accessories Vendor requirements.
- E. Provide, near the water closet, a sanitary napkin receptacle at female staff and student female use individual toilets and at each female group toilet room stall as per MDC Accessories Vendor requirements
- F. Provide stainless steel grab bars with peened surfaces and flanges for exposed mounting at accessible toilets.
  - 1. Grab bars and the installation of grab bars shall comply with FBC accessibility requirements.
  - 2. Provide vandal resistant fasteners and backing in partition or wall for sufficient anchoring to resist a 250-pound force applied from any direction.

## G. Mirrors:

1. Provide non-tilting fixed mirrors, at heights to comply with accessibility requirements.
  2. Mirrors shall be provided with concealed theft-proof mountings and appropriate wall-backing according to manufacturer's requirements.
  3. When located above a lavatory, bottom edge of reflecting surface shall be mounted at the lowest mounting height permitted by the fixtures and related elements.
  4. When not located above a lavatory, bottom edge of reflecting surface shall be located at 34" above finished floor.
  5. Staff and Faculty use toilet rooms:
    - a. Provide mirrors in all staff toilet rooms.
    - b. Mirrors shall be 1/4" tempered glass with a stainless-steel frame
    - c. Size of mirror to be min 18" W x 36" H, when installed above lavatory.
  6. Student and Public use toilet rooms:
    - a. Provide mirrors in all student and public-use toilet rooms.
    - b. Mirrors shall be 1/4" tempered glass with a stainless-steel frame
    - c. In new construction and remodeling projects, and whenever possible in renovation projects, mirrors in public and group student toilet rooms shall not be installed above lavatories and shall have a stainless steel 8"-10" shelf below the full length of the mirror.
- H. Provide a wall mounted vandal resistant stainless-steel soap dispenser over each lavatory and or lab sink according to program requirements as per MDC Accessories Vendor requirements.
1. Use deck mounted soap dispensers, where needed, to comply with FBC accessibility requirements.
  2. At locations with multiple lavatories or at group showers, use a centralized gravity soap system when cost effective.
- I. Provide rod and heavy-duty white vinyl shower curtains with exposed fasteners in showers.
- J. Provide heavy duty, chrome plated, double robe hooks in shower and dressing areas.
- K. Stainless steel folding shower seat mounting heights and locations shall comply with FBC accessibility requirements and shall have proper backing.

**10 40 00 SAFETY SPECIALTIES****10 41 00 Emergency Access and Information Cabinets**

- A. Emergency Access and Information Cabinets includes Fire Department Plan Cabinet and Emergency Key Cabinet. Provide as per State of Florida Legislation Requirements.

**10 44 16 Fire Extinguishers**

- A. All fire extinguishers and non-valve cabinets shall be furnished and installed to meet National Fire Protection Association (NFPA) and all Accessible codes. Each extinguisher shall be approved by Underwriter's Laboratory (UL) and bear their label. MDC is in the process of standardizing Fire Extinguishers for all Campuses, please request information from MDC Project Manager.
- B. Refer to NFPA pamphlet 10, Chapter 2, 3 and 4.
1. Chapter 2: Used to determine the classification of potential fires and the rating or relative fire extinguisher effectiveness for the various types of extinguishers.
  2. Chapter 3: Used to assist in the selection of extinguisher
  3. Chapter 4: Used for the maintenance of fire extinguishers
- C. All fire extinguisher locations shall be identified by means of a sign as approved by MDC.
- D. Fire extinguisher cabinets shall be clear aluminum, flanged, recessed and lockable with full Lexan door, non-breakable glass.
- E. A/E to coordinate fire extinguishers in rated walls. Fire rated walls shall maintain the required rating after recessed cabinets are installed.
- F. Comply with applicable codes for quantity and location of fire extinguishers. All Fire Extinguishers shall meet the following requirements:
- G. Locate fire extinguishers in open common areas or at corridors in friction latch either semi-recessed with rolled corners or fully recessed cabinets. Locate fire extinguisher at ADA accessible heights. Provide signage as required by code and MDC signage requirements. Key-locked or beak-glass type fire extinguisher cabinets are prohibited.

- H. Outdoor mounted cabinets shall be weather proof, UV and cleaning chemical resistant. Cabinets to be red fiberglass with easy view window and full gasket-sealed door bearing white lettering “Fire Extinguisher”. Hardware to be full-length stainless-steel hinge and quick opening latches. Units shall be J-hook mounted within with mounting penetrations sealed after installation.
1. At instructional, staff and low hazard areas, use fire extinguisher cabinets. Cabinets shall be friction latch either semi-recessed with rolled corners or fully recessed.
  2. At service areas units shall be wall mounted, use wall brackets with J-hook straps. At kitchens units shall be heavy-duty strap to minimize dislodgement.
  3. Extinguisher cabinets in fire rated walls shall be fire rated or construction around the fire extinguisher cabinet recess shall be detailed to maintain the required rating of the wall assembly.
  4. Extinguishers and cabinets shall be visible and not hidden from view behind wall construction, furniture or built-ins.
- I. Extinguishers shall have all metal head assemblies with j-hook and eye type head mount attachment. Plastic is no allowed.
- J. All extinguishers shall be placed and sized for preferred five-pound (5 lb.) coverage spacing. Ten-pound (10 lb.) size or larger may be used where code requires larger coverage for specific hazard.
- K. Carbon dioxide (or approved equivalent) extinguishers shall be used where clean agent is needed. The use of Halon extinguishers is not allowed.
- L. Units shall be tagged by the Contractor within three (3) months from Certificate of Occupancy.
- M. Areas required to contain fire extinguishers:
1. Flammable areas (sodium bicarbonate 40BC):
    - a. Kitchens (Install alkaline dry chemical, for saponification of greases, within 15 feet of cooking equipment).
    - b. Science laboratories.
    - c. Automotive shops.
    - d. Boiler rooms.
    - e. Air handling unit rooms.
    - f. Flammable liquid storage areas.
    - g. Duplicating stations.
    - h. Teacher lounges.

2. Hazardous areas (4A – 60BC):
    - a. Woodworking shops.
    - b. Storage rooms where wood or paper products are stored.
    - c. Electrical rooms.
    - d. Portables.
  3. Low hazard areas (2A – 10BC)
    - a. Other areas not mentioned above.
    - b. Class A or B fire areas.
    - c. Electronic lab areas (carbon dioxide, Class C, 10BC).
- N. See FBC for fire blanket requirements.

## 10 50 00 STORAGE SPECIALTIES

### 10 51 13 Metal Lockers

- A. Provide the types and numbers of metal lockers as per program requirements and in compliance with the following minimum nominal dimensions:
- |                              |   |
|------------------------------|---|
| TYPE A: Student/Physical Ed. | – 6 tier lockers: 72" H overall x 12" W x 15 or 16" D   |
| TYPE B: Student/Varsity      | – 2 tier lockers: 72" H overall x 18" W x 36" H x 24" D |
| TYPE C: Staff                | – Single-tier lockers: 72" H x 12" W x 18" D            |
| TYPE D: Kitchen Staff        | – 6 tier lockers: 72" H overall x 12" W x 18" D         |
| TYPE E: Music Suite          | – 3 tier lockers; 72" H overall x 12" W x 18" D         |
- B. Provide a 4-inch minimum concrete curb for floor mounted locker units according to manufacturer's size guidelines.
- C. Provide 1 double prong hook and 2 single prong hooks riveted inside locker Types B, and C.
- D. Provide number of kitchen staff lockers according to program requirements.
- E. Provide sloped tops for locker units.
- F. Provide combination locks for all sport teams and at kitchen lockers or as per program requirements.

- G. Provide locker ventilation and benches according to Master Specifications Guidelines.
- H. Lockers shall be electrostatically spray painted after fabrication with epoxy enamel and baked to produce a gloss finish.
- I. Locker reconditioning may include the following items as determined by a site evaluation:
  - 1. Replacement of locker doors, latch mechanisms, and sloped tops:
    - a. Locker door replacements shall be 1-piece, 14-gauge minimum cold rolled sheet steel doors, with flanges at all edges, welds at corners, and ventilation as required per locker type.
    - b. Provide heavy-duty, continuous weld, completely concealed and tamper proof, side door hinges. Provide a minimum 2 hinges per door and 180-degree door swing.
    - c. Provide padlock locking attachment with strike plate. Padlocks are Not-In-Contract.
  - 2. Repair frames as required
  - 3. Refinish interior and exterior surfaces.

### 10 55 13 Central Main Delivery Boxes

- A. At all new Facilities provide a Relay Collection Mail Box (RCMB) for Postal Service (USPS) deliveries and pickup. Show on the Drawings a “tentative” exterior location for the RCMB, close to the school Administration offices. The exact location of the RCMB will be directed by the USPS branch that serves that facility. Specify that the Contractor shall contact the USPS local Branch Growth Director when the facility is nearly complete to obtain the precise location and mounting height for the RCMB. Mount RCMB on an integral steel pedestal, embedded in, or baseplate-mounted, on a sidewalk or a concrete pad. The RCMB shall be 2-tiered, with two access doors and without any slots. Access to the interior of the RCMB shall be through key operation only: One door shall have an “Arrow” lock hardware for Post Office use; the other door shall have a cylinder lock keyed by MDC Central Lock Dept., for use by the school administration.

### 10 56 13 Metal Storage Shelving

- A. Metal shelving shall be clip-type adjustable shelving of modular unit construction on individual bolted frame assemblies. Sections shall be relocatable and each shelf independently adjustable without the use of tools.
- B. Shelving Unit Sizes.



- Type A: 85" H x 36" W x 12" D, with fixed top shelf, six adjustable shelves, and closed base fronts.
- Type B: 85" H x 36" W x 18" D, with fixed top shelf, six adjustable shelves, and closed base fronts.
- Type C: 85" H x 36" W x 24" D, with fixed top shelf six adjustable shelves, and closed base fronts.

- C. Attach shelving units securely to walls with proper backing, or if freestanding, to floors. Wall standards with adjustable brackets are only allowed at custodial closets.

**10 70 00 EXTERIOR SPECIALTIES**

**10 71 13 Exterior Sun Control Devices**

- A. Exterior Sun Control Devices are encouraged. All Sun Control Devices shall have prior approval from MDC.

**10 73 16 Metal Canopies**

- A. Exterior walkways connecting student occupied or administration buildings and accessible walks from passenger loading/drop-off zones, excluding portables, shall have a protective covering according to FBC.
- B. Pre-fabricated metal walkway covers or canopies are not recommended, walkways following the aesthetic/structure of the new building are preferred, metal walkways accepted only with MDC Facilities Department prior approval, and shall comply with the following:
  1. Provide integral gutters and downspouts.
  2. Connect downspouts to a storm drainage system (where required to achieve positive drainage of the surrounding landscaped and paved areas).
  3. Extend the roof cover 1 foot beyond each side of the walkway and limit the roof edge to not exceed an elevation of 9'-0" above the walkway.
  4. Roof cover shall be continuous and connect to adjacent buildings.
  5. Provide a straight slab edge at covered walkways at least 6 inches beyond metal column face.
  6. Provide bollards or other means to protect walkway columns that may be exposed to damage by motor vehicles.
  7. Wind loading design for covered walkways and metal canopies shall comply with the FBC. Submit to the BCC calculations, signed and sealed by a Florida registered professional engineer, establishing wind velocity pressure values for the specific project according to FBC ASCE-7.

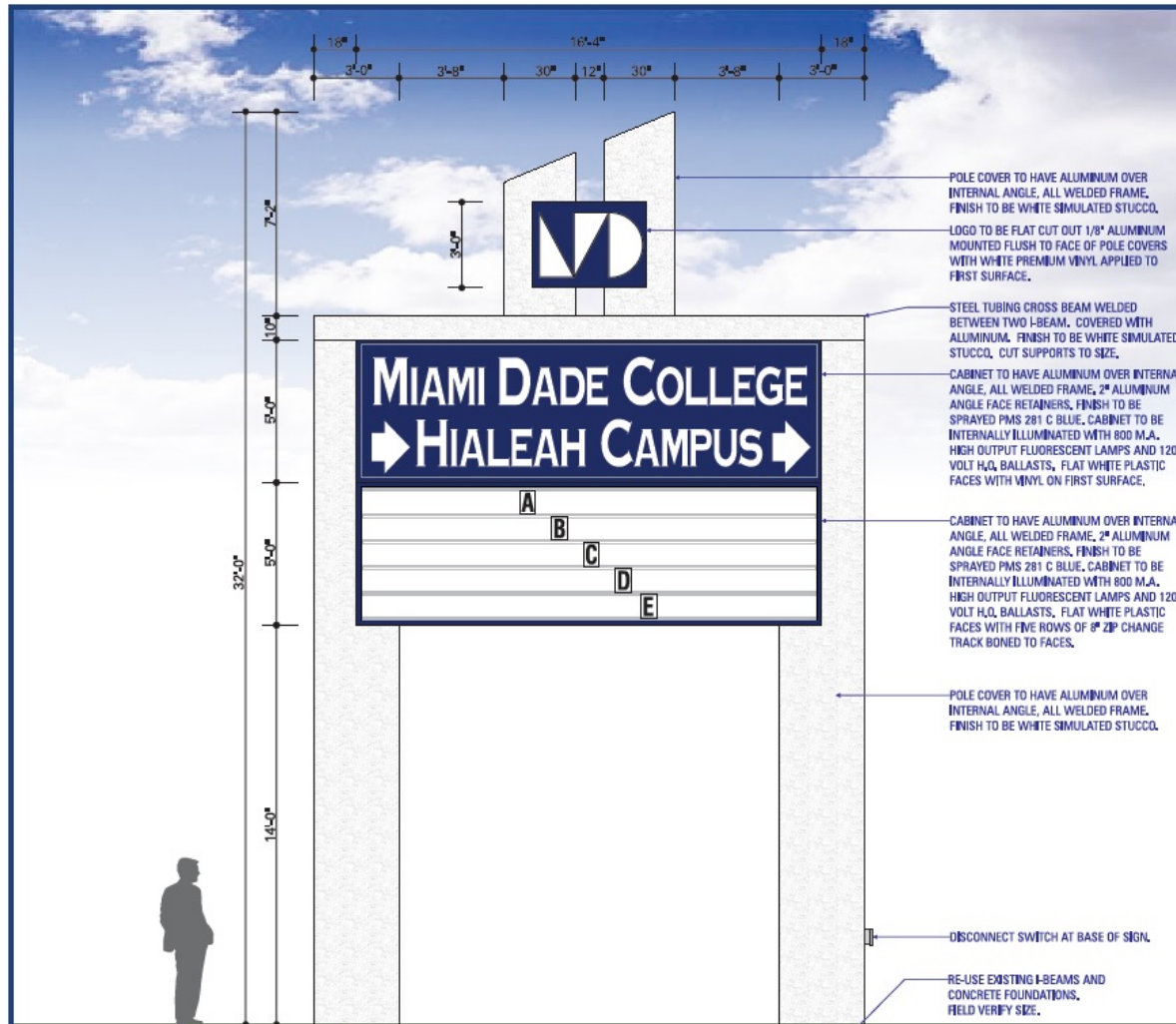
**10 75 00 Flagpoles**



- A. Provide one flagpole per facility and comply with the following:
1. Overall length shall be 30 feet above finished grade, plus depth required for embedded foundation with ground sleeve.
  2. Flagpole wind load design shall comply with the FBC. Submit to the Building Code Consultant (BCC) calculations, signed and sealed by a Florida registered professional engineer, establishing wind velocity pressure values for the specific project in accordance with FBC ASCE-7.
  3. Provide a tapered, seamless fiberglass pole with an internal halyard system. Use of a tapered, seamless aluminum pole and external halyards may be accepted at a secure location.
  4. A 6-inch diameter aluminum finial ball with gold anodized finish is the only accepted ornament.
  5. Flagpole shall be equipped with a grounding sleeve and lightning spike.
- B. Provide a flash collar to match pole finish.

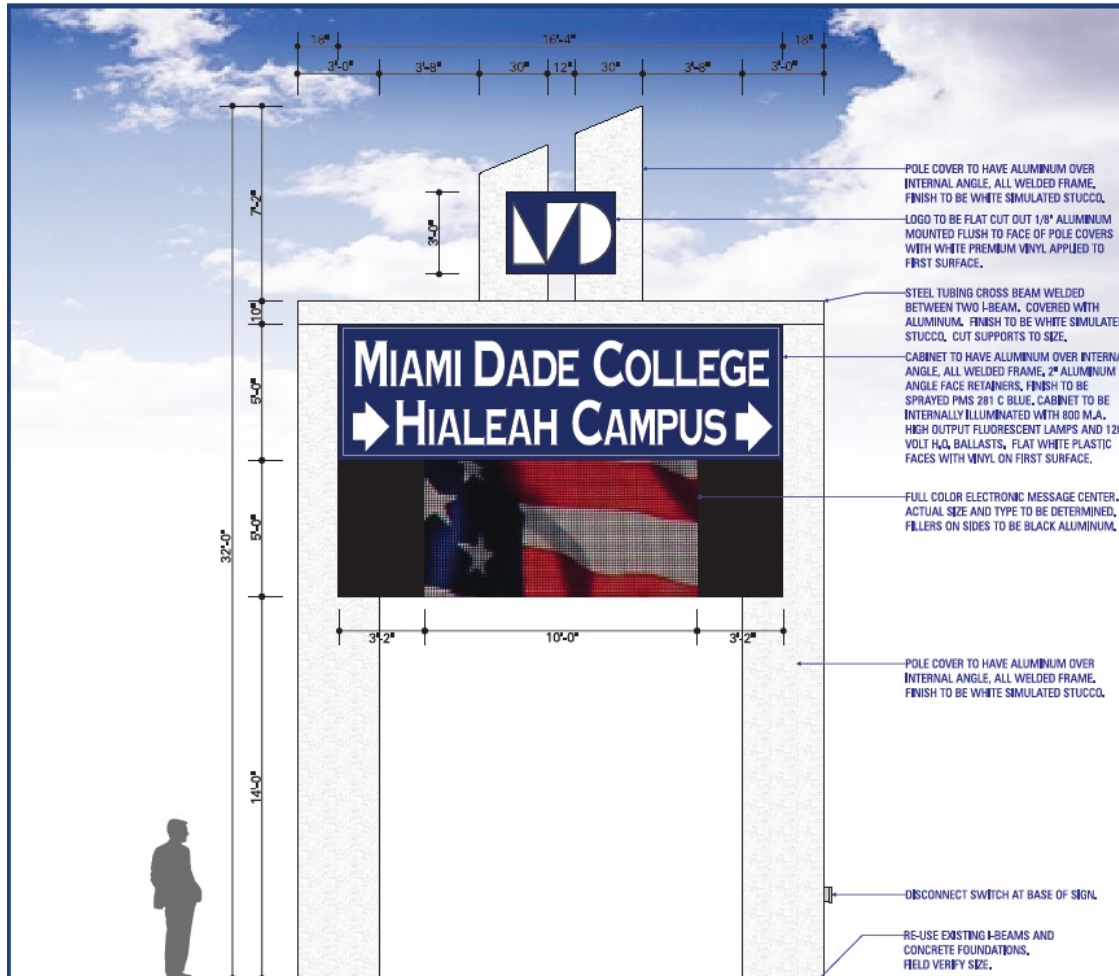
**NOTE: This division of the design criteria shall be included as part of Project Manual in the Construction and Contract Documents.**

**END OF DIVISION**



SK-10.1

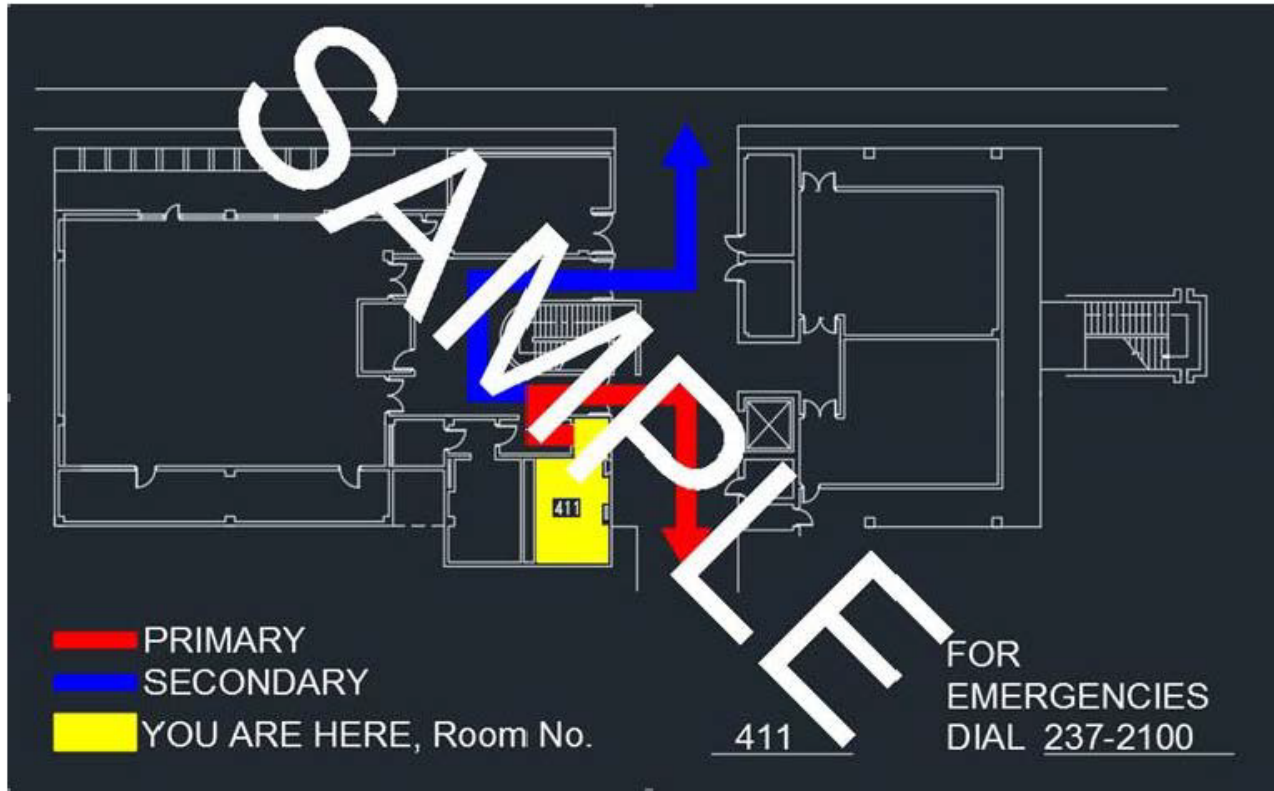




SK-10.2



The Room No. and Emergency Phone Number will need to be updated to reference the correct room number and number to call.



SK-10.3



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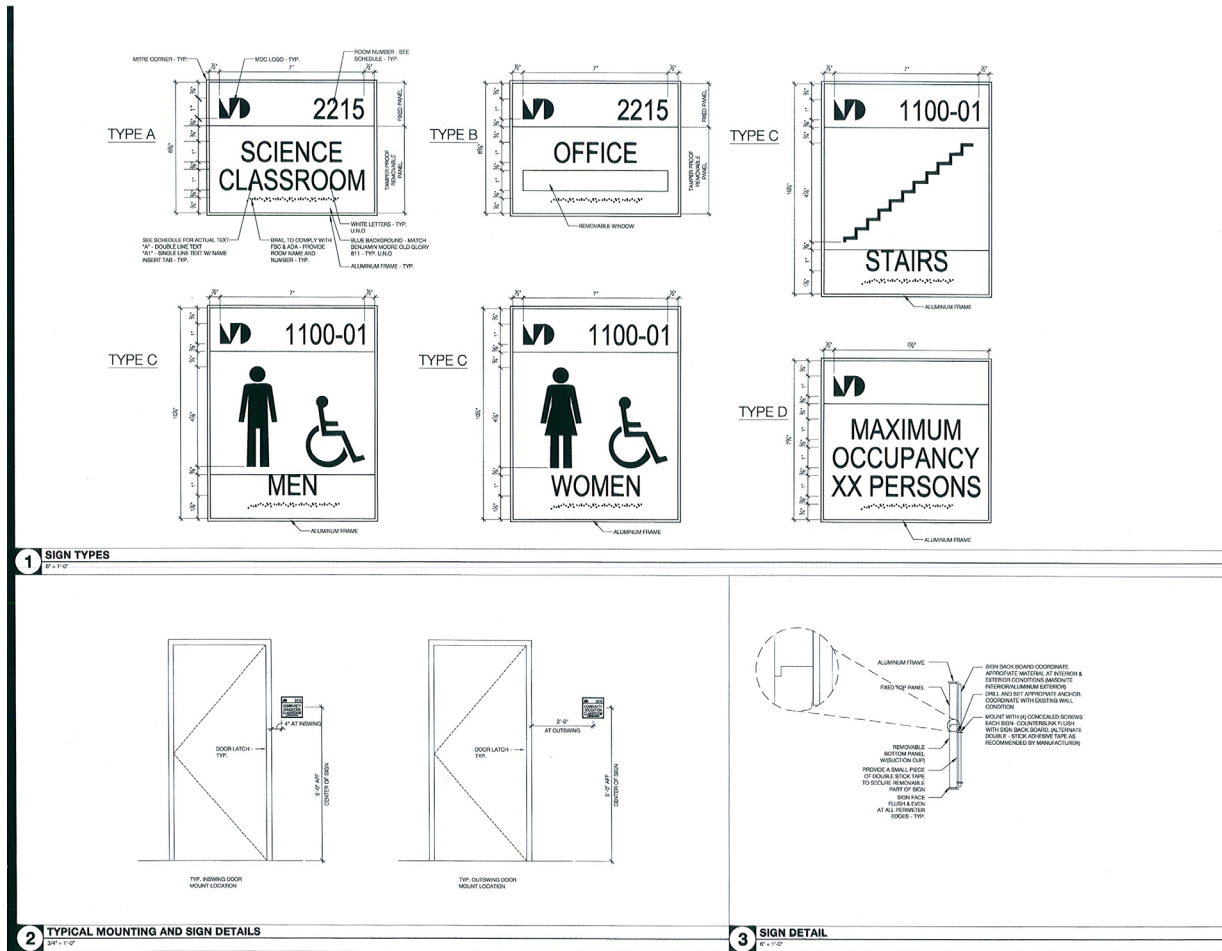


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**SK-10.4**







SK-10.5



**11 00 00 EQUIPMENT**

**11 01 00 GENERAL**

- A. Comply with the latest editions of the Florida Building Code, Florida Fire Prevention Code and all other required Codes and regulations.
- B. Quality of materials, shop drawing reviews, equipment integrity and installation shall be a major concern of the A/E.
- C. Building construction quality in food storage, preparation, and serving areas is extremely important. Strive to eliminate gaps between building materials that would allow pests access through floors, walls, or roofs.
- D. All equipment and its installation shall be UL listed, if applicable.
- E. Installers, service personnel, and contractors for new or existing equipment using refrigerant shall comply with Environmental Protection Agency (EPA) regulations regarding technician certification and recycling/recovery equipment.

**11 10 00 VEHICLE AND PEDESTRIAN EQUIPMENT**

**11 11 36.13 Commercial Electric Vehicle Charging Unit**

- A. MDC is presently assessing the implementation of the Florida Building code and Miami Dade County Ordinance Section 33-122.5 requiring Electric Vehicle Charging Stations at all garages and vehicular parking lots, this Section 11 11 00 will be updated to reflect this requirement once MDC determines the Commercial Electric Vehicle Charging Stations to be selected. A/E to request from MDC Project Manager update on Electric Vehicle Charging Stations Type and Manufacturer. Refer to Division 32 10 03 for additional information.

**11 12 00 Parking Control Equipment**

- A. MDC is presently assessing all Card Control Parking Equipment and Parking Gates; this Section 11 12 00 will be updated to reflect these changes. A/E to request from MDC Project Manager final Card Control and Parking Gate equipment requirements.

**DIVISION 11**

**EQUIPMENT**

This section contains the following:

**11 01 00 GENERAL**

**11 10 00 VEHICLE AND PEDESTRIAN EQUIPMENT**

11 11 36.13 Commercial Electric Vehicle Charging Unit

11 12 00 Parking Control Equipment

11 13 00 Loading Dock Equipment

**11 40 00 FOOD SERVICE EQUIPMENT**

11 41 33 Foodservice Shelving

11 48 13 Commercial Dishwashers

**11 50 00 EDUCATIONAL AND SCIENTIFIC EQUIPMENT**

11 52 00 Audio Visual Equipment

*(Continues)*





**11 13 00 Loading Dock Equipment**

- A. A loading dock shall be provided for buildings requiring frequent delivery of heavy bulky items such as stage sets, books, special event materials etc.
- B. Equipment installed for purposes of removing or installing building systems shall be identified in the Construction Documents and details shall include weight limits and static/dynamic load parameters. Weight test certifications shall be provided to MDC as part of the Close Out Documents.

**11 40 00 FOOD SERVICE EQUIPMENT**

- A. All commercial kitchens and supporting areas shall be designed by a commercial food service consultant.
- B. Large break rooms and centralized food warming areas must be provided with local exhaust.
- C. All cooking equipment that produces smoke or grease-laden vapors shall be vented to the exterior.
  - 1. For most facilities, the equipment lists will be provided with the Program. Consult MDC Project Manager to verify equipment selection before design layout.
  - 2. Use foam expanding agents and refrigerants not contributing to the depletion of the Earth's protective ozone layer. The use of products containing R-11, R-12, R-113, R-114, or R-115 is discouraged.
  - 3. Equipment and installations are required to be listed by Underwriters Laboratories (UL).
  - 4. Construction documents shall note the Contractor to be responsible for the disconnecting and moving of equipment to be reused designated to MDC storage facilities or as otherwise directed at kitchen renovations involving existing equipment removals.
  - 5. Kitchen plumbing drawings shall be coordinated with food equipment and counter layout.
  - 6. Kitchen Floor shall be sloped to floor drains. Floor drain locations shall be coordinated with kitchen and equipment layout and shall not create trip hazards or water ponding
  - 7. Use easily cleanable materials in food service areas. Components such as "Unistrut" or other similar materials are not allowed.
- D. Trash Compacting System.
  - 1. Compactors will be used for dining room and facility waste instead of pulping and extractor equipment. Compactors are not-in-contract.
  - 2. Locate compactor 2 feet away from a wall near the dining room exits and at least 3 feet away from the exits.

- 11 52 13 Projection Screen
- 11 53 00 Laboratory Equipment
- 11 60 00 ENTERTAINMENT AND RECREATION EQUIPMENT**
- 11 61 43 Stage Curtains
- 11 80 00 FACILITY MAINTENANCE AND OPERATION EQUIPMENT**
- 11 90 00 OTHER EQUIPMENT**
- 11 95 13 Kilns



If more than 1 unit is provided, locate at remote exits.

3. Provide a convenient route, not through the kitchen, from the compactor to a service yard dumpster.
4. Provide quarry tile under and extending 4 feet from the sides and front of the compactor and to the rear wall. Use a quarry tile or rubber base.
5. Walls at the unit shall be standard dining room wall finish.

E. Walk-in Cooler/Freezer.

1. Insulated cold storage rooms are prefabricated, foamed-in place, free standing walk-in rooms, designed for easy, accurate, indoor on-site assembly over a recessed slab.
2. Refrigeration system components include a fully automatic outdoor air-cooled condensing unit and a ceiling mounted evaporator unit in the refrigerated room.
3. Prefabricated floor, ceiling, and wall sections shall contain at least 4 inches of insulation.
4. Depress kitchen slab at walk-in cooler/freezer to provide equal cooler, freezer, and finish kitchen floor elevations. Depth shall include thicknesses for floor insulation, quarry tile over a galvanized steel floor, and setting bed.
5. Stainless steel finish floor overlay panels shall be used only at a renovation project without a depressed slab.
6. Cold storage room floors shall be designed to carry 600 pounds per square foot loading and be finished with quarry tile.
7. The freezer door shall open into the cooler and the cooler door shall open into the kitchen.
  - a. Provide wet-trap floor drains for condensate according to FBC.
  - b. Provide at least 8'6" clear kitchen ceiling height for walk-in cooler/freezer rooms.

F. Custom Fabricated Food Service Equipment

1. At food service areas, provide the following, but not limited to, custom stainless-steel fabricated equipment including necessary accessories.
2. Cook's table with 1 compartment sink.
3. Baker's table with 1 compartment sink.
4. Vegetable/salad sink, 3 compartments.
5. Pot washing sink, 4 compartments.
6. Vegetable/salad table.
7. Pot rack, wall mounted

G. Serving Line Equipment and Units

1. Serving line aisle widths shall be at least 42 inches wide.

2. Stainless steel serving line equipment shall include:

- a. Milk/Juice Counter (If required): Refrigerated milk box able to accommodate 6, 10, or 14 standard size milk cases according to program requirements. Provide floor drain near unit.
- b. Top and Tray Slide: Countertop unit with three die formed inverted ridge tray slide.
- c. Hot Food Section: Dry, moist, electric, with 12 inch by 20-inch openings according to program requirements to fit standard cafeteria pans.
- d. Cold Food Section: Refrigerated frost top with a perimeter drain and refrigerated storage below with adjustable shelves.
- e. Protector Cases: Plexiglass front and ends to be installed over hot and cold food sections.
- f. Display Cases: 18-inch-wide unit with plexiglass shelves and sneeze guards.
- g. Cashiers Stand: With footrest, cash drawer, and a duplex electrical receptacle.
- h. Decorative laminated plastic front for serving line equipment is optional. Finish edges with stainless steel angle.

H. Food Preparation, Holding and Dispensing Equipment

1. Food preparation equipment includes, but is not limited to:

- a. Floor mounted mixer with a power bowl lift, bowl and beater accessories. (See M- DC Master Specification Guidelines for accessory list).
- b. Vertical cutter/mixer with two sets of casters.
- c. Ice Maker Capacities: 800 lbs.
- d. Mobile Can Storage and Dispenser Racks.
- e. Stationary Can Storage and Dispenser Racks
- f. Inclined Can Rack.

I. Cooking Equipment

1. Cooking equipment to include but not limited to, the following:

- a. Double stacked convection ovens with porcelain steel liners, stainless steel doors with glass panels and stainless-steel front, left side, right side, top and back panels.
- b. Convection steamer with filtration equipment at boiler.
- c. Steam Kettle: Stainless steel unit, gas fired, complete with hot and cold water.
- d. Deep fry combination with fryer drain cabinet and built-in filter system.
- e. Electric heavy-duty range with polished stainless-steel cabinet base, 6-inch stainless steel legs and adjustable bullet feet.

2. Cooking equipment for Instructional Food Lab Commercial Cooking Center to include but not limited to the following:
  - a. Convection Oven: Stainless steel.
  - b. Deep fat fryer with adjustable legs.
  - c. Griddle with adjustable legs for mounting.
  - d. Convection Steam Cooker with in-line water conditioner and legs for mounting.

J. Exhaust Hood

1. Design the kitchen water wash exhaust hood to be a four-sided, filter less stainless steel hood capable of extracting 95 percent of generated grease through a series of horizontal overlapping exhaust air baffles and equipped with a UL listed wet chemical fire suppression system such as Ansul R-102, exhaust and supply air fans, black steel ductwork, 140 Degree F minimum detergent water wash system with a wall-recessed water wash control panel, florescent lighting and front horizontal air discharge. Hood shall be installed in an island type fashion. Acceptable manufacturers are:
  - a. Gaylord CRG-BDL-MAW
  - b. Greitzer Model Joshua I Series
  - c. Ventmaster H-LM-BMA
  - d. No substitutes shall be approved.
2. When pre-approved by the MDC Facilities Design & Support Section, provide a kitchen filter type exhaust hood in lieu of the water wash type. Hood to be a four-sided, stainless steel hood capable of extracting 90 percent of generated grease through a series of horizontal overlapping exhaust air baffles and equipped with a UL listed wet chemical fire suppression system such as Ansul R-102, exhaust and supply air fans, black steel ductwork, florescent lighting and front horizontal air discharge. Hood shall be installed in an island type fashion. Acceptable manufacturers are:
  - a. Gaylord CFX-BDL-MA
  - b. Greitzer Model Joshua III Series
  - c. Ventmaster GL Series
  - d. No substitutes shall be approved.
3. Hood exhaust ductwork shall be fabricated of black steel welded liquid tight.
4. Gas valve solenoid to be directly connected to the fire alarm.

**11 41 33 Food Service Shelving**

- A. Provide shelving for the food service areas as required for project and coordinated with MDC.
- B. Shelving shall be freestanding, unless otherwise indicated as “mobile”.
- C. Install first shelf 10 inches above finish floor with remaining shelves equally spaced.
- D. Dry Storage Shelving:
  - 1. Provide mobile shelving units along the full length of three (3) perimeter walls. Shelving shall be high-density wire-type or smooth polypropylene with steel core posts and traverses. Individual mobile units to 3 to 5 feet in length, 24" wide, 75" high, 4 tiered with each tier spaced approximately 18" apart. Each unit shall be provided with high-density stem type casters with at least 2 casters having brakes and bumpers. Minimum each shelf weight-bearing capacity shall be 400 pounds at corners and 600 to 800 pounds on straight shelving. Coordinate layout with MDC.
  - 2. Provide high-density wire-type top-track storage shelving systems along the full length of one perimeter wall. Minimum of 3 mobile units positioned between stationary end units. Spacing of mobile units to create a single aisle opening between any two units as needed. Quantity to be coordinated with MDC.
  - 3. Provide 24" wide and 80" high Gravity Fed Can Dispensing Racks made of high strength all-welded aluminum construction. Each unit shall have mobile locking casters and hold approximately 162 #10 cans. Gravity fed can unit to be placed in center of dry storage room. Quantity to be coordinated with MDC.
  - 4. Provide 24" wide and 40" high Gravity Fed Can Dispensing Rack made of high strength all-welded aluminum construction. Unit shall have mobile locking casters and hold approximately 72 #10 cans. Gravity fed can unit to be placed in center of dry storage room.
- E. Paper Storage Shelving:
  - 1. Provide Cantilevered Shelving heavy-duty aluminum construction with cross brace support. Free standing units to be 5 feet in length, 24" wide and 72" high with outer leg support. Each unit to have three (3) 24" deep tubular adjustable shelves paced approximately 24" apart. Shelf capacity minimum of 900 lbs. Quantity to be coordinated with MDC.
  - 2. Provide mobile shelving units along the full length of three (3) perimeter walls. Shelving shall be high-density wire-type or smooth polypropylene with steel core posts and traverses. Individual mobile units to 3 to 5 feet in length, 24" wide, 75" high, 4 tiered with each tier spaced approximately 18" apart. Coordinate layout with MDC.
- F. Cold Storage and Freezer Shelving:

1. Provide reinforced polymer-shelving units that are mobile, corrosion and rust proof, and designed for use in temperatures from –10° F to 45° F. Individual units shall be a minimum 36" to 60" long, 24" wide and 75" high, with 4 open grid adjustable shelves. Mobile shelving units shall have a minimum of 600 lb. capacity per shelf. Shelving to be placed continuous along three perimeter walls of the walk-in cooler and freezer.
2. Provide durable, heavy-duty one-piece polymer construction dunnage racks, designed for use in temperatures from –10° F to 45° F, with slotted top to provide for proper air circulation. Each rack shall be 36" to 60" wide, 12" high, and 21" deep. Dunnage racks shall be placed along entire length of remaining wall directly under the cooler and freezer fans.

#### **11 48 13 Commercial Dishwashers, Dryers and Appliances**

- A. Provide washing machines and clothes dryers in food service areas, locker rooms and vocational instructional spaces according to program requirements and the following.
  1. All washers, dryers and any other related appliances shall be commercial grade.
  2. Provide gas dryers when gas is available and economically feasible.
  3. Fifty pounds capacity commercial washers and dryers for staff use in large facilities food service and locker rooms.
  4. Food service washers and dryers shall be on a 4" high raised concrete platform. Provide a floor drain next to the platform in a location where it does not create trip hazards.
- B. Dryers shall be vented to exterior and the exhaust ducts shall be concealed within an adjacent partition or chase.
- C. Provide commercial grade dishwashers in science labs and preparation rooms. Coordinate with MDC.

#### **11 50 00 EDUCATIONAL AND SCIENTIFIC EQUIPMENT**

##### **11 52 00 Audio Visual Equipment**

- A. Multimedia spaces, equipment and control design requirements will be provided on a project by project basis through each Campus.

##### **11 52 13 Projection screens**

- A. Projections screens requirements shall be provided on a project by project basis through each Campus

B. Large screens shall be sized according to use and location, stage movie screens shall be as follows:

1. All screens shall be electrically operated roll-down or otherwise approved by MDC.
2. In stages the screens shall be located directly behind the house curtain, concealed from view in roll-up position, centered on the stage proscenium opening, seating space or as coordinated with MDC.
3. In other spaces screens shall be mounted recessed with ceiling, shall be fully concealed from view when in the rolled-up position and shall be placed so as to maximize the view angle from the entire room area.
4. Screens shall be matt white, fireproof and mildew resistant.
5. Provide two (2) multi-station control switches for each screen.
6. Location of switches shall be coordinated with MDC during design.
7. Provide all necessary power, data and communications conduits to support the installation of the screens.

#### 11 53 00 Laboratory Equipment

- A. Areas planned for any research, laboratory, testing, manufacturing, or shop activity that involves the use of hazardous materials and processes shall comply with this section. The term laboratory has been generically used and is intended to cover any area or equipment that has hazards associated with its routine use in a laboratory, research, or similar application. This standard shall apply to the installation of equipment into existing areas to the extent necessary to retrofit the space for safe use.
- B. Unique specialty systems required for the operation of a proposed process are the responsibility of the department to maintain and/or support via funding in coordination with Facilities. Examples include specialty filtration, sensing and warning systems, debris collection, and suppression.
- C. The following design basis shall apply to all laboratories. Alternative means and methods will only be considered on a case-by-case basis, as recommended by a design professional's evaluation.
1. All spaces shall be designed at a minimum as NFPA 45 or 55-compliant.
  2. All laboratory spaces shall be designed to contain wholly the contents needed to operate. Satellite storage and dispensing areas are not permitted as an assumed basis of design. Adjacent corridors and mechanical spaces are not available for extension of laboratory activities.
  3. All features, work surfaces, and flooring shall be suitable for the processes planned in the space. At a minimum, flooring must be non-pervious, monolithic, and liquid-tight, with covings or equivalent methods to ensure spills cannot seep underneath adjacent walls and cabinetry. All flooring penetrations for the area must be sealed to prevent spills from seeping to floors below. Liquid-tight seals are required at room perimeters and where cabinetry that cannot be easily cleaned beneath.
  4. All areas where substances that are damaging to human tissue and/or infectious agents are handled shall

be equipped with a hand wash sink and emergency eyewash and shower stations. The eyewash and shower shall be a combination unit for simultaneous use, and will be located in a well-lit area, in accordance with current ANSI standards. Each unit shall be identified with a highly visible sign. The location of the unit will be coordinated to provide adequate clearances to area electrical hazards and Ground Fault Circuit Interrupter (GFCI) protection. Adjacent surfaces shall be suitably water-repellent.

5. **A three (3)-inch floor drain with trap primer and integral funnel shall be provided at each emergency eyewash and shower equipment station. The adjacent floor shall be sloped to drain.**
6. Areas using free-standing gas cylinders shall be provided with racks and securing straps or chains to secure containers properly. Special ventilation shall be provided for hazardous gases. Incompatible gases shall be separated by the regulated distances. Highly flammable gases, such as hydrogen, shall be stored outside of the building
7. Cabinetry for chemical and flammable storage shall be provided and sized for anticipated use, with no less than one separate unit for each material type planned. Cabinetry shall meet NFPA and OSHA requirements. Secondary containment is required for all liquid hazardous materials stored on the floor. The cabinet shall have venting compatible with the chemicals stored. Cabinets used to store flammable or corrosive materials shall be labeled with appropriate signage. Cabinetry built into fume hood bases is preferred. See Division 12 for additional laboratory casework requirements.
8. Prior to system design, the Engineer shall perform an evaluation of the type of contaminants being exhausted for all laboratory work areas containing chemical, biological, or similar hazards. Areas in which hazardous materials are present shall maintain a continuous airflow at an air-pressure that is negative relative to adjacent spaces and corridors at all times. Floor plans shall be arranged to maintain an overall positive air pressure for the building envelope.  
Design shall include means for energy conservation when laboratory workspaces are unoccupied. Details on equipment, sensors, fail safes, air changes per hour at all settings, etc. will be included in the design. All laboratory work areas with chemical, biological, or similar hazards must be provided with 100% exhausted air without recirculation. Air filtration units are not permitted.
9. All laboratory workspaces using chemicals shall be equipped with fume hoods permanently ducted to the exterior. A Class II B2 biological safety cabinet (BSC) shall be provided when working with biologicals and toxic, radioactive, flammable, corrosive, or malodorous chemicals are used.  
Fume hoods shall be Variable-Air-Volume (VAV) type capable of maintaining the required minimum face velocity of 100 fpm for standard fume hoods and 60 fpm for high-performance, low-volume exhaust, +/- 5% of design with the sash set at working height of 18". Nonbypass constant volume and ductless-type fume hoods are prohibited.  
Factory installed; permanent sash stops shall be incorporated into all new laboratory fume hoods at eighteen (18) inches from the working surface. A sash shall be provided with chain-driven, counterweight movement components. The front shall contain a full-view vertical sash for total visual access of the hood interior. Internal lighting and utilities connections shall be included, as needed, for the application, with consideration being given to accessible placement.



Special purpose hoods shall be identified for the intended application, with visible signage such as “FOR PERCHLORIC USE ONLY” or “FOR RADIOACTIVE ISOTOPES.”

Fume hoods, ducted cabinets, and exhaust drops shall be tested and adjusted after installation and prior to occupancy, in coordination with the building test and balance report. The Engineer shall review the noise and vibration levels of the units and include isolation equipment as required to meet acceptable levels. Performance tests on hoods must be in accordance with the latest edition of ANSI/ASHRAE 110 Method of Testing Performance of Laboratory Fume Hoods. Testing shall be witnessed by the Owner. An inspection tag indicating all NFPA 45 parameters shall be provided.

**10. Laboratory hoods and associated exhaust or supply system shall be tested and balanced again six (6) months after the date of occupancy. The report shall include adjustments made or recommended, fan curve performance efficiency, vortex behavior, and face velocity.**

11. Fume hoods - Utility service fixtures for gas, air, water, and vacuum shall be remote-controlled, with valves identified by index button. Outlets shall have serrated tips for line connections. All outlets shall be color-coded with the valve controls, and the color key must be consistent within the same work area and building, where possible. Water service shall also have an integral vacuum breaker and a turret with six-inch swivel gooseneck, and shall be PVC, epoxy, or similarly coated, as required for the application.

12. All biosafety cabinets shall be National Science Foundation (NSF) -listed, UL-approved, and installed in accordance with the manufacturer’s requirements. Equipment shall be clearly identified as to the type of service it provides, especially where more than one appliance is available.

Biosafety cabinets shall be vented from the building if toxic, radioactive, flammable, corrosive, or malodorous chemicals are used. Biosafety Level 2 laboratories or higher that are using chemicals shall be equipped with a Class II-B2 type cabinet. Venting to external ducts shall be monitored with a flow monitoring system with both audible and visual annunciations that alert the cabinet users of loss of external ventilation. Alternatively, thimble connections or canopy mini enclosures in cabinets shall be fitted with a ribbon streamer or equivalent attached at an edge through which air enters the device to indicate the airflow direction.

Biosafety cabinets will be located so as to neutralize any interference or disruptions in airflow. They shall be located away from doors, high traffic areas, at least ten feet from autoclaves, away from HVAC vents, and not directly across from other BSCs. A distance of at least six feet between cabinets is preferred. A 12-inch minimum maintenance clearance shall be provided behind and on each side of the cabinet. When the BSC is hard-ducted or connected by thimble unit to the ventilation system, adequate space shall be provided so as not to interfere with airflow.

Each BSC shall be tested, certified, and tagged before it is placed into service, after it has been repaired or relocated, or after the HVAC configuration has been changed. An NSF- certified technician shall perform this test. Ongoing testing, re-certification, and filter replacement costs are the responsibility of the department.

13. VXVGD fuel gas piping shall not be installed to bio safety cabinets. All laboratory fume hoods and biological safety cabinets shall be equipped with manufacturer-approved integral visual and audible airflow alarms.

Safety alarm consoles must be factory-tested and field-verified to be within acceptable calibration limits. Additional alarms for sash position must be provided. All hoods must have signage stating: "Hood sash must be closed when not in use."

14. Local exhaust shall be provided for equipment storage and for applications involving processes with hazardous materials or materials producing excessive heat.
15. Laboratory exhaust grounded ducts shall be liquid-tight, welded, seamless, and ground with no internal projections. At a minimum, stainless steel (SS) 316 shall be used unless special exhaust conditions warrant alternative methods. Duct sprinklers are prohibited. Ductwork shall be field-tested using smoke or similar means to verify containment.
16. All laboratory spaces shall be equipped with emergency shut-off valves for vacuum, fuel, and process gases, and a shunt trip for electric service. Electrical shunt buttons and dedicated fuel gas shutoff valves shall be located adjacent to the primary exit path within each lab. Additional controls for vacuum, process gas, or other systems requiring isolation must be provided for individual labs located just outside the lab where a utility space is suitable or within the lab adjacent to a primary egress path. Vacuum, fuel, and process gas valves must be provided for individual labs located just outside the lab e.g., a ball valve behind a clear cover. A fire alarm solenoid for automatic supply shut off of fuel gas shall be provided, as well as additional shutoffs for specialty items. Emergency controls shall be provided with protective covers that do not require the use of a key and/or break-away components and intended for the purpose installed. Mushroom-type resettable buttons with covers for interior electrical controls. All controls to be adequately labeled with the utility and area served.
17. All fuel gas supplies, and their associated connections, piping, and fittings shall be provided with a painted yellow finish suitable for the application. Equipment located in open areas shall be installed with concrete pads and protected by yellow, rounded-top, concrete-filled pipe bollards or appropriate collision protection.

#### D. Safety Components:

1. Provide safety cabinets with an emergency shower, eyewash fountain, and storage space for first aid kit, fire blankets, fire extinguisher, and sand bucket. The safety cabinet shall be ADA accessible, easily reached from all areas of the lab, and away from egress paths.
2. Emergency showers shall have pull valves and pull cords to be held under the shower to wash away chemical contamination. Locate a floor drain at the emergency shower.
3. Eyewash fittings shall have push type flag valves and soft stream heads.
4. **Floor under emergency shower and eyewash shall slope to a floor drain and floor material shall be water resistant.** Emergency shower and eyewash shall be located where it does not create a trip hazard.
5. Accessible components shall have a forward approach for accessibility to the disabled. A parallel wheelchair approach for side access is not acceptable. See FBC for clearances and allowable heights.
6. Provide 6-foot-long rubber drench hoses and hose spray fittings for deck mounting at instructor demo desk and according to program requirements.

7. Provide emergency shut-off button by instructor's desk to shut-off all gas and electrically operated equipment.
  8. A combined vandal resistance water/gas faucet shall be used in science laboratory sinks and workstations.
  9. Provide tamperproof fasteners and fittings on equipment.
  10. Use vacuum breaker fittings on gas, water or water related items.
  11. Laboratory sinks and cup drains shall be black, epoxy resin.
- E. Laboratory casework includes, but not limited to:
1. Tables and Worktops:
    - a. Tops designed to contain spills.
    - b. At science classrooms specify plastic laminates tops.
    - c. At science demo classrooms and science labs specify solid epoxy resin tops and sinks.
  2. Cabinets:
    - a. Specify a clear oak or other clear wood exterior and concealed plywood construction.
    - b. Flakeboard, particleboard and other types of wood composition board are not allowed.
    - c. Display cabinets shall have sliding wood framed doors with safety glass. Swinging glass doors are not allowed.
    - d. Specify locks at doors and drawers according to program requirements. All cabinet locks (drawers and doors) within a new facility shall be keyed to one grand master. All cabinet locks within a room shall be keyed alike but shall be keyed differently from any other room.
- F. Laboratory equipment includes, but not limited to, the following:
1. Student Stations:
    - a. Specify with steel support structure and solid epoxy resin tops and sinks.
    - b. Provide for at least one student workstation accessible to the disabled in each laboratory and demonstration classroom.
  2. Fume Hoods:
    - a. The Chemistry Classroom and Science Material Storage/Preparation Area fume hood shall be provided with gas and CW at both ends of the hood along with an integral exhaust/supply air makeup system. The fume hood shall be de-energized by activating a red mushroom button located behind the classroom

- demo table which will simultaneously shut off the gas supply and electricity (except the classroom lights) to the demo table and the student work tables
- b. Provide a forward approach for accessibility, supplemental air hood, epoxy resin work surface, natural gas, cold water, epoxy resin cup sink, acid waste, electricity, and vapor-proof light.
  - c. Fume hoods shall comply with SAMA, ASHRAE, NFPA, and other applicable codes.
  - d. Fume hoods shall be located within the laboratory to allow unimpeded exit in case of a fire or explosion within the fume hood. Locate hoods away from paths of egress.
  - e. Provide unifacial and bifacial fume hoods according to program requirements. Fume hoods shall be located to ensure that proper ADA access is provided to each unit.
  - f. Locate fume hoods away from high traffic areas and provide sufficient aisle space for access.
  - g. Safety devices such as drench shower/eye wash stations and fire extinguishers shall be near the fume hood. Locate a floor drain at each drench shower/eye wash station.
  - h. Fume hood exhaust system shall be coordinated with the room emergency exhaust system and the supplemental outside air supply, and not interconnected with other ventilation duct system.

## 11 60 00 ENTERTAINMENT AND RECREATION EQUIPMENT

### 11 61 43 Stage Curtains

- A. Stage and supporting areas as well as all related systems such as lighting, sound and acoustics shall be designed by an experienced professional in such specialty.
- B. Stage curtains shall be provided as required in Theaters, Auditoriums, Black Boxes/Little Theaters and Audio-Visual Production Studios following MDC requirements for such spaces.
- C. Curtain fabrics shall be flame resistant according to the latest edition of FBC, FFPC and NFPA requirements. A sewn-on permanent label shall name the manufacturer and state that the fabric is non-combustible.
- D. Provide a minimum of 50 percent additional fullness and box pleats. Provide double bottom hems, canvas chain pocket and chains at full-length curtains.
- E. Provide structural supports as required for specific curtain layout designs. Supports shall be designed by structural consultant.
- F. Stage curtains shall include all components required for the proper operation of all programs and related spaces. Specific requirements shall be coordinated with MDC.

- G. Electrically operated curtains shall be provided for all main curtains.

#### 11 80 00 FACILITY MAINTENANCE AND OPERATION EQUIPMENT

- A. **Equipment needed to provide facilities operational support to the building will take priority in funding over general building furnishings and equipment.**
- B. **Central vacuum cleaning systems are prohibited.**
- C. Housekeeping closets shall be a minimum of 120 sq. ft on the first floor and 90 sq. ft on each subsequent floor. Each room shall directly access the main corridor or common area and must be rectangular in shape, without pass- through rooms.
- D. All buildings three stories or more in height shall include a central trash and recycle room. The room shall have a floor drain in the center of the room, shall be located on the first floor, and shall include a minimum 8' wide x 10' tall, insulated roll-up door, with exterior access. The room size is indicated on the RECYCLING AND TRASH EQUIPMENT TABLE on page D.11-5
- E. Each housekeeping closet and central trash recycle room shall have a sealed concrete floor, wall shelving space, and a floor mop sink, which must be precast, have corner splash pans with a maximum six-inch front curb (*as pictured*), hot and cold-water service, and trap drains. Power must also be provided.
- F. All buildings three stories or more in height shall include a maintenance workspace with a sealed concrete floor, located on the first floor, and start at a minimum of 120 sq. ft. All other floors to start with a minimum of 90 sq. ft.
- G. First floor housekeeping and maintenance rooms shall have power and data connections. Power shall include two dedicated, 20-amp circuits.
- H. A key-type security box and time clock compatible with systems used by MDC will require data connections and power at a single first floor location. Consult with the MDC Project Manager to determine if these are to be Contractor or Owner-furnished.
- I. Metal storage sheds and similar structures are not permitted on any of the MDC campuses.

**11 90 00 OTHER EQUIPMENT****11 95 13 Kilns**

- A. Kiln rooms and kiln areas shall comply with the following:
1. Locate away from exits and paths of egress.
  2. Fire rated wall partitions for new, renovated, or remodeled projects are not required.
  3. Specify a sealed concrete floor with a trowel and light broom finish.
  4. Provide square footage according to program requirements.
  5. Kiln rooms will be used only for kiln operations and contain only kiln equipment. Provide “COMBUSTIBLE STORAGE NOT PERMITTED” signage.
  6. Ventilation:
    - a. Provide fire rated wall envelope and doors as required by FBC and FFPC.
    - b. At kiln rooms, provide a wall or door makeup air louver 12 inches above finish floor and an exhaust fan with a grille at the opposite end of the room.
    - c. At kiln areas, provide an MDC accepted exhaust hood to fit over the MDC accepted kiln.
    - d. Provide manually operated, thermostatically controlled exhaust systems, rated at 250 CFM minimum, and vented to the exterior. Outside makeup air is not required, unless the kiln room has only exterior access.
    - e. Exhaust ducts shall be under negative pressure.
  7. Shielding and Clearances:
    - a. Provide 18-inch minimum clearance between kilns and walls.
    - b. Provide adequate clearances at the front of kilns for proper loading and unloading. Kiln rooms shall be accessible to the disabled.
    - c. Provide kiln areas with 48-inch-high minimum side/rear walls if no fire separation is required.
  8. Electrical:
    - a. Verify available voltage of 208 or 220/240 at new and existing kiln rooms before kiln selection.
    - b. Drawings shall coordinate the locations of the appropriate power outlet, the exhaust hood when required, and the In-Contact kiln.
      - 1) Kilns with on/off switches shall receive an appropriate, visible, and easily accessed outlet to be within reach of the 6 feet long power cord of the kiln and have the panel circuit breaker identified

“KILN”.

- 2) Provide an accessible disconnect switch within the room for hard-wired kilns.
- c. Install rate of rise heat detectors at kiln rooms.

**NOTE: This division of the design criteria shall be included as part of Project Manual in the Construction and Contract Documents.**

**END OF DIVISION**

**12 00 00 FURNISHINGS**

**12 01 00 GENERAL**

- A. Comply with the latest editions of the Florida Building Code, Florida Fire Prevention Code and all other required Codes and regulations.
- B. Interior finish materials within all occupied and assembly spaces shall meet the interior finish class requirements of FBC Chapter 8. Upholstered seating in assembly spaces shall meet the requirements of NFPA 101, Chapter 10 (part of the Florida Prevention Code).
- C. The design and selection of furnishings, in concert with other building components, shall produce a building that meets the programmed sustainability rating (LEED rating) of the specific project. These objectives are in line with the objectives of all Divisions and should be coordinated with requirements in Division 1 Section “Sustainable Design Requirements.”

**12 10 00 ART**

- A. MDC promotes Art in Buildings and in Public Spaces, A/E to obtain approval from MDC prior to implementation of Murals, Wall Decorations, Sculptures, Art Glass or any other Art in Buildings and or in Public Spaces.

**12 20 00 WINDOW TREATMENTS**

- A. Window treatments shall meet the interior finish class requirements of FBC - Buildings.
- B. All windows in conference rooms, classrooms or auditoriums shall be provided with devices to control sunlight and darken room during audiovisual presentations.
- C. A single neutral color per building selected from manufacturer’s standards. Slats must be aluminum (those with recycled content preferred). Perforated slats are not acceptable.
- D. Window treatment shall be installed as follows:

**DIVISION 12**

**FURNISHINGS**

This section contains the following:

- 12 01 00 GENERAL**
- 12 10 00 ART**
- 12 20 00 WINDOW TREATMENT**
- 12 30 00 CASEWORK**  
12 36 40 Stone Countertops
- 12 40 00 FURNISHINGS AND ACCESSORIES**  
12 48 00 Rugs and Mats
- 12 50 00 FURNITURE**  
12 56 51 Library Furniture
- 12 60 00 MULTIPLE SEATING**  
12 61 00 Fixed Audience Seating  
12 66 00 Telescoping Stands

*(Continues)*





1. Office and Administration spaces: Vertical blinds or commercial-grade roller shades.
2. Instructional areas: Commercial-grade roller shades.
3. Libraries, Media Center, etc.: Vertical blinds or commercial-grade roller shades
4. Horizontal blinds and drapes are not allowed.

E. Window Treatment Types:

1. Vertical Blinds: Heavy-duty construction, flame resistant, non-toxic, PVC louvers.
2. Shades: Commercial grade vinyl-coated fiberglass reinforced, room darkening shade with clutch rollers.
3. Use of motorized blinds must be approved by MDC.
4. Blinds and shades shall be provided with all necessary blocking, grounds, tracks and other devices required for installation as part of the contract even if blinds or shades might be furnished by the owner.

## 12 30 00 CASEWORK

- A. Modular laboratory casework shall be produced by a nationally recognized laboratory casework manufacturer that is a member of the Scientific Equipment and Furniture Association (EFA)
- B. The use of particleboard for plastic laminate finished counter tops or for the structural components of laboratory casework is prohibited.
- C. **Bases for all casework, hoods or similar border areas at fixed laboratory furnishings shall be feet mounted for cleaning underneath or equipped with a liquid tight seal at the floor to prevent spills from seeping under adjacent surfaces.**
- D. Laboratory countertops shall be solid epoxy or stainless-steel construction. Sinks shall be integrally cast of under mount.
- E. Epoxy resin counter tops and sinks, as well as the adhesives and insulation applied to it, shall be asbestos free.
- F. Shelving used for chemicals shall be acid-resistant
- G. **Furnishings and equipment placed in close proximity to wet areas (sinks, safety showers, etc.) shall be water-resistant.**

- 12 90 00 OTHER FURNISHINGS**
- 12 92 00 Interior Planters and Artificial Plants
- 12 93 00 Interior Public Space Furnishings

- H. Metal drawer slides shall be PVC coated and shall carry a minimum 100 lb. load rating.
- I. The use of plastic drawer and cabinet pulls is prohibited unless specifically pre-approved for specific instances.
- J. All utilities run inside of a laboratory casework system shall be accessible for repair, modification, or replacement.
- K. When existing modular oak laboratory casework is to be refinished as part of a project or department request, refinishing shall only be done in a natural clear finish matching as close as possible to the original finish.

#### **12 36 40 Stone Countertops**

- A. Granite surfaces shall be used only with prior approval from MDC.
- B. Granite surfaces must have factory polished finish; slight pitting is unacceptable.
- C. Samples from actual slab shall be provided to the MDC Committee for approval.
- D. Stone must be obtained from a single quarry source.
- E. Joint locations must be indicated on drawings. Avoid mitered joints and joints located near cutouts.
- F. Continuous support must be provided under countertop. A sub top, made of a sturdy material such as plywood, sized to limit deflection to not more than  $1/720$  of the span, is the preferred form of support. Where cabinets are not used for support, framing must be provided and must also be rigid enough to limit deflection to no more than  $1/720$  of the span.

#### **12 40 00 FURNISHINGS AND ACCESSORIES**

##### **12 48 00 Rugs and Mats**

- A. Recessed floor mats or recessed floor grilles, including drain pan fabricated from aluminum or stainless steel shall be provided at entrances from exterior areas to spaces with carpeting or wood flooring.
- B. Straight grille pattern is preferred.



**12 50 00 FURNITURE**

- A. The criteria for selecting the furniture is based on its durability, its ergonomics qualities and the function for what it is going to be used.  
For each specific job, please refer to project program requirements.
- B. The following guidelines are presented in an effort to establish Furniture Specification and Installation Standards that will:
1. Create a cohesive and efficient environment in which employees, and faculty can perform their tasks.
  2. Create a safe, flexible and efficient environment for our students to learn and interact and,
  3. Generate an inventory of furniture that adapts to the changing environment.
- C. MDC purchase department requires that all vendors are registered in the DMS Florida State Contract.
1. Preferred vendors are:
    - a. Empire Office - Steelcase
    - b. J.C. White – Haworth
    - c. KI
    - d. Pradere Office Products
    - e. Herman Miller
  2. The purchase of furniture items will be processed as follows:
    - a. Less than \$1,000.00: Purchasing will request a letter quote and issue a Purchase Order (P.O.) to the suggested vendor.
    - b. From \$1,000.00 to \$14,999.99: Purchasing will request a minimum of three quotes and issue a P.O. to the lowest bidder meeting the specifications.
    - c. \$15,000.00 and up: Purchasing will request sealed bids and issue a P.O. to the lowest bidder meeting the specifications after receiving Board Approval.
  3. Special requests for non-standard items must be requested in writing by the user, stating all the objectives reasons for the request.
- D. Requirements:

## 1. Specifications:

- a. The attached specification format is used and strongly recommended by the College. It provides all the information required to properly purchase and install furniture. Variations of the format will be accepted only if all the required information is provided.

## 2. Tagging:

- a. In the furniture specifications, each item must receive a “tag” or label that specifically designates the item to a room area. For example, if chairs are specified for a conference room and an office, the chair spec must read as follows:

- 1) TAG 8 each with “C-1 (W-6322-1)”
- 2) TAG 2 each with “C-1 (W6315)”

This indicates the chair type (C-1) and the building and room number (6322-1 or 6315) the chair must go to. Other items, such as the fabric or the color, can be added to the tag and must be in between parenthesis. When the exact same chair is being specified in various colors or fabric they may be tagged as follows:

- 1) TAG 8 each with C-1 A (W6322-1)
- 2) TAG 2 each with C-1 B (W-6315)

The letter following the chair type indicates the difference in color or fabric.

- b. A tag must designate only one specific item. The slightest variation on an item dictates a different tag. For example, if two identical desks are specified but one has a left-hand pedestal and one has a right-hand pedestal, they can no longer share the same tag. The desks must be tagged D-1L & D-1R, (L=left, R=right).
- c. Certain miscellaneous items such as task lights and special support brackets or clamp packages must be tagged and specified separately, not as part of a unit assembly or module.
- d. When identifying the Campus, the following letters assignment must be used:

N= North Campus  
 K = Kendall Campus  
 M= Medical Campus  
 E = Entrepreneurial Center  
 H= Homestead Campus

W= Wolfson Campus  
 I= Interamerican Campus  
 NWS= New World School of Arts  
 H= Hialeah Center  
 T= Tamiami Center

- e. Obtain Furniture Coding Standards for furniture initials to be used in tagging from MDC Project Manager.
3. Keying:
- a. Random keying will not be accepted as part of the specifications. Every item specified with a lock must be assigned a key number. Keying specifications must accompany the final specs, or they will not be considered final. All keying must be specified with “lock cylinders to be field installed, plug all item”. The key number with the corresponding number of locks must follow the item list.
4. Panel Plans:
- a. When the project involves panel systems, a Panel Plan at ¼” scale must be provided separate from the Furniture plan. The dimensioned Panel Plan shall indicate the exact location of the panels and the panel power feed boxes in reference to a fixed wall or column for proper field installation. The plan must also show the location of the outlets with circuit numbers, power feeds and wall brackets. Panels must be identified as P # for regular panels and PP # for powered panels. Panels must also be identified with the number that indicates their dimensions. For example, if a panel is 42” high and 30” wide it should be labeled P4230, indicating always the height first and the width second. Panels base-in feeds cannot be located behind the panels, they must be located adjacent to the panels, this allows access to the connection at all times and the panels can be flush with the wall.
  - b. The Furniture Plan will show the remainder of the furniture, including panel-supported items.
5. Special Furniture Back Panels:
- a. Special 14” high back panels are available from most manufacturers. These special panels must be specified as part of any furniture items (desk, return, credenza or storage unit) to be installed adjacent to a wall with electrical/telephone/data outlets. The use of these special panels will allow access to the outlets at all times.
6. Return of Bridge:
- a. Will be installed at the desk height (29-3/4”h) unless it is specifically requested and specified to be installed at a lower typing level, 28-3/4”, 27-1/4” or 26-1/4” high.
7. Grommets:
- a. Must be specified right, left or center. Keyboard grommets are not allowed.

8. Wire Guide Clip, Cord Reels, and/or Cable Storage Trays:
  - a. Must be specified by the designer when it is anticipated that various pieces of equipment will be used, and the support
  - b. Furniture offers little or no wire-storage capabilities.
9. Installation of Outlets:
  - a. The Project Architect is responsible for the coordination of all mechanical, electrical and data outlets with the furniture. These outlets cannot be blocked or made inaccessible by the placement of furniture. Therefore, their exact location must be documented for correct field installation at the construction phase of the project. A typical detail must accompany all electrical and mechanical drawings, showing the installation height of electrical, data and telephone outlets, switches, thermostats and junction boxes in reference to the floor and door opening.
10. Field Measurements:
  - a. When remodeling/renovating an existing space, field measurements must be taken to accurately depict, in the floor plan, the exact location of outlets to remain and be removed, as well as those that must be remain and covered or protected.
  - b. Field measurements of the space shall confirm the exact location of columns, chase walls, windows, walls, doors, t'starts and any other mechanical/electrical/architectural feature that affects the furniture installation.
11. Field Inspection:
  - a. On the job site, once partitions have been laid out, prior to electrical and drywall installation, the Project Architect must field verify that the partitions layout has been constructed according to plans, especially in areas where critical clearances are involved.
12. Pre-installation Filed Inspection:
  - a. Project Architect shall conduct a field inspection of the areas to receive furniture prior to installation to verify that all the necessary outlets and mechanical requirements have been completed as per contract documents. This inspection must be scheduled with sufficient lead time to allow corrective measures to be accomplished prior to furniture arrival.

13. Post-installation Filed Inspection:
  - a. Immediately following the completion of the installation, the Project Architect shall conduct a detail inspection of the premises to assess all deficiencies and prepare a Punch List of all missing or defective items.
14. Corrective Measures:
  - a. Project Architect must follow-through on corrective measures with furniture manufacturers until installation is complete as specified, all problems have been solved and the installation is completely operational.

#### **12 56 51 Library Furniture**

- A. Provide and coordinate library shelving components and quantities according to program requirements and MDC. Coordinate with specific campus.
- B. A/E shall coordinate the library shelving layout from the preliminary design to ensure capacity and clearances are met. Construction documents shall show the final shelving layout as coordinated and approved by MDC. Shop drawings submittals shall include dimensions, details and assembly instructions.
- C. Each shelving unit shall be self-supporting and not depending on adjacent units or walls for Shelving shall support 50 pounds per square foot (psf) with no deflection.
  1. Secured shelving units to walls and/or floor to prevent accidental flip-over.
  2. Provide appropriate wall backing at wall secured shelving units.
- D. Library shelving units shall be welded metal frames, single or double faced, with adjustable shelves of varying depths, and cantilevered from columns by shelf brackets. Units shall conform to MDC Specifications Guidelines Section on Library Shelving. These requirements include, but are not limited to, the following:
  1. Single faced library book shelving with metal canopy tops, adjustable shelves of a nominal 12" depth, and a height of 66" at elementary schools, 78" at K-8 and middle schools, and 84" at high schools.
  2. Double faced library book shelving, with plastic laminated plywood canopy tops, and adjustable shelves of a nominal 24" depth and 42" in height.
  3. Closed base shelves.
  4. Base support covers and full height, finished 1-piece steel end covers.
  5. One and two-piece divider type shelves with a 3/4" raised front lip.
  6. Legal and letter size dividers at K-8 and elementary schools.

7. V-shaped range finders and end panel holders for 3" x 5" cards.
8. 3/4" x 5" Snap-on label holders.
9. 14-inch-deep hinged periodical shelves with a raised front lip.
10. Storage shelves of nominal 18 to 22 inches deep.
11. All interior and exterior corners shall have corner fillers
12. The front and back edge of plastic laminate tops placed along curved walls shall conform to the curvature of the wall. All abutting edges of tops shall be shown properly mitered and finish to create a tight joint between adjacent top sections.
13. The A/E design shall not use single-face shelving as a stand-alone "island" without first obtaining approval from MDC. When approval to use single-face shelving be properly secured and flush metal or plastic laminate backs be provided.

## **12 60 00 MULTIPLE SEATING**

### **12 61 00 Fixed Audience Seating:**

- A. Seating Layout shall comply with egress and accessibility requirements of FBC and FFPC.
- B. To achieve proper sight lines at auditoriums, provide staggered seating, a sloped orchestra floor and stepped risers at mezzanines and balcony seating areas.
- C. Fixed furnishings and seating shall be included in the construction documents
- D. Chair widths, as measured from centerline to centerline, shall be at least 22 inches or 23 inches wide from center to center. It is recommended that all chairs be the same width.
- E. Potential pinch points during seat or tablet arm operation are not allowed.
- F. Auditorium seating shall comply with ADA requirements and provide the required number of spaces and companions for wheelchair throughout the auditorium including balconies with access above main level of seating. A minimum of two locations for two wheelchairs next to at least one fixed seat shall be provided. Wheelchair locations shall not be located within aisles or paths of egress. See FBC for additional requirements.
- G. Provide folding tablet arms of plastic laminate over plywood at every seat unless directed otherwise indicated by program requirements. Include 10 percent left-hand tablet arms with remainder of tablet arms of right-hand type. Tablet arms are only required in the first five rows and or as indicated in the project program.



- H. Provide for aisle lighting complying with egress lighting requirements. The light source must be located at the aisle level and not in the ceiling. Strip lighting recessed into the concrete slab may be permitted if approved by MDC. See Division 16 – Electrical for additional requirements.

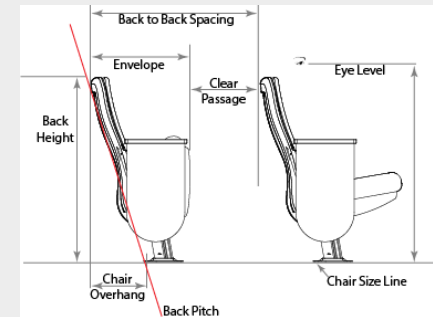
### 12 66 00 Telescoping Stands

- A. Bleachers shall be of wood or plastic seat construction with a wood floor on a retractable metal frame with casters for gymnasium wood floors. Flakeboard, particleboard, and other types of composition board are not allowed.
- B. Bleacher sections shall be securely anchored to walls and open forward.
- C. Bleacher sections in the open position shall be at least 10 feet from court boundaries.
- D. Provide power assisted bleacher operation with the following options:
1. When bleacher sections are less than 10 tiers and no more than 3 sections side-by-side, manual operation with power-assisted mules will be specified.
  2. When bleacher sections exceed 10 tiers and/or 3 sections side-by-side, a fully motorized and synchronized system shall be specified. Locate the controls where operator can monitor entire bleacher operation.
- E. Provide abrasive tread markings at aisles.
- F. Provide demountable guardrails, minimum of 42 inches high with pickets able to reject a 4-inch diameter sphere.
- G. Provide end closure panels at exposed sides of bleacher units and other safety accessories.
- H. Verify bleacher loading conditions with wood flooring manufacturer.
- I. Bleacher layout shall include at least two locations for two wheelchairs next to at least one bleacher seat. Wheelchair locations shall not be located within aisles, paths of egress or within 10 feet of court boundaries. See FBC for additional accessibility requirements.

### 12 90 00 OTHER FURNISHINGS

#### 12 92 00 Interior Planters and Artificial Plants

- A. Interior planters to be provided only with prior approval from MDC



**12 93 00 Interior Public Space Furnishings**

- A. Bicycle Racks shall be provided as required. Refer to Division 32 for Bicycle Racks requirements.
- B. Permanently mounted or installed Trash and Litter Receptors shall be provided as required. Coordinate with specific MDC campus.
- C. Site Seating and Tables shall be provided as required. Coordinate with MDC.

**NOTE: This division of the design criteria shall be included as part of Project Manual in the Construction and Contract Documents.**

**END OF DIVISION**

**14 00 00 CONVEYING EQUIPMENT****14 01 00 GENERAL**

- A. Regulatory requirements for all conveying equipment shall comply with:
1. Florida Building Code (FBC), Chapter 30.
  2. State of Florida Statutes, Chapter 399.
  3. NFPA 70 - National Electrical Code (NEC)
  4. Components, accessories, fabricated parts, and structure requirements shall comply with Current Adopted Edition of ANSI/ASME A17.1- Safety Code for Elevators and Escalators and ASME A18.1 Safety Standards for Platform Lifts and Stairway Chairlifts.
  5. Americans with Disabilities Act and Accessibility Guidelines (ADA).
  6. Florida Administrative Code, 61c5
- B. All conveying equipment shall be provided with drawings and specifications submitted, reviewed, inspected, and permitted by the Miami-Dade County Office of Elevator Safety as an agent of the Bureau of Elevator Safety, Division of Hotels and Restaurants, Department of Business and Professional Regulation.
- C. Elevator selection to be determined based on elevator speed, size, and other requirements and shall be determined by an elevator manufacturer's traffic analysis and/or as per MDC elevator consultant's recommendations and approval.
- D. **Conveying equipment shall not be installed in areas exposed to the weather; all conveying equipment shall be installed inside enclosed building unless otherwise approved by MDC.**
- E. All conveying equipment either new and/or modernization shall be coordinated by the A/E with the MDC Facilities and/or elevator consultant and shall comply with MDC approved vendor's and Manufacturer's list. Elevator standards is based on Thyssenkrupp <https://www.thyssenkruppelevator.com>
- F. All elevators at MDC campuses shall be provided with cameras. Coordinate camera system and location with the Office of Emergency Management (OEM).
- G. New elevator installations shall be either hydraulic and/or traction and shall be determined based on elevator speed and size requirements and shall be determined by an elevator manufacturer's traffic analysis and as per

**DIVISION 14****CONVEYING  
EQUIPMENT**

This section contains the following:

**14 01 00 GENERAL**

- 14 01 10 Dumbwaiter Rehabilitation  
14 01 20 Elevator Rehabilitation

**14 10 00 DUMBWAITERS****14 20 00 ELEVATORS**

- 14 21 00 Electric Traction Elevators (Passenger)  
14 21 13 Electric Traction Elevators (Freight)  
14 24 00 Hydraulic Elevators (Passenger)  
14 24 13 Hydraulic Elevators (Freight)

(Continues)

MDC elevator consultant’s recommendations and approval.

- H. Wheelchair lifts shall not be used in new construction.
- I. Stairway chair lifts (inclined) are not allowed at MDC facilities.
- J. Dumbwaiters and escalators to be provided as per program requirements, if not required by program prior approval from MDC facilities department and/or elevator consultant is required.

**14 01 10 Dumbwaiter Rehabilitation**

- A. All dumbwaiter rehabilitation/upgrade shall meet all current code requirements and shall be upgraded as determined by an elevator manufacturer analysis and as per MDC elevator consultant’s recommendations and approval.

**14 01 20 Elevator Rehabilitation**

- A. All elevator rehabilitation/upgrade shall meet all current code requirements and shall be upgraded as determined by an elevator manufacturer’s traffic analysis and as per MDC elevator consultant’s recommendations and approval.

**14 10 00 DUMBWAITERS**

- A. Provide dumbwaiters as required by program for operations such as Libraries, Cafeterias, Stage and Bookstores and located above ground.
- B. Dumbwaiters to be as per manufacturers pre-engineered, electric or hydraulic system as per MDC elevator consultant recommendations for the applicable application.
- C. Car platform to be 36” wide x 36 deep x 36 height clear inside dimension as a minimum standard with rated load 100 lbs.
- D. A/E to coordinate installation of dumbwaiters with the MDC elevator consultant

14 27 00 Elevator Cab Finishes (MDC standards)

**14 30 00 ESCALATORS AND MOVING WALKS**

**14 40 00 LIFTS**

14 42 00 Wheelchair Lifts



**14 20 00 ELEVATORS**

- A. Locate elevators to be accessible from all locations in the facility. **Elevators shall NOT be installed in areas exposed to the weather; all elevators shall be installed inside enclosed building unless otherwise approved by MDC.**
- B. Each multi-story building shall have passenger elevators (either traction or hydraulic), if a freight elevator is not provided then one of the passenger elevators shall be provided with wall padding. Selection of type of elevator to be determined based on elevator speed, size, and other requirements and shall be determined by an elevator manufacturer's traffic analysis and as per MDC elevator consultant's recommendations and approval.
- C. When elevators are across each other, the minimum width between entrances shall be 10'-0". Elevator lobby shall not be obstructed with signage, exhibits etc.
- D. For buildings where equipment must be moved from floor to floor, one elevator shall have a minimum inside cab wall length of (7) seven feet.
- E. Support rails on three walls of the elevator cab are required.
- F. Elevators shall be equipped with automatic leveling devices.
- G. All elevators shall have dedicated elevator equipment rooms located directly off a main corridor or common area. Elevator equipment room floors shall be smooth, sealed and epoxy painted.
- H. Elevator Hoist ways shall be provided with the following:
  - 1. Conduits or plastic pipes shall not be installed in the pit, hoist ways or machine room. Only metal sump pump discharge lines are allowed in pits and hoist ways.
  - 2. Elevator pits 4'-0" or deeper shall have a metal ladder, permanently installed and extending to at least 30" above the access floor and have a rung at the top for a hand grip.
  - 3. A moisture-proof light shall be provided in each pit, with a light switch located so that it is accessible from the pit entrance and adjacent to the pit stop switch. Two sealed, four-foot fluorescent bulb, watertight fixtures shall be provided in all elevator pits, one fixture per side.
  - 4. Beams, floor slabs or other building construction shall not project more than 2" inside the general line of the hoist-way unless the topside of the projection is beveled at an angle of not less than 75 degrees.
  - 5. Hoist-ways of elevators serving more than three floors shall be vented to outside air to prevent accumulation of smoke or gasses. The area of the vents shall not be less than three and one-half percent (3½ %) of the

area of the hoist-way, nor less than three square feet for each elevator, whichever is greater. Vents and frames shall be made of noncombustible material. All vent openings shall reject a ball two inches in diameter and shall be covered with a screen.

- I. Elevator cabs shall be provided as per item 14 27 00 Elevator Cab Finishes below.

#### **14 21 00 Electric Traction Elevators (Passenger)**

- A. The primary use of new elevators is for students, staff and visitors not just for the handicapped, secondary use is for the moving of oversized equipment. Traction elevators are for high use and shall be designed as the normal means of vertical transportation unless otherwise indicated in the project program.
- B. Electric traction passenger elevators shall be considered when building height is more than 60 feet of travel distance and when a cab speed of 350 feet per minute or above are required.
- C. Electric traction elevators shall be considered when budget and energy efficiency are a required component in the building design process of Sustainable Designs (LEED).
- D. Selection of type of electric traction elevator to be determined based on elevator speed, size, and other requirements shall be determined by an elevator manufacturer's traffic analysis and as per MDC elevator consultant's recommendations and approval.

#### **14 21 13 Electric Traction Elevators (Freight)**

- A. Not all new structures require dedicated freight elevators, each individual case should be considered and provided as per elevator consultant recommendations and as per MDC approval.
- B. Dedicated freight elevators shall be provided using following criteria below:
1. Office building total gross floor area is 250,00 sf or more
  2. One additional freight elevator for each additional 350,000 sf
  3. Buildings with special labs with large equipment
- C. Selection of type of electric traction freight elevator to be determined based on above items and shall be determined by an elevator manufacturer's traffic analysis and as per MDC elevator consultant's recommendations and approval.

#### **14 24 00 Hydraulic Elevators (Passenger)**

- A. Hydraulic passenger and/or freight elevators shall be considered when building height is less than 60 feet of travel distance and when a cab speed of 200 feet per minute or below are required.
- B. Provide in-ground passenger and freight elevators, do not use hole-less hydraulic elevators unless previously approved by MDC
- C. Hydraulic elevators shall be considered when budget and energy efficiency are a required component in the building design process of Sustainable Designs (LEED).
- D. Selection of type of hydraulic elevator to be determined based on elevator speed, size, and other requirements and shall be determined by an elevator manufacturer's traffic analysis and as per MDC elevator consultant's recommendations and approval.

#### **14 24 13 Hydraulic Elevators (Freight)**

- A. Not all new structures require dedicated freight elevators, each individual case should be considered and provided as per elevator consultant recommendations and as per MDC approval.
- B. Dedicated freight elevators shall be provided using following criteria below:
  - 1. Office building total gross floor area is 250,00 sf or more
  - 2. One additional freight elevator for each additional 350,000 sf
  - 3. Buildings with special labs with large equipment
- C. Selection of type of hydraulic freight elevator to be determined based on above items and shall be determined by an elevator manufacturer's traffic analysis and as per MDC elevator consultant's recommendations and approval.
- D. Selection of type of hydraulic freight elevator to be determined based on elevator speed, size, and other requirements and shall be determined by an elevator manufacturer's traffic analysis and as per MDC elevator consultant's recommendations and approval.

#### **14 27 00 Elevator Cab Finishes**

**Finishes for all MDC elevators (new or refurbished) shall meet the following requirements:**

- A. Elevator doors shall be 302/301 stainless steel with a #4 finish.

- B. Provide Car Operating Panel (COP) with brushed #4 stainless steel face, if rehabilitating it shall be mounted on the existing cab front wall.
- C. Provide tamper resistant buttons with 1" diameter metal button and a 1 3/8" metal halo will be used. The button shall have a stainless-steel finish. Button shall indicate a registered hall call with L.E.D. jewel illumination. Car call buttons, alarm button, door close, and open button shall be identified by symbols required by A.D.A and Florida handicapped standards.
- D. Braille in elevator cabs shall be integrated into the Car Operating Panel (COP).
- E. Hall stations shall be surface mounted fixtures with a 60-degree panned edge and one-piece construction. The faceplate material finish shall be #4 stainless steel. Each hall station shall include a digital position indicator.
- F. Intermediate terminal stations with two illuminating push buttons, one for the up direction and one for the down direction. Provide two hall stations on each intermediate landing.
- G. Cab shell and dome shall be made of galvanized steel.
- H. The cab platform shall be of marine grade plywood.
- I. Interior Panels: Shall be constructed with 5WL rigidized stainless-steel design pattern will be used. Panels shall have clips or be interlocking.
- J. The handrail shall be rectangular flat bar stainless steel design 2"(h) x 1/2"(w) x 78" (1) with returned ends. Install on three walls and shall meet ADA requirements.
- K. A modular down light ceiling shall be installed consisting of fire-resistant plywood panels with an exterior surface of laminated satin finished stainless steel. The ceiling shall have a concealed frame hanging no more than 7" below the canopy and a nominal space of 1-1/2" between the edge of the ceiling and the wall. Ceiling panels with centered MR16 LED GU10 bulb with flood panel lens and down light fixtures shall be used. A minimum of 5 fc. shall be maintained inside the cab. The ceiling panels shall be removable to allow easy access to the top emergency exit. The emergency exit shall not be obstructed by cab lighting fixtures and electrical conduits.
- L. The elevator cab flooring shall be made of non-slip material. Floor coverings, underlayment, and its adhesive shall have a critical radiant flux of not less than 0.45 W/cm<sup>2</sup>. Car flooring shall be rubber or terrazzo sheet flooring.
- M. Wall studs will be installed directly into the elevator interior wall allowing standard eyelet to hook over it. The studs will have a stainless-steel finish.



- N. Wall pads shall be flame retardant. Elevator pads will cover the entire perimeter of the cab walls. A cut out shall be provided for access to the car station. Pads will not overlap or obstruct the normal operation of the elevator. Elevator pads will hang from the eyelets and not rub against the floor. The outer fabric shall be made of vinyl. The pads are to be quilted with a thick cotton fiber which provides the highest shock absorption. Rugged thread shall be used throughout. Each stitch shall be knotted for better wear. Pads shall be of the same material on both sides for uniform appearance. Elevator pads shall be reversible.

#### **14 30 00 ESCALATORS AND MOVING WALKS**

- A. Escalators are not allowed unless with prior approval from MDC. Provide upgrades to existing escalators as determined by an escalator manufacturer's traffic analysis and as per MDC elevator consultant's recommendations and approval.
- B. Moving walks are not allowed unless previously approved by MDC.

#### **14 40 00 LIFTS**

##### **14 42 00 Wheelchair Lifts**

- A. Vertical platform or inclined wheelchair lifts are not allowed at new construction unless previously approved by MDC
- B. Vertical platform lifts shall be provided at stages and/or other required spaces only if accessibility to an existing area cannot be obtained by means of a ramp at renovation or remodeling projects due to space restrictions.
- C. Lifts shall not be installed in a required means of exit.
- D. Floor penetrations are not allowed.
- E. Platform floors and ramps shall be slip resistant.
- F. Selection of wheelchair lifts type shall be determined by an elevator manufacturer's analysis and as per MDC elevator consultant's recommendations and approval.

**NOTE:** This division of the design criteria shall be included as part of Project Manual in the Construction and Contract Documents.

**END OF DIVISION**

**21 00 00 FIRE SUPPRESSION****21 01 00 GENERAL**

- A. Comply with the latest editions of the Florida Building Code, Florida Fire Prevention Code NFPA and all other required Codes and regulations.
- B. Provide 1/4" scale drawings indicating all pipe sizes and routing, sprinkler head location, type and k factor, area of coverage, valves, water pressure, etc. Drawings and computer-generated Hydraulic Calculations shall be designed, signed and sealed by a Florida registered Professional Engineer.
- C. The fire sprinkler system piping mains shall be fabricated of Schedule 10, ASTM A-135 or ASTM A-795 galvanized steel pipe with screwed, welded or grooved ends. Branch piping up to 2 inches in size shall be XL, ASTM A-135 thread able light wall galvanized steel piping with screwed ends. No other pipe material shall be approved.
- D. Provide glass bulb type quick response sprinkler heads with the ordinary temperature range of 155 Degree F except where subject to high temperatures caused by heaters, hot pipes, radiant ceilings or other heat source in which case they shall be of the high temperature type.
- E. All child care/day care facilities shall be fully sprinkled.
- F. Electrical rooms and telecom rooms SHALL NOT contain sprinkler heads. In lieu of fire sprinkling, all electrical rooms shall be two-hour fire-rated and contain heat detectors.
- G. Utilize clean agent extinguishing in special conditions only if required by users.
- H. Utilize precaution systems in special conditions only if required by users.

**21 10 00 WATER-BASED FIRE SUPPRESSION SYSTEMS**

- A. Fire sprinkler systems shall be wet pipe and hydraulically designed for the occupancy designated by NFPA 13 for the space use. Comply with NFPA 13, 14, 101 and FBC.

**DIVISION 21****FIRE SUPPRESSION**

This section contains the following:

**21 01 00 GENERAL**

**21 10 00 WATER BASED FIRE  
SUPPRESSION SYSTEMS**

**21 30 00 FIRE PUMPS**

- B. Provide a 6-foot-high chain link fence around the fire protection system backflow preventer when installed in an area accessible to the public.
- C. Install fire department connection at a clear, accessible location and without interference from nearby objects. Locate fire department connection at the minimum distance from structures required by NFPA or the Fire Department
- D. Provide an indicating valve with tamper switch at the water entrance and a flow switch. An alarm check valve may be required at the connection to the water supply to prevent surges and false alarms. Provide an electric driven bell adjacent to the water entrance or fire pump location.
- E. Provide at each floor an accepted water flow detector alarm device connected to activate the building fire alarm system.
- F. Upon completion, provide owner with appropriate extra heads and a cabinet as specified by NFPA 13. When used, provide an equal number of concealed type fire sprinkler heads and concealed cover plates.
- G. Provide standpipes as required by NFPA and Life Safety Code.
- H. Provide fire department valves where required and spaced so that 100 feet of hose and 30 feet of hose stream can reach any portion of the building.

### 21 30 00 FIRE PUMPS

- A. Fire pumps shall be as manufactured by Aurora, Patterson or Armstrong. Fire Pump Controller to be TornaTech.
- B. Fire pumps shall be split case, horizontal type, UL/FM approved.

**NOTE: This division of the design criteria shall be included as part of Project Manual in the Construction and Contract Documents.**

**END OF DIVISION**

**22 00 00 PLUMBING**

**22 01 00 GENERAL**

- A. Comply with the latest editions of the Florida Building Code, Florida Fire Prevention Code and all other required Codes and regulations.
- B. Plumbing materials within all occupied spaces shall meet the requirements of the M-D County Water conservation ordinance.
- C. All plumbing design shall be in compliance with the requirements of the American with Disabilities Act Accessible Guidelines. The Florida Building Code – applicable edition (Building, Plumbing, Energy Conservation, Gas), NFPA, Chapter 64#-11 (Food Hygiene) of the Florida Administrative Code, Florida Department of Environmental Protection (DEP), Florida Department of Environmental Resources Management (DERM), Florida Department of Transportation (FDOT), United States Environmental Protection Agency (EPA) and the American Society of Civil Engineers (revision specified by FBC.). All plumbing piping shall be supported in accordance with the Florida Building Code (Plumbing) latest adopted edition.
- D. No piping carrying domestic water, CHW, fire sprinkler water, etc. shall be run through any of the electrical rooms. In addition, do not penetrate CW lines used for electrical grounding through and into the electrical rooms. Terminate CW lines outside the electrical rooms and provide grounding straps.
- E. Each horizontal sanitary and storm drainage pipe shall be provided with a clean out at the upstream end of the pipe. Offset cleanouts so that they are not located in classrooms, corridors or entrances. Use wall cleanouts whenever possible. All piping shall run at 1/8” per foot slope, minimum.
- F. DO NOT install any plumbing piping inside the block cores of exterior walls. Install piping in furred walls.
- G. Cleanouts shall be provided at 50-foot intervals for sanitary pipes of 3 inch or less and 75-foot intervals for pipes 4 inch and larger. Also, at every change of direction greater than 45 degrees.
- H. Each building drain shall be provided with a two-way grade cleanout within 5 feet after exiting the building. If the two-way cleanout is installed in a grass area, it shall be embedded in an 18” x 18” x 4” thick concrete pad.
- I. Joint connections for joining domestic water pipe shall be FREE OF LEAD. When used, 95/5 solder and flux shall

**DIVISION 22  
PLUMBING**

**This section contains the following:**

<b>22 01 00</b>	<b>GENERAL</b>
22 05 29	Hangers and Supports for Plumbing Piping and Equipment.
22 05 53	Identification for Plumbing Piping and Equipment
22 07 16	Plumbing Equipment Insulation
22 07 19	Plumbing Piping Insulation
<b>22 10 00</b>	<b>PLUMBING PIPING</b>
22 11 23	Domestic Water Pumps
22 13 23	Sanitary Waste Interceptors
22 14 29	Sump Pumps
22 15 00	General Service Compressed Air Systems

*(Continues)*



not have a lead content exceeding 0.2 percent. Threaded connections shall be made with non-lead bearing compounds. Joint connections for gas copper pipe shall be welded or brazed with lead-free solder.

- J. The primary roof drain system shall be sized for a rainfall intensity as required by the Florida Building Code (Plumbing) – applicable edition.
- K. All primary roof drain system storm drain runoff shall be terminated in storm drain systems. The use of splash blocks or surface drains are prohibited. In addition, the underground primary drain system shall be provided with a gooseneck relief pipe extending above grade to indicate clogged lines.
- L. A secondary emergency roof drain system shall be provided totally INDEPENDENT of the primary roof drain system and may consist of parapet scuppers or scupper heads and exterior surface mounted leaders. All secondary emergency roof drain system storm drain runoff shall be terminated above grade.
- M. When buildings are designed with an interior storm drain system, the vertical storm drain piping (conductor shall be provided with base cleanouts and access doors. The use of No-Hub cast iron pipe for above grade interior use is approved.
- N. In no instance will the use of PVC piping such as for the sanitary, storm drain, fire sprinkler systems, etc. be permitted for above grade use in any portion of the building interior in buildings of over three stories.
- O. Sanitary, grease and storm drain system piping installed below grade within the building interior can be either cast iron or Schedule 40 PVC. Above grade piping can be either no-hub cast iron or Schedule 40 PVC (if not installed in a plenum.)
- P. Water piping to be copper type K underground and copper type L above ground. The use of ProPress type piping is acceptable.
- Q. Hose bibbs to be located along the building exterior at 75-foot intervals and shall be installed in flush hydrant boxes. Hose bibbs to have integral vacuum breakers.
- R. Condensate drainage piping shall be insulated copper above grade and PVC below ground. Ensure P trap is calculated to comply with requirements of the AHU static pressure.
- S. P & T relief lines are to be copper.
- T. Water closets installed back-to-back if wall hung shall be provided with double tee-wye or double combination sanitary fittings. The use of double sanitary tees is PROHIBITED.

22 40 00 PLUMBING FIXTURES

22 60 00 GAS & VACUUM SYSTEMS FOR LABORATORY, HEALTHCARE AND FOOD SERVICE FACILITIES

- U. Water heaters for other than the kitchen shall be sized for a 70°F temperature rise (70°F to 140°F) and provided with quarter turn ball valves in lieu of gate valves on the cold and hot water supply lines. In addition, heat traps shall be provided on the CW and the HW lines if they are not already integral with the water heater.
- V. Commercial water heaters for the kitchen and other high-volume uses shall be sized for a 100°F temperature rise. 140°F hot water shall only be required for the kitchen four-compartment pot sink, the water wash exhaust hood. All water heaters shall be provided with 24-hour time switches and programmed to operate only during occupied periods. Depending on size, provide expansion tank for hot water system.
- W. Wall or shelf mounted water heaters shall be provided with a 2-inch-high galvanized steel safety pan containing a 1-inch drain line. Both the safety pan 1-inch drain line, and the 3/4-inch P&T water heater relief drain line shall be independent of each other. They shall be fabricated of copper and run separately into a mop sink, floor drain or extend to the building exterior as a last resort. Discharge onto a concrete walkway is PROHIBITED. The P & T relief line shall be piped to the building exterior and terminated 6" above grade. In systems with expansion tanks, provide relief drain to exterior.
- X. The entire kitchen area shall be provided with 4-inch floor sinks having a maximum depth of 6 inches. The only exceptions shall be the walk-in cooler/freezer entry door, dry storage room entry door and the paper storage room entry door which shall be provided with trough drains and the laundry room which shall be provided with a 3-inch floor drain. All trough drains shall be a maximum of 36 inches long. Other plumbing fixtures requiring floor sinks shall be the combination emergency shower/eyewash fixtures, which shall be sized for 3 inches.
- Y. The kitchen area shall be provided with curb or recessed floor area and shall contain a 4-inch floor sink equipped with a chrome plated, bronze spray nozzle and water supply assembly supplied by 110 Degree F hot water.
- Z. The kitchen grease trap shall be provided with 4 inches minimum influent and 6-inch minimum effluent pipes. If multiple tanks are required, the tanks shall be installed in parallel. All tanks shall contain an aluminum or concrete baffle plate to separate the grease containment area from the liquid containment area. Sizing calculations shall be provided on the plans along with a tank detail. Grease traps shall be located as close as practical to the food waste location. Tanks may be concrete gravity type or plastic hydromechanical type (if installed per manufacturer's recommendations but must comply with the latest Miami Dade County DERM FOG requirements. Grease traps shall have discharge side sampling ports, located to provide easy access. If plastic tanks are used, provide calculations as to possible flotation.
- AA. Indirect safe wastes shall be provided underneath the kitchen equipment and connected to the floor sinks located in accessible areas.

- BB. All floor drains and floor sinks shall be equipped with trap primers connected to the discharge pipe of the water closet flush valve in order to prevent evaporation of the trap seals. In areas where that is not possible, the primer connection shall be made to the domestic water line of a lavatory or a sink.
- CC. Floor drains shall be provided in wet all areas. At the emergency shower/eyewash units they shall be located within 2 feet of the shower discharge and shall be sized for 3 inches.
- DD. The dumpster area shall be provided with an area drain accessible for removal of the bucket and a wall hydrant containing 110 Degree F for cleaning purposes.
- EE. 3/4-inch flush mounted anti-siphon wall hydrants with covers shall be used for all building interior and exterior installations. 3/4-inch hose bibbs shall only be used in mechanical rooms.
- FF. Plumbing fixture flows are to be restricted to 0.5 GPM for lavatories; 1.0 GPM for classroom sinks, kitchen sinks, service sinks and mop sinks; 1.5 GPM for showers; 0.75 GPF for urinals; and 1.28 GPF for water closets. LEED requirements may necessitate further reductions.
- GG. Provide all counter mounted sinks with hot and cold water.
- HH. Toilet rooms shall be provided with standard height, non-handicap water closets. Separate handicap toilets for public use shall be equipped with standard height handicap water closets. Group toilets containing a handicap toilet stall are to be provided with minimum of one lavatory, one floor drain, and a wall hydrant installed at a height of approximately 2 to 3 feet. The wall hydrant shall be recessed and shall have a vacuum breaker and loose key.
- II. All handicap lavatories shall be provided with insulated P-traps, angle stops, and supply lines installed parallel to the wall and with trap guards.
- JJ. All handicap water closets flush valves, urinal flush valves and lavatory self-closing faucets shall be suitable for maximum of 5 PSI activating pressure in accordance with ADA requirements.
- KK. In Science Classrooms and the Science Material Storage/Preparation Area, chemical waste shall run through an acid resistant high-density polyethylene pipe, silica glass chemical waste system, polypropylene PVDF or acid resistant CPVC system and into a high-density polyethylene neutralizing tank before being discharged into the sanitary sewage system. The neutralizing tank shall contain a bolt-down cover and be similar to the Enfield Series T Neutralization Tank. Tank shall be double wall. No electrofusion piping will be acceptable
- LL. In Chemistry Classrooms and the Science Material Storage/Preparation Area, provide a combination emergency



shower/eyewash equipped with a stay-open shower ball valve, six aerated brass spray heads with a stay-open ball valve and a 3-inch floor sink for evacuating large volumes of shower water. Waste from the eyewash fixture shall be indirectly connected to the floor sink with all the waste piping installed inside interior walls. The combination emergency shower/eyewash is to be installed at the rear of the classroom opposite the teacher's demo table and away from any door or cabinets. The fixture shall be anchored to the floor with a base plate and to the wall with a bracket at the top of the fixture riser which shall be screwed into a 2-inch x 4-inch length of wood or equivalent installed behind the plastered wall. The combination emergency shower/eyewash shall be Model #SE-603 as manufactured by Speakman.

MM. In Science Classrooms, provide hot and cold water to each teacher's demo table and to each utility sink at the rear of the classrooms. The student table sinks shall be provided with cold water only.

NN. In the Science Material Storage/Preparation Area, a distillation water still shall be provided over the utility sink to produce the highest purity water. The still shall be Mego-Pure Still/Fisher EMD Scientific #S50920ND as manufactured by Corning.

OO. All Science area fume hoods shall be provided with cold water and gas at both ends

PP. The Science Material Storage/Preparation Area Organic and Inorganic Storage Room shall each be provided with acid resistant floor drains connected to the chemical waste system.

QQ. Every building shall have at least one main vent stack not less than 3" diameter. Air admittance valves (AAW) used to eliminate venting to the outdoors are PROHIBITED.

RR. A vent terminal shall be a minimum of 10 feet from any door, window or fresh air intake.

SS. All valves or other equipment requiring access inside walls or above inaccessible ceilings shall be provided with access panels to match finish of wall or ceiling.

TT. All cooling towers shall be provided with submeters for the makeup water line

UU. All cooling towers and other sources of possible contamination to water supply shall be provided with approved backflow preventer assemblies.

VV. Reclaimed water is acceptable for use subject to Florida Building Code requirements for uses where applicable.

## **22 05 29 Hangers and Supports for Plumbing and Equipment**

- A. Provide non-corroding materials only.
- B. Base the spacing of hangers on the strength and modulus of elasticity of each piping material.
- C. Provide rigid supports sway bracing when the pipes are 4” or larger and the change in direction is greater than 45 degrees.
- D. Anchor pipe as to restrain drainage piping from axial movement.
- E. Piping shall be isolated from incompatible materials
- F. Preferred Manufacturers:
  - 1. Allied Tube & Conduit.
  - 2. Flex-Strut Inc.
  - 3. GS Metals Corp
  - 4. Thomas & Betts Corporation
  - 5. Unistrut Corporation; Tyco International, Ltd.
- G. Structural Performance: Plumbing piping and equipment hangers and supports shall withstand the effects of gravity loads and stresses within limits and under working conditions and not be detrimental to the pipe they support.
- H. Access panels: Provide access panels to match finish of walls and ceilings at all locations where access is required to valves or other plumbing devices and where not otherwise accessible through accessible Ceilings.

**22 05 53 Identification for Plumbing Piping and Equipment**

- A. Label all piping per industry standards at equipment room and 10’ o.c thereafter.

Description	Background	Letters
Hot Water	Yellow	Black
Cold Water	Green	White
Gas	Yellow	Black
Air	Blue	White
Vacuum	Green	White
Steam	Yellow	Black



Nitrogen	Green	White
Oxygen	Yellow	Black
Hydrogen	Yellow	Black
Refrigerant	Yellow	Black
Fire	Red	White

- B. Provide ID tags at all valves and plumbing equipment
- C. Provide metal labels for equipment
- D. Stencil material and paint for piping
- E. Provide aluminum Tags for valves
- F. Piping and equipment shall be labeled as per current industry standards.

**22 07 16 Plumbing Equipment Insulation**

- A. Provide insulation for the unfired hot water storage tanks to conserve energy.
- B. Protect the insulation against physical damage by adding a strong jacket or delaying installation of the insulation on the piping system.
- C. When installing insulation in a corrosive environment, select the proper jacket which will withstand the most severe conditions.
- D. Select the proper insulation to fit in confined spaces.
- E. Preferred manufacturers:
  - 1. CertainTeed Corp.; Duct Wrap
  - 2. Knauf Insulation; Duct Wrap
  - 3. Manson Insulation Inc.; Alley Wrap
  - 4. Owens Corning; All-Service Duct Wrap
- F. Install equipment insulation to achieve the following:
  - 1. Reduction of heat or cooling temperature loss through the piping



2. Eliminating of condensation
3. Personnel protection by keeping the surface temperature low enough to touch.
4. Protection of equipment from abrasion or damage from external forces.

**22 07 19 Plumbing Piping Insulation**

- A. Provide fiberglass insulation for all hot water lines.
- B. Provide foam rubber insulation for all condensate piping.
- C. Provide fiberglass insulation for all horizontal roof drain lines above ceilings.
- D. Protect piping system's insulation against physical damage.
- E. When installing insulation in a corrosive environment, select the proper jacket which will withstand the most severe conditions.
- F. Select the proper insulation to fit in confined spaces.
- G. Preferred manufacturers:
  1. CertainTeed Corp.; Duct Wrap
  2. Knauf Insulation; Duct Wrap
  3. Manson Insulation Inc.; Alley Wrap
  4. Owens Corning; All-Service Duct Wrap
- H. Install equipment insulation to achieve the following:
  1. Reduction of heat or cooling temperatures loss through the piping.
  2. Elimination of condensation.
  3. Personnel protection by keeping the surface temperature low enough to touch.
  4. Protection of equipment from abrasion or damage from external forced.
  5. Consider the appearance of the pipe, where aesthetics are important.
  6. Reduction of noise from the piping system.

**22 10 00 PLUMBING PIPING****22 11 23 Domestic Water Pumps**

- A. Where the water pressure in the public water main is insufficient to supply the minimum pressure and quantities specified by code, the supply shall be supplemented by a water pressure booster system.
- B. Provide water booster pumps on by-pass for use if primary system fails.
- C. Provide pressure level alarms at all domestic water pumps
- D. Variable flow pressure booster systems shall be provided completely assembled and wired.
- E. For applications with less than 100 pounds per square inch (psi) boost, and flow (as sized by Hunter's curve) of 300 gallons per minute (gpm) or less, specify a duplex close-coupled end-suction booster with variable frequency drive (VFD) controls and a remote mounted 100 to 200 gallon tank. Each pump should be sized for 50 percent capacity minimum, and be trim the impeller to horsepower
- F. For higher flows but still less than 100-psi boost, specify triplex or quadruplex end suction boosters with no more than 300 gpm per pump. For example, a 400-gpm booster should be a triplex with a minimum 133 gpm per pump. A 1,000-gpm booster should be a quadruplex with 250 gpm per pump.
- G. Preferred manufacturers:
  - 1. Grundfos
  - 2. Bell & Gosset
- H. High efficiency pumps shall be specified.

### 22 13 23 Sanitary Waster Interceptors

- A. Interceptors and separators shall be provided to prevent the discharge of oil, grease, sand and other substances harmful or hazardous to the building drainage system, the public sewage treatment plan or processes.
- B. Locate interceptors as close as feasible to the exterior wall of the served area
- C. Waste lines normally receiving grease waste shall be routed through the interceptor
- D. Individual grease interceptor capacity shall be at least 750 gallons, if concrete. Per current DERM FOG requirements if hydro mechanical.
- E. Maximum individual grease interceptor capacity shall not exceed 1,250 gallons, if concrete.

- F. Provide multiple 1,250 gallon capacity interceptors in series for required capacities above 1,250 gallons (if concrete)
- G. Grease Interceptors:
  - 1. Precast concrete
  - 2. Hydro mechanical plastic
- H. Oil Interceptor:
  - 1. Precast concrete
  - 2. Factory fabricated, cast iron or steel body, with removable sediment bucket or strainer, baffles, vents and flow control fitting on inlet.
- I. The interceptors shall intercept substances that have been separated from the waste water, which is then discharged, leaving behind the separated material in the interceptor itself.

#### **22 14 29 Sump Pumps**

- A. Where the drainage system or portions thereof cannot discharge by gravity to the sewer, the drainage shall be collected in a tightly sealed and vented sump and pumped to a gravity sewer or drain.
- B. The sump must be sized to provide adequate holding capacity and to limit the retention period of the waste.
- C. The minimum capacity of the sump must be such that the pumping equipment operates for at least 15 seconds per pumping cycle to prevent short cycling, thereby extending the life of the equipment.
- D. A check valve and full open valve, located on the discharge side of the check valve, shall be installed in the pump or ejector discharge piping between the pump or ejector and the gravity drainage system.
- E. Preferred manufacturer
  - 1. Goulds
- F. The sump pump capacity and head shall be appropriate to anticipate future use requirements.
  - 1. Sump pit shall be not less than 18 inches in diameter and 24 inches deep, unless otherwise approved.

**22 15 00 General Service Compressed-Air Systems**

- A. The compressed air system shall be fabricated of ASTM A53 or A120, Schedule 40 black steel pipe. Black steel pipe installed underground shall be coated with a bitumastic material or other MDC approved material. Above grade piping shall be painted to match the surrounding walls. At the designer's option, copper piping equal to ProPress crimp joint type K underground and L above ground (rated for compressed air use) can be utilized.
- B. The air compressor supplying the compressed air shall be a portable, wheeled, air cooled, single stage compressor with a 20-gallon capacity horizontal receiving tank.
- C. Compressed air outlets with quick disconnects shall be provided in the Technology Education Classroom and the Project Storage Room in accordance with the MDC Educational Specifications.
- D. The walls separating the Project Storage Room and the Audio Studio shall be acoustically treated to reduce sound transmission into the Audio Studio.

**22 40 00 PLUMBING FIXTURES**

## A. General requirements:

## 1. Mount fixtures to the following heights above finish I floor.

## a. Water Closet:

Standard	15	inches to top of bowl rim
Disabled	17-19	inches to top of seat

## b. Water Closet Flush Valve:

Standard	11-1/2	inches above bowl rim
Disabled	11-1/2	inches above bowl rim

## c. Urinal:

Standard	24	inches to top of bowl rim
Disabled	17 Max.	inches to top of bowl rim

## d. Urinal Flush Valve:

Standard	47-54	inches to valve
Disabled	44 Max.	inches to valve

e. Lavatory:

Standard	31	inches to top of basin rim
Disabled	34	inches to top of basin rim

f. Shower Heads:

Standard	79	inches to bottom of head
Disabled	48	inches to bottom of head when provided with separate shower heads

g. Electric Water Cooler:

Standard	30	inches to spout
Disabled	36	inches to spout

B. Plumbing fixture list

1. The following is a partial list of plumbing fixtures and trim recommended for use.

**FOR MDC STANDARDIZATION PURPOSES, USE ONLY THE DESIGNATED I.D. FOR EACH FIXTURE AS SHOWN IN PARENTHESIS.**

2. Acceptable Manufacturers

- a. Kohler
- b. American Standard
- c. Eljer

**(P-1) Urinal**

- 1) Urinal: Wall mounted, blowout, 1-gallon flush, vitreous china, 1-1/4-inch top spud and privacy shields.  
Kohler #K-4972-T “Stanwell”  
American Standard #6601.012 “Lynbrook”
- 2) Flush Valve: Exposed chrome plated, diaphragm type with metal oscillating handle escutcheon, integral screwdriver stops and vacuum breaker.  
Sloan Royal #180-1.0-YB  
Zurn #Z-600 1 -WS- 1





- 3) Sensor operated flush valve: Sloan RESS-U, 1.0 GPF

**(P-1A) Urinal/Disabled**

- 1) Urinal: Wall mounted, blowout, 1-gallon flush, vitreous china, 1-1/4-inch top spud and privacy shields.  
Kohler #K-4972-T “Stanwell”  
American Standard #6601.012 “Lynbrook”
- 2) Flush Valve: Exposed chrome plated, diaphragm type with metal oscillating handle escutcheon, integral screwdriver stops and vacuum breaker.  
Sloan Royal #180-1.0-YB  
Zurn #Z-600 1 -WS- I
- 3) Sensor operated flush valve: Sloan RESS-U, 1.0 GPF

**(P-2) Water Closet**

- 1) Bowl: Floor mounted, siphon jet, 1.5 to 1.6-gallon flush, vitreous china closet bowl with elongated run and 1- 1/2-inch top spud.  
Kohler #K-4350 “Welcomme Lite”  
American Standard #2234.015 “Madera” EL 1.5
- 2) Flush Valve: Exposed chrome plated, diaphragm type with metal oscillating handle, escutcheon, seat bumper, integral screwdriver stops, vacuum breaker and YK pipe support. Sloan Royal #111-YB  
Zurn #Z-6000-WS- I
- 3) Sensor operated flush valve (at all public toilets):  
Sloan Solis RESS - C-1.6/1.1 dual flush.
- 4) Seat: Solid white fire-resistant plastic, open front, self-sustaining hinge, brass bolts and without cover.  
Centoco #500STSCSS  
Olsonite #1OCC/SS/FR

**(P-2A) Water Closet/Disabled**

- 1) Bowl: Floor mounted, siphon jet, 1.5 to 1.6-gallon flush, vitreous china closet bowl with elongated rim and 1- 1/2-inch top spud.  
Kohler #K-4368 “Highcliff Lite”  
American Standard #3043.001 Madera FloWise
- 2) Flush Valve: Exposed chrome plated, diaphragm type with metal oscillating handle, escutcheon, seat bumper, integral screwdriver stops, vacuum breaker and YK pipe support.  
Sloan Royal #111-3-YB  
Zurn #Z-6000-WS- 1

- 3) Sensor operated flush valve (at all public toilets):  
Sloan Solis RESS - C-1.6/1.1 dual flush.
- 4) Seat: Solid white fire-resistant plastic, open front, self-sustaining hinge, brass bolts and without cover.  
Centoco # 500STSCCSS  
Olsonite #1OCC/SS/FR

**(P-4) Lavatory - Cold Water Only (Toilets)**

- 1) Basin: 20 x 18-inch wall hung with floor-mount concealed arm carrier, acid-resisting two holes enameled cast iron lavatory with 4-inch centers.  
Kohler #K-2867 "Hudson"  
American Standard #4869.038 "Regalyn"
- 2) Faucet: Adjustable slow closing push button metering faucet for CW only, 4-inch center, deck plate, 2.0 GPM flow control aerator and internal stream regulator.  
Chicago Faucet #857-669; T & S #B-805
- 3) Supply Riser: 3/8-inch chrome plated angle stop (compression) 5/8 x 3/8 plus supply line 3/8 x 1/2 (16") and escutcheon  
McGuire #158LK
- 4) Grid drain: offset perforated wheelchair lavatory drain assembly with a 1-1/4 in tailpiece  
McGuire #155-WC
- 5) P-Trap: Chrome plated with swivel joint and cleanout.  
McGuire #8872
- 6) Carrier: Steel upright with cast iron arms.  
J.R. Smith #702-M34  
Zurn #Z-1236

**(P-4A) Lavatory/Disabled-Cold Water Only (Toilets)**

- 1) Basin: 20 x 18-inch wall hung with floor-mount concealed arm carrier, acid-resisting, two holes enameled cast iron lavatory with 4-inch centers.  
Kohler #K-2867 "Hudson"  
American Standard #4869.038 "Regalyn"
- 2) Faucet: Adjustable slow closing push button metering faucet for CW only, 4-inch center, deck plate, 2.0 GPM flow control aerator and internal stream regulator.  
Chicago Faucet #857-669; T & S #B-805
- 3) Supply Riser: 3/8-inch chrome plated angle stop (compression) 5/8 x 3/8 plus supply line 3/8 x 1/2 (16") and escutcheon.  
McGuire #158LK

- 4) Grid Drain: Offset perforated wheelchair lavatory drain assembly with a 1-1/4-inch tailpiece  
McGuire #155-WC
- 5) P-Trap: Chrome plated with swivel joint and cleanout.  
McGuire #8872  
Note: P-Trap to be insulated and installed parallel to wall.
- 6) Carrier: Steel upright with cast iron arms.  
Josam 17100-M-628  
Zurn #Z-1236

**(P-5) Lavatory - Hot and Cold Water – In non-student areas except one in each public toilet.**

- 1) Basin: 20-inch x 18-inch wall hung with floor-mount concealed arm carrier, acid-resisting, two-hole enameled cast iron lavatory with 4-inch centers.  
Kohler #K-2867 “Hudson”  
American Standard #4869.038 “Regalyn”
- 2) Faucet: Quarter turn, rear deck mounted fitting for HW and CW with rigid gooseneck spout, 4-inch center, 1.6 GPM vandal resistant flow control aerator and 4-inch wrist blade handles.  
Chicago Faucet #895-GN1-FC-3 17 T&S #B-892
- 3) Supply Riser: 3/8-inch chrome plated angle supply (compression) 5/8 x 3/8 plus supply lines 3/8 x 1/2 (16”) and escutcheons  
McGuire #158LK
- 4) Grid Drain: Offset perforated wheelchair lavatory drain assembly with a 1-1/4-inch tailpiece.  
McGuire #155-WC
- 5) P-Trap: Chrome plated with swivel joint and cleanout.  
McGuire #8872
- 6) Carrier: Steel upright with cast iron arms.  
J.R. Smith #702-M34  
Zurn #-1236

**(P-6) Countertop Lavatory-Cold Water Only (Group Toilets)**

- 1) Basin: 19-inch diameter countertop, self-rimming, enamel cast iron lavatory with 4-inch centers.  
Kohler #K-2905 - 4 “Farmington”  
Another acceptable self-rimming enameled cast iron lavatory
- 2) Faucet: Adjustable slow closing push button mixing faucet, 4-inch center, deck plate, 2.0 GPM flow control aerator and internal stream regulator.  
Chicago Faucet #857-669 T&S #B-805
- 3) Unless otherwise directed, use electronic faucet Sloan Solis Wireless EAF-275 or EAF-27515 in all

- public toilets.
- 4) Supply Riser: 3/8-inch chrome plated angle supply (compression) 5/8 x 3/8 plus supply lines 3/8 x 1/2 (16") and escutcheon  
McGuire #158LK
  - 5) Grid Drain: Offset perforated wheelchair lavatory drain assembly with a 1-1/4-inch tailpiece.  
McGuire #155-A
  - 6) P-Trap: Chrome plated with swivel joint and cleanout.  
McGuire #8872

**(P-7) Three Station Lavatory - Cold Water Only (Group Toilets Only)**

- 1) Three station, barrier free, wall mounted solid surface lavatory with three adjustable slow closing push button metering spray nozzles for CW only, lavatory overflows, contoured stainless steel access panel, 2.0 GPM flow control aerator, combination stop, strainer and check valves.  
Bradley #MG-3/AST "Express"  
Acorn #3773-2-H "Meridian"

**(P-8) Countertop Lavatory - Hot and Cold Water  
In non-student areas except for one in each public toilet**

- 1) Basin: 19-inch diameter countertop, self-rimming, enamel cast iron lavatory with 4-inch centers.
- 2) Kohler #K-2905-4 "Farmington"
- 3) Another acceptable self-rimming enameled cast iron lavatory
- 4) Faucet: Adjustable slow closing push button mixing faucet, 4-inch center, deck plate, 2.0 GPM flow control aerator and internal stream regulator.
- 5) Chicago Faucet #844-669 T&S #B-807
- 6) Supply Riser: 3/8-inch chrome plated angle supply (compression) 5/8 x 3/8 plus supply lines 3/8 x 1/2 (16") and escutcheon.
- 7) McGuire #158LK
- 8) Grid Drain: Offset perforated wheelchair lavatory drain assembly with a 1-1/4-inch tailpiece
- 9) McGuire #155-A.
- 10) P-Trap: Chrome plated with swivel joint and cleanout. McGuire #8872

**3. Wash Fountains – Acceptable Manufacturers**

- a. Bradley
- b. Acorn

**(P-9) Wash fountain - Cold Water Only (Group Toilets)**

- 1) Pre-assembled, three station, barrier free, floor mounted precast terrazzo or molded solid surface material such as Terreon wash fountain with three adjustable slow closing push button metering spray nozzles for CW only, 2.0 GPM flow control aerator, combination stop, strainer and check valves.  
Bradley #WF2504-B  
Acorn #3603

**4. Stainless Steel Sinks – Acceptable Manufacturers**

- a. Just
- b. Elkay

**(P-10) Single Compartment Sink - Cold Water Only  
(Science Classroom 10-foot Work Counter)**

- 1) Bowl: 15-inch x 15-inch single compartment, 20-gauge, Type 302 or 304 stainless steel, steel rim sink with rear deck single faucet hole and sound dampening undercoat.  
Just #SL 1515 AGR  
Elkay #BPSR-15
- 2) Faucet: Quarter turn, rear deck mounted fitting for CW only with rigid gooseneck spout, 1.6 GPM vandal resistant flow control and 4-inch wrist blade handle.  
Chicago Faucet #350-GN2-FC-3 17  
T&S Brass #B-305
- 3) Supply Riser: 3/8-inch chrome plated angle stop (compression) 5/8 x 3/8 plus supply line 3/8 x 1/2 (16") and escutcheon  
McGuire #158LK
- 4) Grid Drain: Chrome plated drain assembly with 1-1/2-inch tailpiece.  
McGuire #152
- 5) P-Trap: Chrome plated with swivel joint and cleanout.  
McGuire #89 12

**(P-11) Single Compartment Sink - Cold Water Only**

- 1) Bowl: 17-inch x 22-inch single compartment, 20-gauge, Type 302 or 304 stainless steel, self-rim sink with rear deck single faucet hole and sound dampening undercoat.  
Just #SL-22 1 7-B-GR  
Elkay #PSR-1722

- 2) Faucet: Quarter turn, rear deck mounted fittings for CW only with rigid gooseneck spout, 1.6 GPM vandal resistant flow control and 4-inch wrist blade handle.  
Chicago Faucet #350-GN2-FC-3 17  
T&S Brass #B-305
- 3) Supply Riser: 3/8-inch chrome plated angle stop (compression) 5/8 x 3/8 plus supply line 3/8 x 1/2 (16"") and escutcheon.  
McGuire #158LK
- 4) Grid Drain: Chrome plated drain assembly with 1- 1/2-inch tailpiece.  
McGuire #152
- 5) P-Trap: Chrome plated with swivel joint and cleanout.  
McGuire #89 12

**(P-12) Single Compartment Sink—Hot and Cold Water (Clinic and Teacher Planning Room)**

- 1) Bowl: 17-inch x 22-inch single compartment, 20-gauge, Type 302 or 304 stainless steel, self-rim sink with rear deck single faucet hole and sound dampening undercoat.  
Just #SL-2217-B-GR  
Elkay #PSR-1722
- 2) Faucet: Quarter turn, rear deck mounted fittings for HW and CW only with rigid gooseneck spout, 1.6 GPM vandal resistant flow control and 4-inch wrist blade handle.  
Chicago Faucet #50-GN2-FC-3 17  
T&S Brass #B-300
- 3) Supply Riser: 3/8-inch chrome plated angle stop (compression) 5/8 x 3/8 plus supply line 3/8 x 1/2 (16"") and escutcheon.  
McGuire #158LK
- 4) Grid Drain: Chrome plated drain assembly with 1-1/2-inch tailpiece.  
McGuire #152
- 5) P-Trap: Chrome plated with swivel joint and cleanout  
McGuire #8912

**(P-13) Single Compartment Sink with Bubbler-Cold Water Only**

- 1) Bowl: 17-inch x 25-inch single compartment, 20-gauge, Type 302 or 304 stainless steel, self-rim sink with single faucet hole a center left ledge and bubbler hole on front right ledge and sound dampening undercoat.  
Just #CRA-1725-B-GR  
Elkay #PSDKR-25 17
- 2) Bubbler: Push-button, self-closing deck mounted angle stop bubbler with drain lip, flow control and

coupling nut.

Chicago Faucet #748-669

T&S Brass approved equal

Note: Bubbler to be within 6 inches of the counter front ledge.

- 3) Faucet: Quarter turn left deck mounted fitting for CW only with rigid gooseneck spout, 1.6GPM vandal resistant flow control and 4" wrist blade handle.  
Chicago Faucet #350-GN2-FC-3 17  
T&S #B-300
- 4) Supply Riser: 3/8-inch chrome plated angle stop (compression) rigid riser, escutcheon (plate and brass chrome plated nipples.)  
McGuire #158LK
- 5) Grid Drain: Chrome plated drain assembly with 1- 1/2-inch tailpiece.  
McGuire #152  
P-Trap: Chrome plated with swivel joint and cleanout.  
McGuire #89 12

**(P-14) Single Compartment Sink - Hot and Cold Water  
(Media Center Production Lab)**

- 1) Bowl: 32-inch x 22-inch single compartment, 20-gauge, type 302 or 304 stainless steel, self-rim sink with rear deck single hole center faucet and sound dampening undercoat.  
Just #SL-2233-B-GR
- 2) Elkay #PSRS-3322
- 3) Faucet: Quarter turn, rear deck mounted fitting for HW and CW with swinging gooseneck spout, 8-inch centers, 1.6 GPM vandal resistant flow control and 4-inch wrist blade handles.  
Chicago Faucet #50-GN2-FC-3 17  
T&S Brass #B 2862 QT
- 4) Supply Riser: 3/8-inch chrome plated angle stop (compression), rigid riser, escutcheon plate and brass chrome plated nipples.  
McGuire #158LK
- 5) Grid Drain: Chrome plated drain assembly with 1-1/2-inch tailpiece.  
McGuire #155A2
- 6) P-Trap: Chrome plated with swivel joint and cleanout.  
McGuire #8912

**(P-15) Double Compartment Sink - Hot and Cold Water (P-15)  
(Music Room/Band Room)**

- 1) Bowl: 32-inch x 22-inch double compartment, 20-gauge, type 302 or 304 stainless steel, self-rim sink with rear deck single hole center faucet and sound dampening undercoat. Just #DL-2233-B-GR  
Elkay #PSR-3322
- 2) Faucet: Quarter turn, rear deck mounted fitting for HW and CW with swinging gooseneck spout, 8-inch centers, 1.6 GPM vandal resistant flow control and 4-inch wrist blade handles.  
Chicago Faucet #50-GN2-FC-3 17  
T&S Brass #B 2862 QT
- 3) Supply Riser: 3/8-inch chrome plated angle stop (compression), rigid riser, escutcheon plate and brass chrome plated nipples.  
McGuire #158LK
- 4) Grid Drain: Chrome plated drain assembly with 1-1/2-inch tailpiece.  
McGuire #155A2
- 5) P-Trap: Chrome plated with swivel joint and cleanout.  
McGuire #89 12

**(P-16) Art Classroom Sink - Hot and Cold Water**

- 1) Bowl: 60-inch x 30-inch x 12-inch custom-made deep single compartment, 18-gauge Type 302 or 304 stainless steel, self-rim sink with single faucet hole and sound dampening undercoat.  
Just #A50493  
Elkay #CUSTOM-CAS-6030 (12" deep)
- 2) Faucet: Quarterturn, deck mounted chrome plated fitting for HW and CW with rigid gooseneck spout, 1.6 GPM vandal resistant flow control and 4-inch wrist blade handles. Chicago Faucet #50-GN2-FC-3 17  
T&S Brass #B-301
- 3) Faucet: Overhead mounted, 1/2-inch male inlet, plain outlet chrome plated fitting for CW with 0.5 GPM vandal resistant laminar flow control and lever handle.  
Chicago Faucet #4 T&S Brass #B-703
- 4) Supply Riser: 3/8-inch chrome plated angle stop (compression), rigid riser, escutcheon plate and brass chrome plated nipples.  
McGuire #158LK
- 5) Grid Drain: Chrome plated drain assembly with 1- 1/2-inch tailpiece. McGuire #152
- 6) Plaster Trap: Steel or painted cast iron solids interceptor with top access, 1/1/2" inlet/outlet threaded connections, removable intercepting screens and sediment bucket.  
Zurn #Z-1 180  
Josam #61030  
J.R. Smith#8710  
Note: Provide removable access panel in cabinet for trap cleaning and removal.



**(P-17) Service Sink-Hot and Cold Water (Art Classroom Patio)**

- 1) Bowl: Nominal 21 x 18 x 12-inch-deep single compartment. 14 gauge. Type 304 stainless steel, wall mounted, seamless welded construction, rounded vertical and horizontal corners, rolled rims, satin luster finish, wall brackets and two faucet holes.  
Just #A 18665  
Elkay #ESSB-2 118
- 2) Faucet: Quarter turn, backsplash mounted chrome plated fitting for HW and CW with swivel goose neck spout, 8-inch center. 1 .6 GPM vandal resistant flow control, internal stream regulator and 4-inch wrist blade handles.  
T&S Brass #B 2862 QT
- 3) Grid drain: Chrome plated drain assembly with 1-1/2-inch tailpiece.  
McGuire #152
- 4) Plaster Trap: Steel or painted cast iron solids interceptor with top access. 1-1/2" inlet/outlet threaded connections removable intercepting screens and sediment bucket.  
Zurn #Z-1180  
Josam #61030  
J.R. Smith #8714

**(P-18) Handwash Sink - Hot and Cold Water (Kitchen Scullery & Food Prep Areas)**

- 1) Bowl: 12 x 9-inch single compartment, 20-gauge type 302 or 304 stainless steel, wall mounted, seamless welded construction, rounded vertical and horizontal corners, satin luster finish with wall brackets, two backsplash faucet holes and sound dampening undercoat.  
Just #A-544  
Elkay #CHS-1716
- 2) Faucet: Quarterturn, backsplash mounted fitting for HW and CW with rigid gooseneck 1.6 GPM vandal resistant flow control and 4-inch wrist blade handles.  
T&S Brass #B-351-4
- 3) Supply Riser: 3/8-inch chrome plated angle stop (compression) rigid riser, escutcheon plate and brass chrome plated nipples.  
McGuire #158LK
- 4) Grid drain: Chrome plated drain assembly with 1-1/2-inch tailpiece  
Elkay #LK-8
- 5) P-Trap: Chrome plated with swivel joint and cleanout.  
McGuire #152

**5. Shower Trim – Acceptable Manufacturers**

- a. Leonard
- b. Powers

**(P-19) Shower/Wall Mounted - Hot and Cold Water**

- 1) Trim: Concealed shower supply with pressure—balanced single—handle mixing valve, diverter, 2.5 GPM flow control and chrome plated fixed vandal resistant standard height and handicap height showerheads.  
Leonard #H-06 Showerhead  
Powers #141-381 Showerhead  
Leonard #LVC-SS Mixing Valve  
Powers #Hydroguard PB410 Mixing Valve  
Leonard #D2L Diverter  
Powers #141-600B Diverter

**(P-19a) Shower/Wall Mounted and Handheld - Hot and Cold Water**

- 1) Trim: Concealed shower supply with pressure-balanced single-handle mixing valve, diverter 2.5 GPM flow control and chrome plated fixed vandal resistant standard height showerhead and handicap handheld showerhead.  
Leonard #H-06 Showerhead  
Powers #141-381 Showerhead  
Leonard #501P Handheld Shower Head  
Powers #141-318 Handheld Shower Head  
Leonard #LVC-SS Mixing Val-,e  
Powers #Hydroguard PB410 Mixing Valve  
Leonard #D2L Diverter  
Powers #141-600B Diverter

**(TM) Thermostatic Mixing Valve**

- 1) Mixing valve rated at 8-10 GPM at 45 PSI differential with check valve, volume control shutoff valve on outlet and strainer stop check on inlet.  
Leonard # TM-554-15  
Powers  
Symmons

**6. Group Showers – Acceptable Manufacturers**

- a. Bradley
- b. Acorn

**(P-20) Group Showers**

- 1) Control valve cabinet: Acorn Model SFMMV in cabinet DRS-PRC.
- 2) Wall mounted Acorn series 110 and 110 ADA with type 5-LVR single temperature lever.

**7. Electric Water Coolers and Drinking Fountains – Acceptable Manufacturers**

- a. Elkay
- b. Oasis

**(P-21) Electric Water Cooler — Building Interior**

- 1) Fountain: Wall mounted, electric water cooler with stainless steel top, heavy-gauge galvanize steel body with standard cabinet finish or vinyl-on-steel and baked enamel finish, elevated anti-squirt bubbler with stream guard, 5 PSI self-closing front and side push bars, automatic stream regulator, mounting bracket, refrigerated with integral air cooled condenser; capacity of 8 gal/hour of 50 degree Of water with inlet at 80 degree F and room temperature of 90 degree F, 1/5 HP compressor.  
Elkay #LVR CGRN8  
Oasis #P8AM

**(P-21A) Electric Water Cooler/Handicap- Building Interior**

- 1) Fountain: Wall mounted, ADA compliant, handicap electric water cooler with stainless steel top, heavy-gauge galvanized steel body with standard cabinet finish or vinyl-on-steel and baked enamel finish, elevated anti-squirt bubbler with stream guard, 5 PSI self-closing front and side push bars, automatic stream regulator, mounting bracket, refrigerated with integral air cooled condenser; capacity of 8 gal/hour of 50 Degree F water with inlet at 80 Degree F and room temperature of 90 Degree F, 1/5HP compressor. Elkay #LVR CGRN8  
Oasis #P8AM

**(P-22) Drinking Fountain - Exterior Wall Mounted/Handicap**

- 1) Fountain: Wall mounted, ADA compliant, dual-height handicap drinking fountain with stainless steel top, stainless steel heavy-gauge steel body with baked enamel finish,

elevated anti-squirt bubbler with stream guard, 5 PSI push bar, automatic stream regulator and mounting bracket.

Haws #1001 HPS

Oasis #MLFMSLPM

**(P-23) Drinking Fountain - Exterior Pedestal Mounted**

- 1) Fountain: Pedestal mounted handicap drinking fountain with stainless steel receptor, reinforced concrete pedestal with exposed aggregate finish, elevated anti-squirt bubbler with stream guard, 5 PSI self-closing push-button, automatic stream regulator and mounting bracket.

Haws #333806 Sunroc **#SF-8200**

**8. Mop Sink - Acceptable Manufacturers**

- a. Fiat
- b. Mustee
- c. Swan

**(P-24) Mop Sink — Hot and Cold Water (Custodial Closet)**

- 1) Basin: 24-inch x 24-inch x 12-inch one-piece terrazzo corner mop sink with 3-inch stainless steel drain body, dome strainer and lint basket.  
Fiat #TSB-100-2424
- 2) Faucet: Chrome plated service faucet with vacuum breaker, integral stops, adjustable wall brace, pail hook, four arm handles, 8-inch centers and 1.6 GPM flow control restrictor. Fiat #830-AA  
T&S Brass #B-665-BSTR
- 3) Trim: 5/8-inch x 30-inch-long plain end cloth reinforced rubber hose, stainless steel mop hanger plate with three rubber mop grips and vinyl bumper guard.  
Fiat #832-AA and 889-C

**9. Emergency Shower/Eyewash - Acceptable Manufacturers**

- a. Speakman

**(P-25) Combination Emergency Shower/Eyewash (P-25)**

- 1) Shower: 8-inch diameter yellow impact-resistant ABS plastic deluge shower head with 1-1/4-inch stay-open ball valve and rigid pull rod.

- 2) Eyewash: 18-3/4-inch x 13-inch stainless steel receptor with 1/2-inch stay-open ball valve, stainless steel push handle, six aerated brass spray heads with converging streams and yellow propylene covers, 1-1/4-inch tailpiece, integral flow control and bowl strainer.  
Speakman #SE-603  
**Note: No Substitutions.**

**(P-26) Emergency Shower**

- 1) Shower: 8-inch diameter yellow impact-resistant ABS plastic deluge shower head with one-inch overhead supply, one-inch stay-open ball valve and rigid pull rod.  
Speakman #SE-220-SCSV  
Note: No substitutions.
- 2) Wall mounted 18 3/4-inch x 13-inch stainless steel receptor with 1/2-inch stay-open ball valve stainless steel push handle, six aerated brass spray heads with converging streams and yellow propylene covers, 1-1/4-inch tailpiece, integral flow control and bowl strainer. Speakman #SE-400.  
**Note: No substitutions. Eyewash waste shall be indirectly connected to the emergency shower floor sink.**

**10. Recessed Wall Drain Receptor - Acceptable Manufacturers**

- a. Guy Gray

**(P-28) Recessed Wall Drain Receptor (Dehumidifier and Washing Machine)**

- 1) 20-gauge watertight receptor with drain and white enamel finish.  
Guy Gray #T-200-LV

**11. Roof Drain - Acceptable Manufacturers**

The following is a partial list of plumbing specialties recommended for use. These items listed are J.R. Smith unless otherwise indicated but can also be Josam or Zurn.

**FOR MDC STANDARDIZATION PURPOSES. USE ONLY THE DESIGNATED I.D. FOR EACH SPECIALTY AS SHOWN IN PARENTHESIS.**

- a. J.R. Smith
- b. Josam
- c. Zurn

**(RD-1) Roof Drain Building**

- 1) ANSI A112.21.2; lacquered cast iron body with sump, removable cast iron dome strainer, membrane flange and membrane clamp with integral gravel stop, adjustable underdeck clamp, no-hub pipe outlet, roof sump receiver and waterproofing flange.  
J.R. Smith #1010-R-Y-C  
Josam #21500-1-1-22-Z  
Zum #Z-100-C-R-NH

**(RD-2) Roof Drain Covered Walkway**

- 1) ANSI A112.21.2; parapet type, cast iron body with shallow sump, removable sloping cast iron grate, flashing clamp, 45-degree side outlet and threaded connection.  
J.R. Smith #1530  
Josam #24710  
Zurn #Z-189

**12. Floor Drain -Acceptable Manufacturers**

- a. J.R. Smith
- b. Josam
- c. Zurn

**(FD-1) Toilets**

- 1) ANSI A112.21.1; Painted cast-iron one-piece no-hub body with drainage flange seepage openings, weep holes, 5 inch round adjustable nickel bronze top, 1/2-inch trap primer connection.  
J.R. Smith #2005A-P  
Josam #30000-AZ  
Zurn #Z-415-B-NH

**(FD-2) Mechanical Room:**

- 1) ANSI A112.21.1; Medium duty painted cast iron no-hub body with sediment bucket, round bar grate top.  
J.R. Smith #2270Y-B  
Josam #32100  
Zurn #Z-551-Y

**(FD-3) Dumpster Area**

- 1) ANSI A112.21.1; Medium duty painted cast iron no-hub body with sediment bucket, round tractor grate top.  
J.R. Smith #2271Y  
Josam #32100-81-TG  
Zurn #Z-556-Y

**13. Trough Drain - Acceptable Manufacturers**

- a. J.R. Smith/ Enviro-Flo
- b. Polydrain

**(FD-4) Kitchen Walk-in Cooler/Freezer Entrance, Dry Storage Room Entrance & Paper Storage Room Entrance**

- 1) 30 inch long, presloped polyethylene or polymer concrete drainage channel with stainless steel rail edges and end caps, 4 inch bottom outlet, slotted stainless steel grate with locking device (J.R. Smith/Enviro-Flo Model #9870-450-SS-LD); All joints sealed with Model #81191 clear permatex silicone rubber.  
J.R. Smith/Enviro-Flo #9930

**14. Floor Sinks - Acceptable Manufacturers**

- a. J.R. Smith
- b. Josam
- c. Zurn

**(FS-1) Kitchen, /Waste Handling Room, Somat Pulper Room, Kitchen Hood Water wash and Cooling Tower**

- 1) ANSI A112.21.1; 8-1/2 inch x 8-1/2 inch x 6 inch deep, 4 inch bottom outlet, painted no-hub cast iron body, flanged receptor with seepage holes, nickel bronze rim and secured grate with sediment bucket; 1/2 inch trap primer connection.  
J.R. Smith #3101Y-P  
Josam #49300-31  
Zurn #ZN-1960-K-T-23

**(FS-3) Emergency Shower**

- 1) ANSI A112.21.1; 10-inch x 10-inch x 6 inch deep, 3 inch bottom outlet, painted no-hub cast iron body, flanged receptor with seepage holes, acid resistant coated interior, nickel bronze rim and secured grate with aluminum sediment bucket: ½ inch trap primer connection.  
J.R. Smith #3101Y-P  
Josam #49300-31  
Zurn #ZN-1960-K-T-23

**15. Cleanouts - Acceptable Manufacturers**

- a. J.R. Smith
- b. Josam
- c. Zurn

**(FCO-1) Floor Cleanout/interior Finished floor Areas**

- 1) ANSI A112.21.1; Painted cast iron two-piece body with round, adjustable secured nickel bronze top with depressed cover to accept floor finish and closure plug.  
J.R. Smith #4020  
Josam #57008-Z-1  
Zurn #ZN-1400-NH

**(FCO-2) Floor Cleanout/Kitchen Finished Floor Areas**

- 1) Painted cast-iron two-piece body with square adjustable, secured, nickel bronze top with depressed cover to accept floor finish and closure plug.  
J.R. Smith #4160  
Josam #57008-Z-1-SQ  
Zurn #ZN-1400-X

**(WCO) Wall Cleanout**

- 1) Bronze threaded plug with stainless steel cover and screw.  
J.R. Smith #4472  
Josam #58540 w/58600  
Zurn #Z-1468



**(GCO-1) Grade Cleanout/Exterior Paved Areas**

- 1) Painted cast iron body with round, adjustable, scoriated cast iron top and non-tilt tractor cover.  
J.R. Smith #4240  
Josam #55000 WF (heavy duty)  
Zurn #Z-1400

**(GCO-2) Grade Cleanout/Exterior Unpaved Areas**

- 1) Painted cast iron body with round adjustable scoriated cast iron top and non-skid cover.  
J.R. Smith #4231  
Josam #58360-Z-C1  
Zurn #Z-1400-NL

**16. Water Hammer Arresters - Acceptable Manufacturers**

- a. J.R. Smith
- b. Josam
- c. Zurn

**(WHA) Water Hammer Arrester**

- 1) ANSI A12.26.1; sized in accordance with PDI WH-201, precharged suitable for operation in temperature range minus 100 to 300 Degree F and maximum 250 psig working pressure, stainless steel construction.  
J.R. Smith Series 5000  
Josam Series 75000  
Zurn "Shoktrol" Series Z1700

**17. Wall Hydrant - Acceptable Manufacturers**

- a. J.R. Smith
- b. Josam
- c. Zurn

**(WH-I) Wall Hydrant (Building Interior and Exterior and all parking garages)**

- 1) ANSI/ASSE 1011; vandal-proof cast bronze, recessed stainless steel box, mild-climate wall hydrant with satin face, self-opening locking cover removable key, 3/4-inch HPT outlet, integral vacuum breaker;

backflow preventer. Provide protection screw to avoid theft of vacuum breaker.  
J.R. Smith #5509QT-SAP  
Josam #7100-10  
Zurn #Z-1320

**18. Hose Bibb (all hose bibbs must be provided with vacuum breakers) - Acceptable Manufacturers**

- a. J.R. Smith
- b. Josam
- c. Zurn
- d. T&S Brass

**(HB) Hose Bibb (Mechanical Room Only)**

- 1) ANSI/ASSE 1011; cast bronze hose bibb with replaceable hexagonal disc, 3/4-inch HPT outlet, vacuum breaker.  
J.R. Smith #5609QT-SAP  
Josam #7 1070  
Zurn #Z-1310  
T&S Brass #B-730

**19. Trap Primer - Acceptable Manufacturers**

- a. J.R. Smith
- b. Josam
- c. Zurn

**(TP) Trap Primer**

- 1) Automatic 1/2-inch trap primer systems for all interior floor drains and floor sinks.  
J.R. Smith Series 2699 Josam #88250  
Zurn #Z-I022

**Note: Trap primers shall be connected to the water closet flush valves. Should water closet not be available, connection shall be made to lavatories or water piping.**

**22 60 00 GAS AND VACUUM SYSTEMS FOR LABORATORY, HEALTHCARE AND FOOD SERVICE FACILITIES**

- A. Ensure any gas system at a facility can be easily located.
- B. Should LP gas be used in lieu of natural gas, the Contractor shall be responsible for furnishing and installing the LP tank. The tank shall be installed underground and properly anchored to prevent hydraulic uplift. Installation of tanks above grade shall require review by the MDC Facilities Department Design & Support Section and, if approved, shall be provided with a chain link fence enclosure.
- C. The gas system piping shall be fabricated of ASTM A53 or A120, Schedule 40 black steel pipe and shall not be installed less than 18 inches below grade. Black steel pipe installed underground shall be coated with a bitumastic material or other MDC approved method. Joints shall be welded or brazed with lead-free solder. At the designer's option, copper piping equal to ProPress crimp joint type K underground and L above ground (rated for gas use) can be utilized.
- D. Avoid running gas piping under concrete slabs at all times. If approved, install the carrier pipe in a welded black steel pipe sleeve sealed at one end and vented to the outside at the other end. The pipe sleeve should be at least two and one-half to three pipe sizes larger than carrier pipe, but not less than 2 inches for a 3/4 inch gas pipe. NEVER embed piping in concrete.
- E. Gas supply pipe mains SHALL NOT be installed in, above or across interior corridors or stairwells. As an example, gas supply pipe mains running through or passing across an interior corridor SHALL NOT be approved. Gas supply branch piping shall be approved to run across interior corridors only as a last resort if it is installed in a pipe sleeve which in turn is contained or enclosed in a one-hour fire-rated gypsum board enclosure within the confines of the corridor.
- F. A gas supply branch connected upstream of the building gas supply main solenoid valve shall be installed to provide uninterrupted gas supply to the emergency generator should it be gas-fired.
- G. The kitchen or other high use areas shall be provided with a commercial grade gas-fired water heater such as Model #GNR I60-075-DF-9 as manufactured by Lochinvar (or similar by AO Smith.) Gas-fired heaters shall always be the first option and, when selected, shall be located in a one-hour fire-rated room located on the building perimeter and equipped with an exterior door. Should gas not be available at the site, an electric water heater shall be permitted such as Model #HS36-082 as manufactured by Lochinvar, or similar by AO Smith.
- H. For natural gas, the exterior above grade building gas supply main entering the building and containing the gas

meter, pressure regulator, manual shutoff valve, etc. shall be provided with a weatherproof, normally closed, lever-operated manual reset solenoid valve. The entire assembly shall be enclosed inside a vandal proof, ventilated steel cage housing under lock and key. Should the building fire alarm system be activated, the building gas supply main solenoid valve shall close and cutoff any further supply of gas into the building.

- I. All gas solenoid valves whether used for the gas supply main at the point of delivery to the building or the science classroom demo tables shall be 120 Volt normally closed, lever-operated manual reset electric solenoid valves. Automatic reset type solenoid valves are PROHIBITED.
- J. In Science Classrooms and the Science Material Storage/Preparation Area, provide a 120 Volt normally closed, lever-operated manually reset electric solenoid valve on the main gas supply piping to all tables along with one lockable type quarter turn butterfly valve on each table. The lockable type quarter turn butterfly valve shall be used by the teacher to shut-off the gas supply to the demonstration table, student worktables and the fume hood at the end of each day. In addition, provide one manual quarter turn butterfly valve on the pipe branch located inside the demo table that supplies gas to the student work tables. This valve shall be used to shut-off the gas supply to the student work tables at the discretion of the teacher.
- K. In Science Classrooms and the Science Material Storage/Preparation Area, the demo table gas solenoid valve will be de-energized by activating a red ON/OFF mushroom button located behind the demo table, which will simultaneously shut off the gas and electricity (except the classroom lights) to the student work tables and the fume hood at the discretion of teacher. It shall not be directly wired to the building fire alarm system but shall be de-energized when the fire alarm system is activated. For example, activation of the red mushroom button shall not activate the building fire alarm system...but activation of the building fire alarm system shall de-energize the demo table gas solenoid valve via a set of contacts. In the Science Material Storage/Preparation Area, the red mushroom button shall be centrally located so that it serves the same purpose. All other electrical circuits shall be wired separately. The hot and cold-water supplies under the demo table shall also be equipped with manual quarter turn butterfly valves for shutoff purposes.
- L. In addition, a manual valve will be provided to each instructional space provided with gas at the point of entry into the space.
- M. All gas lines feeding equipment located under an NFPA 96 kitchen hood shall be directly connected to the fire alarm system of the building.
- N. All fume hoods shall be provided with one gas and one cold water connection at each end.

**NOTE: This division of the design criteria shall be included as part of Project Manual in the Construction and**

Contract Documents.

END OF DIVISION

**23 00 00 HVAC**

**23 01 00 GENERAL**

- A. Comply with the latest editions of the Florida Building Code, Florida Fire Prevention Code and all other required Codes and regulations.
- B. HVAC system design, equipment selection and energy conservation shall meet the requirements of this section, the latest editions of the Florida Building Code (FBC) and its supplements, Florida Mechanical Code, Florida Plumbing Code, ASHRAE 62.1 Guidelines for Ventilation Rates, and ASHRAE 90.1, For Energy Efficiency, NFPA, Chapter 64E-11 (Food Hygiene) of the Florida Administrative Code, American with Disabilities Act Accessible Guidelines (ADAAG), Florida Department of Environmental Protection Guidelines (DEP), Florida Department of Environmental Resources Management (DERM) Florida Department of Transportation (FDOT), United States Environmental Protection Agency Guidelines (EPA) and the American Society of Civil Engineers (ASCE) (revision specified by the applicable FBC).2
- C. The installation of the Mechanical systems shall comply with the manufacturer’s recommendations for installation and service clearances required, the latest edition of Design and application guidelines of the Industrial Ventilation Manual, ASHRAE, SMACNA, ASCE, ASME, ASPE and other industry accepted standards.
- D. The efficiency and energy performance of the system shall meet or exceed the requirements set forth in ASHRAE Standard 90.1 and the Florida Building Code (Energy). This shall be clearly shown on the construction documents.
- E. The volume of ventilation air for a space shall be in accordance with latest edition of ASHRAE Standard 62.1. In existing areas to be remodeled, utilize bipolar ionization to reduce outside air quantities, without the need to increase the equipment capacity, nor the need to increase the size of the mechanical rooms. In new construction, all projects shall comply with latest applicable standard of the U. S. Green Building Council and shall achieve LEED Silver certification. Bipolar ionization and UV technology should be utilized. Whichever procedure is used, it shall be clearly shown on the Construction Documents.
- F. A copy of the heat gain calculations, a copy of the Florida Energy Efficiency Code calculations, for Building Construction (FEEC), and a copy of the Life Cycle cost Analysis (LCCA) shall be prepared by the Engineer of Record and provided to the MDC Facilities Management Department or review. Data shall be submitted in an 8-1/2”x 11” binder, titled “HVAC Calculations”, and shall include the project name, project number and date.

**DIVISION 23**

**HVAC**

**This section contains the following:**

- 23 01 00 GENERAL**
- 23 08 00 HVAC Commissioning
- 23 09 00 Instrumentation and Control for HVAC
- 23 09 23 Direct Digital Control System for HVAC
- 23 20 00 HVAC PIPING AND PUMPS**
- 23 30 00 HVAC AIR DISTRIBUTION**
- 23 31 00 HVAC Ducts and Casing
- 23 34 00 HVAC Fans
- 23 60 00 CENTRAL COOLING EQUIPMENT**
- 23 64 00 Package Water Chillers
- 23 65 00 Cooling Towers

*(Continues)*



Calculations shall include the full load and partial load psychrometric analysis and charts for the cooling coil sections. The HVAC heat gain calculations shall be performed using the outdoor design parameters as indicated in the ASHRAE Fundamentals Manual (1% summer – both design cooling and dehumidification shall be considered, and 99% winter), and the following design parameters:

G. Summer Design Parameters

1. Classrooms, Libraries, Offices, Laboratories, Auditoriums - Indoor Design = 72 – 73 degrees Fahrenheit db and 40-60% RH
2. Corridors, Gymnasiums, Lobbies, Restrooms, Changing Rooms, Kitchens – Indoor Design = 76°F db and 40-60% RH.
3. Mechanical Rooms, Storage Rooms, Custodial – Indoor Design = 80°F and 60% RH.  
Occupied mode set points:
  - a. Temperature 72-73 o F b. Relative humidity 40% to 60% c. 1200 ppm CO2  
Unoccupied mode set point :
  - b. Temperature 78 o F b. Relative humidity 40% to 60% c. Minimum CFM, and associated ppm CO2, needed to maintain positive building pressure.  
Note. If unoccupied mode set points are exceeded BAS control sequence is to activate HVAC system to bring parameter within set point range.

H. Winter Design Parameters

1. Indoor Design 68 Degree F db

I. General Design Parameters

1. Daily Range= 15 Degree F db
2. Atmosphere Clearness factor = 0.90
3. Lighting Heat Gain = 1.5 W/SF unless installed lighting is substantially lower
4. Occupant Heat Gain = 250 BTUH Sensible & 200 BTUH Latent (adjusted as appropriate for activity level)
5. Facility Occupant Hours = 7:00 AM to 11:00 PM Monday thru Saturday.

- J. The Architect/Engineer (A/E) of record shall be responsible for notifying MDC Facilities Management Department’s Project Manager assigned to the project, as to when the air conditioning system is fully operational and ready for the Test & Balance procedure. The (A/E) of record, thru the General Contractor, shall verify with the contractor, prior to notifying MDC, that all dampers are fully functional over the entire range of movement, that all rotational equipment turns in the correct direction, that motor voltages are verified and that controls are correctly

<b>23 70 00</b>	<b>CENTRAL HVAC EQUIPMENT</b>
23 72 00	Air-to-Air Energy Recovery Equipment
<b>23 80 00</b>	<b>DECENTRALIZED HVAC EQUIPMENT</b>

connected and operational. In the event that the Test & Balance cannot be completed due to conflicts with the operation of the installed equipment or systems, the contractor shall be liable for the cost of any additional labor to complete the Test & Balance for renovation and remodeling projects, T&B shall be performed pre-construction and post renovation/remodeling construction. Both shall be done by an independent licensed T&B contractor.

- K. In addition to contractually required deliverables, the AE will provide, and require the contractor to update, an Excel spreadsheet listing all major pieces of equipment (chillers, pumps, fans, air handlers, ERVs, VAVs, cooling towers, DX systems, and any and all equipment that requires routine and preventive maintenance, in a format that can be easily imported into FM Systems Interact. This shall be closely coordinated and approved by MDC Facilities Management – Planning Section.
- L. Installation of rooftop equipment shall not be permitted. This includes rooftop air conditioning package units, ducts, piping and conduit. Exceptions are rooftop exhaust fans, air intake hoods; DX split system air condenser units in areas such as the media center, data processing rooms, telecommunications equipment rooms, kitchen, graphic arts, kiln, chemical storage room, chemical classroom, flammable storage, fume hoods, welding hoods and other special ventilation systems. When the installation of rooftop equipment or piping is unavoidable, permission and a written waiver shall be requested from the MDC Facilities Management Department. Upon approval, a clearance of not less than 18” or as required by the Florida Building Code shall be provided under the equipment (if no curb is furnished) or piping shall be provided for roof maintenance.
- M. All equipment located outdoors (roof or otherwise) shall be anchored to sustain hurricane force winds as outlined in the FBC. Details of the method of anchoring shall be provided on the mechanical drawings and detailed on the structural drawings. Equipment shall be certified for wind resistance in accordance with the FBC (Miami-Dade County interpretation).
- N. Do not install any HVAC or plumbing piping inside the block cores of exterior walls. Install only in furred walls.
- O. Ensure positive pressure in ALL areas except in kitchens, labs, toilets, custodian rooms, laboratories in relation to their adjacent spaces, etc. Pressurization shall be calculated by EOR and clearly shown on plans. Show CFM values on all supply, return, and outside air openings on the plans so that they can be properly balanced.
- P. Noise levels due to air conditioning unit fan, ventilating equipment, ducts, grilles, diffusers and air system pressure reducing devices shall conform to the RC Noise Rating Procedure outlined in ASHRAE HVAC Applications Handbook. Classrooms and all spaces, other than those listed below, shall be designed for a maximum noise criteria level of RC-30 (N). The exceptions shall be:



Corridor, Lobbies	RC-40(N)	Chiller Rooms	RC-60(N)
Storage, Toilets, Custodial	RC-45(N)	Mechanical Rooms	RC-45(N)
Gymnasium	RC-45(N)	Kitchens	RC-40(N)

Should the noise levels exceed those listed above, internally baffled duct silencers installed on all supply air discharge ducts or other MDC approved sound attenuation methods, for reducing the noise levels to the values shown above, shall be provided. Exterior installed air-cooled chillers, emergency generators, pumps, cooling towers and accessories shall be designed so that the noise levels do not exceed the noise recommendation of 55 dB at the property line or be transmitted to an adjacent classroom.

- Q. Provide an aesthetically pleasing and sound attenuating concrete masonry unit (CMU) enclosure around exterior HVAC equipment such as cooling towers, air-cooled chillers, etc. in lieu of using chain link fencing. Special attention and consideration shall be provided when air-cooled chillers are to be located adjacent to residential areas. Noise levels generated by this and other equipment shall not exceed 55 dB at the property line (or as required by more stringent local ordinances).
- R. Unless otherwise specified, when selecting either HVAC, plumbing or other mechanical equipment, MINIMUM OF THREE manufacturers complete with selected series types shall be provided in the specifications.
- S. All pumps shall be of the centrifugal type and shall be selected with the correct impeller for the application intended. Pump motors shall be non-overloading over entire operational range. Provide dual pumps with each pump having 100% redundancy for all air conditioning systems. Pumps shall be provided with a VFD with 3 contactor full bypass and H-O-A switch for manual or automatic operation. All pump motors shall be of high efficiency type and Energy Star Rated. Pumps shall be primary/secondary and in some areas tertiary (depending on the campus and facility.) Valves to be 2 way except for end-of-line to be 3 way. All pumps shall have VFDs (with bypass) whether variable speed or not – in constant flow applications, VFDs shall be utilized for balancing and soft start; throttling of pumps is not permitted. All pumps shall be horizontal mounting type. Vertical mounted pumps are not acceptable.
- T. In existing facilities requiring remodeling, renovation and/or additions, the following requirements shall be adhered to by the Project Consultant in order to ensure that final construction documents are correct and brought up to date.
  - 1. Field Verification shall be performed by the Project Consultant. **This is a Mandatory requirement.** The Project Consultant shall verify all existing conditions to ensure the feasibility of construction in order to ensure that the work can be performed in a timely manner and to prevent conflicts and/or delays in the field during construction.
  - 2. A complete set of demolition plans for areas within the scope-of-work shall be provided as part of the



construction documents. Demolition plans shall include the specifications for ALL mechanical equipment, whether the equipment and systems are to remain, to be removed or to be reused. Equipment and systems such as HVAC air handling units (AHU's), ductwork, ductwork sizes including CFM values for the entire system and each outlet and inlet, exhaust fans, size of natural or propane gas piping system sanitary system, storm drain system, domestic water system plumbing fixtures, etc. shall be shown on drawings. Notations such as "EXISTING TO REMAIN" are insufficient and will not be acceptable.

3. A complete updated set of remodeled or renovated plans for areas within the scope-of-work shall be provide and shall include all new mechanical equipment such as HVAC AHU's, ductwork, ductwork sizes including CFM values, exhaust fans, natural or propane gas system, sanitary system, storm drain system, domestic water system, plumbing fixtures, etc. Plans shall also include the new plumbing fixture count (fixture units) being added to the existing sanitary system. Should the existing HVAC system be extended to serve new areas, the AHU and all air distribution terminal devices serving areas other than those in the scope-of-work, but on the same HVAC system, shall also be properly shown on the drawings and rebalanced. The entire system along with the new CFM and GPM values shall be shown on the plans. All new supply and return ductwork, 12" and larger, shall be shown, in double line format on drawings, scaled to exact size. Single line ducts will not be accepted.
- U. All existing HVAC equipment to be reused, in existing facilities requiring renovation work, shall be shown on equipment schedules on the plans by the Project Consultant. The existing HVAC controls, including the VAV boxes and thermostats shall be upgraded to Direct Digital Controls (DDC), to satisfy the life safety code and energy conservation requirements. All existing equipment, electrical data and capacities shall be listed so that proper testing and balancing can be performed. In addition, the Contractor shall provide a maintenance schedule describing all cleaning and repair work to be performed for the new systems.
- V. All existing ductwork, piping, pneumatic controls, pneumatic thermostats, HVAC diffusers, radiant heat panels, etc., that are not to be re-used, shall be disconnected, removed and discarded by the contractor.
- W. In existing facilities requiring renovations and/or additions, all new HVAC equipment shall be tagged and identified in a sequential numerical format in coordination with the existing HVAC equipment so as not to repeat AHU numbers, exhaust fan numbers, etc. In new facilities, all new HVAC equipment shall be tagged and identified in a sequential numerical format. Areas served by the HVAC equipment shall also be provided such as AHU-1/ Media Center, AHU-2/Multipurpose Room, etc.
- X. All new and refurbished equipment, i.e., Chillers, AHU's. Pumps, Exhaust Fans, DX systems, Cooling Towers, etc., that require routine and preventive maintenance shall be listed in an excel spreadsheet with specific information as required by MDC Facilities Planning department. This information shall be formatted such that it can be readily and effortlessly imported to the MDC Facilities Management Software FM systems.

- Y. The LCCA provided must compare the most LCC effective equipment selection to the minimum requirement showing equipment and installation cost, utility incentive dollar amount, operating and maintenance cost during life of equipment with the net Life Cycle Savings that result from the design selection versus the minimum requirement.
- Z. All HVAC installations must provide a seamless integration into existing BAS/BMS systems. Direct coordination must be required between contractors and Johnson Controls JCI Metasys, South Florida Controls, Inc. (SFC), for Delta Controls, and Trane for Trane ES control systems. The contract documents shall request the contractors to obtain proposals and include the quotes from the control's vendors and list them as separate line items in their proposals.

### 23 08 00 HVAC Commissioning

- A. The Designer shall provide to the owner, TAB contractor and the BAS Contractor:
  - 1. The Owner's Project Requirements
  - 2. MEP Design Intent Document
  - 3. Basis of Design Report
- B. Contractor's responsibility:
  - 1. Completely install and thoroughly inspect, start up, test, adjust, balance and document all systems and equipment
  - 2. Assist commissioning agent in performing verification and performance testing.
  - 3. Provide a BAS technician to work with commissioning agent and at his/her direction
- C. BAS commissioning agent shall provide the following:
  - 1. All required instrumentation
  - 2. Inspect all devices
  - 3. Verify proper electrical voltages and check circuits.
  - 4. Coordinate with controls sub to obtain all settings.
  - 5. Test, calibrate and set all digital and analog devices
  - 6. Submit startup report
  - 7. Check for leaks, proper operation of all valves.
  - 8. Complete demonstration of all systems
  - 9. Verify trend log.
  - 10. Review and provide all operator training and O & M Manuals.

11. Training of all systems.

### **23 09 00 Instrumentation and Control for HVAC (Variable Frequency Drives)**

- A. Provide properly sized variable speed equipment for all pumps, air handling units, exhaust and supply fans, cooling towers etc. and as discussed with MDC Facilities. VFDs, where utilized for chillers, shall be supplied by the chiller manufacturer.
- B. Provide all VFDs with mains disconnected switch, drive fusing, integral 3 contactor full bypass switch and rated for 100kA SCCR in a proper UL rated enclosure for the particular application. Include an LCP display, BACnet MS/TP serial communication to fully and seamlessly integrated with the MDC Facilities Management BMS system.
- C. VFDs shall include EMI and RFI filtering to meet EN 61800-3 standards and a 5%-line reactor or dual DC link reactors to minimize harmonics. The point of coupling by IEEE 519-2014 Recommended Standards, is the secondary side of the building transformers or the common point where the linear and non-linear loads connect. Individual voltage harmonics to be less than 5% and Total Harmonic Distortion less than 8% TDD.
- D. Approved variable speed drive motor manufacturers shall be ABB, Trane, Danfoss or with pre-approval from MDC Facilities Management, an approved equal.
- E. VFDs shall include a six (6) year parts and labor warranty. Or 5 years above and beyond factory one year warranty.

### **23 09 23 Direct-Digital Control System for HVAC**

- A. Performance Guidelines
  - 1. List controls functions such as start-stop, chiller plant optimization, interlocks, sensors, OA modulations, BacNet compatibility
  - 2. Define minimum number of points to be monitored and controlled
  - 3. Specify all controls components: sensors, actuators, field panels, communications protocol
  - 4. Require contractor documentation of control sequence, points list and all parameters.
  - 5. Define required graphics
  - 6. Define all alarm capability and notification options
  - 7. Define basic reports required with ability to create custom reports
  - 8. Required service response time and preventative maintenance schedule

**B. Contractor's required qualifications:**

1. Provide equipment from one of the following: Delta Controls, Trane Company, Johnson Controls-Metasys (or college preapproved vendor).
2. The only MDC approved BAS installing contractors are: BOS/South Florida Controls for Delta Controls system, Trane Company for Trane Controls (Tracer) System, Johnson Controls for Johnson Controls Metasys System, DCI for Johnson Controls Metasys System or college preapproved vendor.
3. Vendors shall provide maximum 3-hour response time when notified of a need for service and shall provide a routine preventive maintenance schedule consisting of one annual and three quarterly inspections.

**C. Parameters as to use / brand**

1. BAS to be bid as a separate discipline, not within any other trade. BAS sub to be directly hired by general contractor. A separate line item shall be listed for Bas/HVAC controls
2. Controls system for any new facility or for any existing building that is being retrofitted shall be designed to be fully compatible with the BAS system already existing on each campus. Provide seamless coordination
3. There shall be no standalone DDC system in any new project.
4. All new DDC systems must follow the network nomenclature scheme for individual addresses, as provided by MDC.
5. All new DDC systems must be fully integrated into one or all of the MDC BAS servers by one of the college's BAS approved integrators.
6. The only MDC approved BAS integrators are: BOS/South Florida Controls, DCI, Trane Company or college preapproved vendor
7. Check for leaks, proper operation of all valves.
8. All room thermostats or controllers shall have a locking cover
9. Complete demonstration of all systems
10. Verify trend log.
11. Review and provide all operator training and O & M Manuals.
12. Training of all systems.

**23 20 00 HVAC PIPING AND PUMPS**

- A. New CHW and condenser water chemical treatment systems for chillers shall be furnished installed and maintained by the Current Water Treatment Service Provider for MDC Facilities Management Department. The A/E consultant shall confer with the MDC Facilities Management Department, and the MDC water treatment service provider, for specific infrastructure requirements related to electrical utilities and the required piping connections. The Contractor shall be responsible for furnishing and installing the chemical pot feeder for the CHW system.

- B. Provision shall be made by the Contractor for furnishing and installing the chemical pot feeder and installation of the electrical services and required piping connections. The electrical services shall include a 120 Volt dedicated service to the water treatment system and a 120 Volt hookup to the solenoid for bleeding purposes.
- C. Only schedule 40 black steel pipes with welded joints and dielectric fittings at points of connections to dissimilar metals shall be approved for the chilled water (CHW) and condenser water (CW) main piping. Above ground chilled water piping runouts to the individual AHU of sizes 2 inches and smaller may be Type “L” copper not to exceed 20 feet in length. Usage of PVC pipe for the chilled and condenser water piping is PROHIBITED with the sole exception of the above ground condenser water connection to the cooling tower, which SHALL BE PVC schedule 80 with UV treatment. Black steel pipe installed underground shall be coated with a bitumastic material.
- D. Size piping with diameters larger than 2” at 4ft water head pressure loss per 100ft of piping. Larger pipe velocity shall not exceed 4ft/sec. Pipe velocities shall not exceed 8ft/second underground and 6 feet per second above grade.
- E. All CAV chilled water coils shall be provided with a two way, modulating chilled water valve in order to maintain a wet coil so as to dehumidify at all times. VAV chilled water coils shall be provided with a two-way modulating valve. Constant volume chilled water flow systems require prior written approval from the MDC Facilities Management Department and shall utilize three-way valves.
- F. Upon installation and after pressure testing, the chilled water and condenser water piping shall be flushed with water in order to remove sand and other foreign contaminants. The A/E Consultant shall include in their specifications that it is Mandatory that all the pipe ends shall be temporarily sealed with plastic sheeting and duct tape and remain empty of any water after pressure testing until the final pipe connections are complete.
- G. Underground chilled water and condenser water piping shall not be installed less than 24 inches below grade, nor under foundations or footings.
- H. Upon completion of the chilled water and condenser water piping installation and prior to insulating the basket strainers, the Contractor shall flush the piping systems with water in order to remove sand and other foreign contaminants. The strainers shall be removed, cleaned and re-installed during this cleaning procedure. The chilled water and condenser water piping shall be chemically cleaned by the Contractor in order to remove mill slag, dirt oil and/or other foreign contaminants. The strainers shall then be removed again, cleaned and reinstalled. Upon completion, the chilled water and condenser water piping shall be drained, flushed and a nitrite solution shall be applied to prevent pipe oxidation. The Contractor shall then contact the MDC Facilities Management Department, for verification of the water quality and strainer cleaning. Upon acceptance, the MDC Facilities Management Department’s water treatment service provider shall furnish, install and maintain the water

chemical treatment system.

- I. 125 PSI W.O.G. Mueller Model 91 AP or Nibco Model F-910 flanged silent check valves are MDC standards for the chilled water system.
- J. When field-insulating the black steel chilled water piping, in both the building interior and exterior spaces, two-piece pre-formed foam glass insulation such as Foam-glass as manufactured by Pittsburgh Corning with Pittwrap CW jacket for underground piping shall be used. The use of factory pre-insulated polyurethane foam black steel pipe with extruded PVC or high-density polyethylene jacket such as manufactured by Thermacor, Perma-Pipe, Accutherm or Insul-Tec, is approved for Exterior underground piping only. Fiberglass insulation will not be approved.
- K. Details of the underground chilled water and condenser water pipe anchors, sleeves and expansion loops or joints shall be shown on the plans.
- L. The use of underground chilled or condenser water shutoff valves in valve boxes is Prohibited. Install the valves inside buildings in areas such as the mechanical rooms, in an accessible location, and properly identified.
- M. When an air handling unit or pump is being replaced, replace all valves, strainers and other appurtenances as well.
- N. Water treatment for chilled and condenser water must be provided by the contractor and must be contracted directly from the approved MDC provider. Obtain information as to current provider from the MDC dedicated water treatment specialist, Garratt Callahan.

## 23 30 00 HVAC AIR DISTRIBUTION

### 23 31 00 HVAC Ducts and Casings

#### A. Ductwork:

- 1. The supply, return and outside air ductwork shall be fabricated of galvanized steel in compliance with SMACNA “HVAC Duct Construction Standards Metal and Flexible”. The use of fiberglass duct board for duct construction or exposed fiberglass duct liner is Prohibited in all existing and new facilities. The first twenty (20) feet downstream of an air handling unit shall be double wall acoustically lined K rated perforated ductwork.



2. Exhaust ductwork shall be fabricated of galvanized steel except for specialty exhaust systems such as the shower area exhaust (aluminum), kitchen hood exhaust (black steel), fume hoods and dishwasher exhaust (stainless steel) etc. Outside air ductwork shall be minimum 18 gauge and shall be externally insulated.
3. In order to attenuate sound and for flexibility, use UL 181 Class 1 commercial grade insulated flexible duct to connect the supply air diffusers and return air grilles to the supply and return air distribution duct. Flexible duct shall have a minimum R-value of 6.0 and be constructed of an aluminum foil laminate inner core liner encapsulating a steel wire helix, factory installed high density fiberglass blanket insulation and a metalized reinforced vapor barrier jacket similar to Omniair Series 1200, Thermaflex MXE or Flexmaster Type 5M. Hard duct drops should only be used when there are no ceilings or as a last option in designs containing ceilings.
4. Flexible duct shall be one-piece and cut as short as possible but Shall not exceed 8 feet in length and shall not be installed so that it lies on the ceiling or is kinked. Spliced duct is Prohibited. Size flexible ducts to a 0.04" / 100 ft pressure drop. Provide balancing dampers in the rigid take off at main trunk.
5. The supply air duct shall be fully insulated as well as return air ducts located in unconditioned spaces or in mechanical rooms. Return air ducts located above ceilings of conditioned spaces may be left uninsulated if the ceiling space is used to relief excess conditioned air from the conditioned spaces. The exhaust and outside air ducts shall be uninsulated. Supply air duct insulation and return air duct insulation (when required) in concealed areas shall be fiberglass blanket insulation.
6. The supply and return air ducts shall be provided with 45-degree shoetaps and lockable volume dampers. Should 45-degree branch takeoffs (shoetaps) not be appropriate, two-piece round bellmouth takeoffs with volume dampers such as manufactured by Buckley will be acceptable only after review and approval in writing by the MDC Facilities Management Department. The use of any other 90-degree branch take off is prohibited. Provide access panels below manual volume dampers on all non-removable ceilings.
7. Utilize double thickness turning vanes at all elbows.
8. Provide dampers on terminal devices for balancing purposes only when the branch duct serving the device cannot be provided with a manual, lockable, balancing damper.
9. Smoke detectors are required on both the supply and return air of the AHU units. The supply air smoke detector shall be installed in the ductwork upstream of the unit discharge but before the duct heater. The return air smoke detector shall be installed in the ductwork before the outside air intake.
10. Duct sealers such as mastic shall be water-based, fire resistive, non-toxic and compatible with mating materials. Under no circumstances shall the use of petroleum-based products be permitted for duct or insulation sealant or adhesive purposes. Mastic sealant shall be applied to all duct transverse joints and longitudinal seams.
11. HVAC or exhaust ducts shall not be supported from joist cross and lateral bracing or from galvanized steel decking.
12. After installation and prior to test and balance, the duct system shall be cleaned by forcing high velocity air through it to remove the accumulated construction dust. To obtain sufficient air, half the system should be cleaned at a time, dependent on the system size. Equipment that may be subject to damage from excessive dust or dirt shall be protected with construction filters or bypassed during cleaning. Duct cleaning shall be



- performed by a Florida Licensed, professional Duct Cleaning company.
13. For grid type ceilings, the supply air diffusers shall be 2'x 2' lay-in aluminum louvered types with round necks similar to the Titus TDC-AA, Metalaire Series 5000 or Price AMD. Return air grilles shall be aluminum hinged, louvered, eggcrate or perforated types provided without filters similar to the Titus #350FF or Titus #50FF, respectively. The top panel of the Supply Air (SA) diffuser above the ceiling shall be fully insulated to prevent condensation. The use of perforated type diffusers for supply air is Prohibited.
  14. For plastered ceilings such as in the kitchen, the supply air diffusers shall be surface mount, aluminum louvered type similar to the Titus TDC-AA, Metalaire Series 5000 or Price AMD. Return air grilles shall be aluminum hinged, louvered types provided without filters similar to the Titus #350FF or the Titus 50FF. The top panel of both the supply air diffusers and the return air grilles above the ceiling shall be fully insulated to prevent condensation. The use of perforated type diffusers for supply air is Prohibited.
  15. Exposed ductwork shall be approved by MDC Facilities Management Department on a case by case basis. When approved, all exposed air conditioning ductwork shall be manufactured from galvanized sheet steel suitable for painting. All exposed duct shall be either round or flat-oval, double wall type. Exposed rectangular or flexible duct of any kind are Prohibited.
  16. Variable volume boxes shall be DDC controlled and double wall, not internally lined.

### 23 34 00 HVAC Fans

- A. In building perimeter toilets and custodian rooms, use ceiling exhaust fans containing gravity dampers and terminating with a brick vent or extruded aluminum louver such as manufactured by Penn Ventilator Company or Greenheck. Should a sidewall exhaust not be possible, then terminate with a rooftop cap such as the Penn Ventilator Company "Airette". Minimize all roof penetrations at all times in order to prevent potential roof leaks. In individual use toilets provide a time delay relay tied to the light switch.
- B. All exhaust fans shall be controlled by the MDC BMS system. Refer to BAS section for controls sequences.
- C. All general-purpose exhaust fans in non-classroom areas such as gymnasiums, auditoriums, etc. shall be electrically interlocked to the AHU serving those zones so that the exhaust fans operate when the AHU is energized. These areas shall be continuously exhausted during occupied periods.
- D. All custodian room exhaust fans shall be interlocked to the AHU serving that zone so that the exhaust fan operates when the AHU is energized. These areas shall be continuously exhausted during occupied periods.
- E. All exhaust fans, with the exception of the smoke exhaust fans and kitchen hood exhaust fans, shall be designed to immediately shutdown upon activation of the building fire alarm system. If the design allows, MDC should take advantage of the FPL rebate for kitchen demand control ventilation.

- F. In the Flammable Storage Room, provide a mechanical ventilation system consisting of an explosion-proof upblast exhaust fan sized for twenty Air Changes/Hour. The exhaust duct shall extend from floor to ceiling in order to exhaust fumes from both the floor and ceiling levels.
- G. In the Science Material Storage/Preparation Area, provide a mechanical ventilation system consisting of an explosion-proof upblast (purge) exhaust fan sized for twenty Air Changes/Hour.
- H. In the Science Material Storage/Preparation Area Organic and Inorganic Storage Rooms shall each be provided with continuous operating explosion-proof upblast exhaust fan sized for twenty Air Changes/Hour and shall be coated with a chemical resistant coating. The exhaust duct shall extend from floor to ceiling in order to exhaust fumes from both the floor and ceiling levels. In addition, a chemical resistant coating shall be applied to the exhaust duct. Makeup air shall be provided via an outside air makeup duct containing a fire damper and a grille, which shall be chemical resistant coated.
- I. In the Science Material Storage/Preparation Area and the Science Classrooms containing fume hoods, provide a mechanical exhaust system consisting of an explosion-proof upblast (purge) fan sized for twenty Air Changes per Hour and coated with a chemical resistant coating. Air makeup shall be provided by dedicated Make Up Air fans or can be provided by the AHU system's supply air diffusers to the Science Lab/classroom while simultaneously closing the return air register/grille via a motor operated damper electrically interlocked with the purge fan.
- J. An audible alarm activated by a pressure differential switch in the exhaust ductwork shall be provided for exhaust fans, in such areas as the Science Material Storage/Preparation Area, Organic and Inorganic Storage Rooms, Science Classrooms, Flammable Storage Area, and Electrical Rooms to indicate fan failure. The alarm shall be powered by a separate circuit.
- K. Internal duct liner is not permitted, double wall construction shall be used.

## **23 60 00 CENTRAL COOLING EQUIPMENT**

### **23 64 00 Package Water Chillers**

- A. Before a new chiller plant or chiller equipment is proposed for a project, the AE shall provide a study as to the feasibility of connecting to the existing loop so as to ascertain the viability of connection size, tonnage, loop capacity and cost of connection versus new equipment
- B. For new facilities or small additions to existing facilities with cooling loads of up to 200 Tons, the basis of design

shall be an air-cooled chilled water system with a constant air volume (CAV) system, or a variable air volume (VAV) system. Evaluate FPL HVAC incentives to maximize potential rebates with lowest life cycle cost.

- C. All air-cooled chillers SHALL be provided with a factory applied dip coating for corrosion protection of all coil surfaces. The coating material and process as applied to fin tube coils shall provide an effective corrosion protection in a pH range of 1.0 to 14.0. The coating material shall consist of a complex chain linked poly-elastomer or phenolic material and possess negligible effect on heat transfer coefficients. The coils shall be prepared through the manufacturer's procedural cleaning steps allowing for drying prior to the coating process. A 0.5 to 1.0 dry mil thickness of acrylic resin primer shall be applied by spray-coating and be fully cured prior to applying the protective finish coat. The coil corrosion protection coating shall be applied by spray application and built-up to a dry mil thickness of 2.5 to 3.0. The corrosion protection coating shall be built-up on the fin edges with a final spray coating process applied to both sides of the coil. Coating shall be fully cured prior to packing for shipment. Protection shall be provided for the coil tubes from fluid infiltration during the coating process by maintaining a 50 PSI blanket of nitrogen on the fluid side. Prior to shipment, the coil shall be pressure tested with nitrogen to 110 percent of operating pressure and then evacuated. Upon completion, the coil shall be pulled down to a 200-micron vacuum to insure integrity of the coil and absence of moisture inside the coil. Coating materials shall have passed a MINIMUM OF 5000 HOURS OF SALT SPRAY EXPOSURE in testing performed by an independent laboratory in accordance with ASTM B 117.85 standards. The coating shall be field-repairable and touchup product shall be available for this purpose. The company providing the coating process shall also provide a five-year coil warranty. The entire coating process shall be Enecon, Belzona, Surfssil or approved equal. Units shall be provided with hail guards.
- D. For new facilities or major additions to existing facilities with a cooling load of greater than 200 Tons, dual water-cooled chillers and cooling towers with VAV or air handler systems shall be provided. The EOR shall provide an LCCA to be reviewed and approved by MDC Facilities Management. This selection should be based on the chiller that provides the lowest life cycle cost.
- E. All chillers shall be eligible for the FPL rebate program. NO EXCEPTIONS.
- F. Centrifugal chillers shall consider Miami design conditions. Chillers without condenser water relief shall unload at these conditions to at least 25% without the use of hot gas bypass. Centrifugal chillers to be evaluated for LCCA and highest efficiency.
- G. Chiller plant sizing to be programmed with each of the dual chillers sized at between 50% and 100% load, to be decided on a case by case basis with consultation with MDC Facilities Management.
- H. If a new chiller plant is determined to be required, the AE shall study the feasibility of connecting the new plant to the loop to increase loop diversity.

- I. Magnetic bearing chillers may be considered provided the conditions in this article are met.
- J. Chilled water temperature to be 42 degree F. leaving and 54 degree F. entering the chiller plant.
- K. Condenser water temperatures to be 85 degree F/95 degree F with 80 degree wet bulb.
- L. Acceptable manufacturers: Trane (preferred), York, or college approved equal.
- M. Chillers shall be selected with refrigerants not subject to phase out within 5 years. Deviation from this shall require pre-approval and a written waiver from the MDC Facilities Management Department.
- N. Select two new chillers in lieu of one chiller when budget and space permits. Install multiple water-cooled centrifugal or screw chillers in parallel. Size chiller, pumps and AHU's at design load. DO NOT OVERSIZE the mechanical equipment.
- O. Chillers shall be provided with the manufacturer's microprocessor module. Chillers shall be controlled by their local control panel, and via open protocol (BacNet), by the MDC Building Management System.
- P. Chiller plant rooms shall be air-conditioned.
- Q. When replacing or installing a new water-cooled chiller, the specification shall include a statement that a minimum of fifteen hours shall be provided for training MDC Maintenance Personnel by the HVAC manufacturer's technical representatives. The total should be comprised of seven and one-half hours of classroom instruction and seven and one-half hours of hands-on training. A total of seven and one-half hours training shall be provided for air-cooled chillers. Training should start at the time of equipment startup and be completed prior to Substantial Completion.
- R. When an existing water-cooled or air-cooled chiller is to be replaced, the replacement chiller must meet minimum FPL efficiency criteria. The A/E consultants shall coordinate with FPL to ensure the maximum rebate for each chiller installation is obtained. Water cooled chillers to be rated per local conditions on 85 degree F condenser water without condenser water relief. Again, FPL requirement has changed. Refer to note above reference to FPL business HVAC program in link provided. <https://www.fpl.com/business/pdf/SMB-HVAC-Standards.pdf>
- S. Refrigerant from all water-cooled centrifugal chillers at existing MDC facilities scheduled for replacement and containing CFC-11 or CFC-12 shall be recovered by the contractor performing the work. As well as all other HVAC equipment refrigerant recovery in compliance with the Clean Air Act.

- T. All HVAC equipment refrigerant recovery shall be the responsibility of the Contractor in compliance with the Clean Air Act.
- U. The chiller water makeup line shall be provided with a pressure reducing backflow preventer similar to the Wilkens #975RPZ or Watts #909RP backflow preventer to prevent contamination of the domestic water line. Unless the design criteria require a higher pressure, adjust PRV to maintain 12 PSI pressure on the chilled water pump suction.
- V. Refrigerant discharge to the atmosphere is permitted solely for the water-cooled chiller pressure relief device or rupture seal. The designer shall provide refrigerant relief pipe sizing calculations and the piping shall discharge in a safe location and manner. Differing refrigerants/pressures shall not be manifolded. In compliance with Section 608 of the Clean Air Act, venting chiller refrigerant into the atmosphere via the same device during servicing or disposing of HVAC equipment is PROHIBITED.
- W. All refrigeration machinery rooms shall have life safety/refrigerant detection systems in accordance with the latest version of ASHRAE 15/34. All signage, warning devices and exhaust fans (and makeup fans, where required) shall be provided. For chiller replacements, the machinery room shall be brought up to current standards.
- X. All water-cooled chillers shall have epoxy coating on the condenser waterboxes and tubesheets.
- Y. Chillers shall have tube sheets and end bells. Provide hinged condenser heads for maintenance cleaning on all water-cooled chillers. Chillers larger than 500 tons and where space is limited shall have marine boxes. Clearances shall be clearly shown on the project documents.
- Z. Provide field installed insulation on cooler to ensure no condensation forms in 95-degree DB, 79-degree WB ambient conditions.
- AA. In addition to the standard manufacturer's one-year parts and labor warranty on the chiller, an extended four-year parts and labor warranty on the compressor and motor shall be provided.

### **23 65 00 Cooling Towers**

- A. Provide a stainless steel mechanical-draft, counterflow, vertical discharge, variable speed cooling tower with a stationary water distribution manifold, stainless steel hardware, a maximum of 0.005 percent drift loss of design GPM flow rate and capable of cooling water from 95°F to 85°F at an entering wet bulb temperature of 80°F. New cooling towers SHALL BE CTI CERTIFIED. Factory certification is preferred, but field certification by CTI certified personnel shall be acceptable. There SHALL BE NO EXCEPTIONS to this requirement.

- B. Towers shall be designed for direct drive. When towers with capacities greater than 200 Tons are gear driven, the speed of reducer gear shall be rated in accordance with the practices of the American Gear Manufacturer's Association using a service factor of 2.0 for cooling tower service in accordance with CTI Standard 111. The gear reducer shall be of the spiral bevel, single reduction oil fill type of industrial grade as manufactured by Flenders-Motox, Amarillo, Hub City or approved equal. All tower fans shall be provided with variable speed drive motors (variable frequency drives), when specified.
- C. MDC approved towers are Marley, Evapco or Baltimore Air Coil. All 304 stainless steel construction. And use 316 L for extreme conditions near costal applications.
- D. Select two cooling towers or multiple cell towers in lieu of one tower in order to minimize system downtime. On multiple towers having a common condenser water system, an equalizer line shall be provided between both tower sumps with a manual butterfly valve for servicing.
- E. Provision shall be made for a backflow preventer for the cooling tower water makeup line in order to prevent contamination of the domestic water line. In addition, provide a Miami Dade Water and Sewer Dept. approved water meter on the cooling tower water makeup line to record water consumption (Connected to the BAS in order to see water use load profile not just consumption). Acceptable backflow preventers are the Wilkens #975RPZ or Watts #909RP backflow preventer Provide an automatic makeup water connection utilizing a mechanical float switch. Provide an electronic BTU meter (Bacnet compatible) for connection to BMS.
- F. Provision shall be made to drain the cooling tower overflow and basin into an area drain installed in the tower foundation pad via an air gap. The area drain shall be connected to the sanitary system. Discharge onto the ground is PROHIBITED.
- G. Provide working platforms and all OSHA compliant approved safety guard rails.

### 23 70 00 CENTRAL HVAC EQUIPMENT

- A. Zoning and air distribution parameters
  - 1. When a VAV system is selected, variable speed drive motors motor (variable frequency drive or VFD) shall be provided for the air handling units.
  - 2. Outside air shall be pretreated to maximize dehumidification, as applicable and approved by MDC. The outside air systems shall be designed to ensure that the minimum outside quantity will be supplied to the main AHU at all times during occupied hours. Provide CO2 monitoring and demand control ventilation. Comply with all requirements required to obtain FPL rebate for CO2 monitoring.

3. On all systems, the AHU supply fans shall operate continuously during occupied periods in order to ensure positive pressure and ventilation requirements within the zone or space served. During the unoccupied periods, low leakage outside air dampers shall be fully closed and the toilet fans shall shutdown as they are interlocked with the AHU's and controlled by the MDC Building Automation/Management System. In addition, the AHU supply fan/cooling coil shall cycle on and off in the recirculation mode during the unoccupied periods to maintain afterhours design temperature until complete shutdown of the central chilled water system is initiated at a preselected time by the MDC Facilities Building Management System (BMS) system. Consider use of occupancy sensors interlocked with BAS.
4. In order to minimize the introduction of moist laden outside air into a building during unoccupied periods, provide a motor-operated, modulating, low leakage outside air damper at each of the mechanical room outside air makeup openings arranged to open one-half hour before classes start and to close one-half hour after classes end. Low leakage outside air dampers shall be integrated into the MDC BMS system so that they are controlled by Co<sub>2</sub> Monitors, as permitted by the FBC and ASHRAE standards. Also, part of the FPL rebate program to do Outside Air Modulation based on C<sub>2</sub>O sensors and motorized damper control.
5. The air handling unit (AHU) shall be double walled with 2-inch-thick foam injected insulation having a minimum R-value of 13, constructed of galvanized steel and painted with factory's standard coating. Casing construction must be true "no-through metal" design. All AHU shall contain a 4-inch flat filter section, MERV 8 to 13, as determined by Facilities Department.
6. The constant air volume AHU shall be furnished with a VFD and function as a single zone VAV. The chilled water coil shall be controlled with a two-way, modulating valve. The cooling coil shall be designed to contain between six to eight rows and a maximum of 8 to 12 fins per inch (FPI). Allow for both sides access to all cooling coils.
7. The Variable Air Volume AHU shall be furnished with a two-way, modulating chilled water valve for controlling the flow through the cooling coil. The cooling coil shall be designed to contain between six to eight rows and a maximum of 8 to 12 fins per inch (FPI). Allow for both sides access to all cooling coils.
8. The use of multizone equipment in new facilities is not allowed. In all cases DO NOT design new work as dual duct, hot/cold deck.
9. Provide Electric Heaters to exterior zones only. Utilize electric heaters in VAVs. All VAV boxes shall be single duct throttling type.
10. All Air Handling Units shall contain an insulated SLOPED STAINLESS-STEEL drain pan with a bottom drain. The drain pan shall also be coated with an antimicrobial agent such as Archem or Intercept to destroy microorganisms. Galvanized steel drain pans shall not be permitted.
11. The use of return air plenums, whether ceilings or mechanical rooms, is PROHIBITED. The only exception will be for existing college facilities that already contain and use these spaces as plenums and space within these rooms does not allow for ducted return to the mixing box. In all other instances, the return air and outside air ducts shall connect directly to the AHU unit. In addition, exterior building mechanical room and interior building stairwells shall be provided with air conditioning. For exterior mechanical rooms only provide a supply air diffuser supplying a minimum of 100 CFM of conditioned air in order to prevent condensation



from forming on the AHU casing. Interior mechanical rooms shall not require this provision. If a remodeling project has enough budget to allow for conversion of return air plenums to ducted return, such an upgrade shall be considered.

12. If mechanical rooms are approved for use as return air plenums by the MDC Facilities management, in existing college facilities only, which require renovations and/or additions, design the outside air supply duct so that it is located as close as possible to the AHU inlet and directed to the bottom portion of the cooling coil. In addition, the walls and doors of the mechanical room shall be sealed with moisture retardants and insulation so as to prevent air infiltration and heat intrusion.
13. The use of louvered doors for chiller or mechanical rooms is PROHIBITED! The exterior doors shall be solid, and weather stripped to minimize air infiltration in order to prevent condensation from forming on the AHU casing and ductwork.
14. Mechanical rooms shall be of sufficient size to provide the HVAC equipment manufacturer's recommended clearances for maintenance and servicing. A MINIMUM OF THREE FEET CLEARANCE shall be provided on both sides and the front of the AHU and TWO FEET CLEARANCE in the back.
15. Provide a 3-inch floor drain at the rear or side of each mechanical room and pipe the AHU condensate pipe to discharge into the floor drain (via a 2" minimum air gap) that is connected to the sanitary system. Should connection to the sanitary system not be possible, provide the floor drain with a backwater valve and connect the condensate to the site storm catch basins.
16. Coordinate with the structural engineer and install the AHU's on 6" concrete pads in the mechanical rooms. When the AHU's are provided with internal spring isolation on the fan assembly, install the units on a 3/8" cross-ribbed oil-resistant, resilient neoprene mounting pad between the unit and the concrete pad. When the AHU's are not provided with internal spring isolation on the fan assembly, install the units on spring-type vibration isolators on top of the concrete pad. Ascertain that each unit sits sufficiently high on the concrete pad to enable adequate space for removal/replacement of the condensate trap.
17. Provide a hose bibb adjacent to the door inside each mechanical room for coil wash down. This hose bibb shall also be used for outdoor cleaning purposes if the mechanical room is located on the building perimeter.
18. Provide all variable speed equipment, including pumps, air handling units, exhaust and supply fans, cooling towers etc. with properly sized Variable Frequency Drives.
19. All AHU motors, with the exception of fractional HP motors, shall be high efficiency type, NEMA standard design, and Energy Star rated, wound for specified voltage, and of the grease lubricated ball bearing type. Motors shall have a minimum power factor of 0.90, and a minimum efficiency of 91.7% at 100% load, per IEEE Test Procedure 112.
20. All three phase AHU motors shall be protected against contact failure, loss of any phase (single phasing), low voltage, high voltage, voltage unbalance and phase reversal. The protection device shall be capable of providing automatic power system range sensing; adjustable trip delay, restart delay and voltage adjustment; unbalance trip indicator, and LED status readout. VFD driven motors shall be inverter duty and shall utilize shaft grounding rings, no exceptions.
21. Provide Y-type strainers with metal screens with blowdown valves on the CHW supply line upstream of each



AHU cooling coil.

22. During construction, all AHU's shall be fitted with 4-inch-deep, UL Class 2, medium efficiency, disposable extended area, pleated filters with Minimum MERV 8 rating. In addition, ALL SUPPLY AND RETURN AIR DUCTWORK OPENINGS shall be fitted with blanket type, disposable, one inch thick, synthetic filter media not intended for air flow or taped polyethylene (e.g., Visqueen) in order to prevent construction debris from entering and accumulating inside the duct surfaces. At the discretion of the Owner's representative, the AHU air filters may be removed and replaced as needed in order to maintain the cooling coil and system clean. Prior to test and balance, the 4 inch construction air filters shall be removed from the AHU and replaced with a new set of 4-inch final air 60-65% ADS efficiency filters and the ductwork opening synthetic media or polyethylene covering shall be removed and discarded. The filters installed in the AHU's shall be taped to each other to facilitate filter removal and prevent air bypass. Initial resistance of the 4-inch filters shall not exceed 0.40 In. WG at 500 FPM with a recommended final resistance of 0.60 to 0.80 Inch WG. The Contractor shall provide a metal strap with the end turned up at the bottom and ends of each AHU filter frame to facilitate sliding the filters out for easy removal and replacement.
23. Utilize electronic differential pressure measuring for filters to monitor dirty filter conditions. Filter banks larger than 2000 CFM shall have magnehelic gages factory mounted per filter bank.
24. When installing a variable air volume system, the specification shall include a statement that a total of seven and one-half hours shall be provided for training MDC Maintenance Personnel by the VAV box manufacturer's technical representatives. The total shall be comprised of classroom instruction and hands-on training.
25. A simplified type written Sequence of Operation, geared to a non-technical individual of high school education, explaining the HVAC system operation and corresponding to the actual devices used, shall be installed behind a Plexiglas or Lexan cover in the Mechanical room where the AHU equipment is located. The transparent cover shall be permanently anchored to the wall at a height of 5 feet to the bottom of the cover.
26. Provide a duct detector in the supply and return ducts of all air handling equipment, whether over 2000 CFM or not. Contractor must provide direct coordination with Simplex/JCI for fire alarm shutdown, test mode and for enabling and disabling all devices.
27. Provide carbon filters at all areas with high potential for odor migration, i.e., Kitchens, Makers' Labs, etc.
28. Utilize equipment eligible for FPL rebates for bipolar ionization and CO2 monitoring to reduce o A if allowed by LEED.

### 23 72 00 Air-to-Air Energy Recovery Equipment

#### A. Equipment parameters

1. Comply with parameters for FPL rebates and specify equipment with thermal effectiveness as FPL criteria indexes and increases.
2. ERV can be either wheel or plate exchanger, with 50% or better thermal effectiveness.

**23 80 00 DECENTRALIZED HVAC EQUIPMENT****A. DX equipment**

1. Archives, special collections, elevator machine rooms, server rooms, IT rooms, Public Safety offices and miscellaneous other mission critical areas shall be provided with 7 day, 24 hour air conditioning. Room conditions shall be maintained at a temperature of 75 Degree F and a relative humidity range of 30 to 50 percent RH at all times, including unoccupied periods such as evenings, weekends and holidays throughout the year.
2. Heat gain loads for the Telecommunications Equipment Rooms shall be based on the actual heat rejection properties installed in the space plus a minimum of 10-15% growth for future equipment additions.
3. In addition to the chilled water air conditioning, provided by the primary HVAC chilled water system during the occupied periods, the museums, Telecommunications/IT Rooms, the Public Safety offices, command center and Data Processing/Server Rooms, IT Rooms, Archives, special collections and elevator machine rooms shall each be provided with a secondary source of air conditioning for usage during unoccupied periods such as evenings, weekends and holidays. The secondary system shall be an independent DX system. The DX coils shall be properly sized for 100% of the load. Should the system be a split DX system, the condensing unit shall be installed at ground level whenever possible. The secondary systems shall be on emergency power.
4. All DX equipment to meet FPL Business HVAC programs.

**NOTE: This division of the design criteria shall be included as part of Project Manual in the Construction and Contract Documents.**

**END OF DIVISION**

**26 00 00 ELECTRICAL****26 01 00 GENERAL**

- A. Comply with the latest editions of the Florida Building Code, Florida Fire Prevention Code, National Electrical Code (NEC), NFPA-7E and all other required Codes and regulations.
- B. The design and selection of electrical, in concert with other building components, shall produce a building that meets the programmed sustainability rating (LEED rating) of the specific project. These objectives are in line with the objectives of all Divisions and shall be coordinated with requirements in Division 1 Section “Sustainable Design Requirements.”
- C. Codes and Standards
1. Refer to the latest edition of each of the following codes and standards:
    - a. Florida Building Code- (FBC)
    - b. National Electrical Code NFPA-70-E (NEC)
    - c. Recommended Practice for Electrical Equipment Maintenance NFPA-70B
    - d. National Fire Alarm and Signaling Code NFPA-72
    - e. Standard for Emergency and Standby Power Systems NFPA-110
    - f. Standard on Store Electrical Emergency and Standby Power Systems NFPA-111
    - g. Standard for the installation of lightning protection systems NFPA-780
    - h. Americans with Disabilities Act (ADA)
    - i. Telecommunications Industries Association (TIA)
    - j. UL Underwriter Laboratories
    - k. Institute of Electrical and Electronics Engineers, Inc. (IEEE)
- D. Products
1. Provide certified or listed parts, equipment, assemblies, and installations when categories for such individual electrical components and systems are listed by Underwriters Laboratories (UL) or other M-DC accepted nationally recognized independent laboratories.
  2. Unlisted or uncertified submittals, equipment, and construction may be reviewed on a per condition basis.

**DIVISION 26****ELECTRICAL**

This section contains the following:

**26 01 00 GENERAL**

- 26 08 00 Commissioning of Electrical Systems
- 26 09 13 Electrical Power Monitoring

**26 20 00 LOW VOLTAGE ELECTRICAL DISTRIBUTION****26 30 00 FACILITY ELECTRICAL POWER GENERATING AND STORING EQUIPMENT****26 40 00 ELECTRICAL PROTECTION****26 50 00 LIGHTING**

## E. Contract Documents

1. Electrical Design Criteria (EDC) requirements shall be incorporated into the construction documents (drawings and specifications). No deviations are allowed without the approval of MDC Facilities Management, which shall be obtained in writing.
2. Contract Documents shall reference existing as-built conditions of the electrical infrastructure. When as – built plans are not available or are not up to date, the A/E shall be responsible to generate or upgrade the as-built documents, prior to the initiation of design. The A/E is responsible for providing signed and sealed as-built documents.
3. For projects involving additions, alterations, or renovations, MDC will furnish existing electrical plans and underground utility site plans, upon request and when available. It shall be the responsibility of the Engineer of Record (EOR) to verify accuracy of the as-built information by visiting the site and verifying electrical utilities.
4. The A/E of record shall contact the Utility Company for rebates and design incentives, and any other rebate programs that are applicable, to ensure maximum rebates are obtained and energy efficient equipment or systems are incorporated into the project.
5. The design and selection of electrical systems and components shall include, but not be limited the following technologies:
  - a. Power monitoring systems
  - b. Power distribution & conditioning equipment/systems
  - c. Power generation systems
  - d. Photovoltaic power generation systems
  - e. Solar Water Heating System
  - f. Electric Vehicle Charging Stations
  - g. Energy efficient lighting systems
  - h. High efficiency electronic ballasts
  - i. Occupancy sensors for local lighting controls
  - j. Day-lighting light levels controls
  - k. Time program lighting controls
  - l. Energy-efficient dry-type K13 transformers rated for use with electronic equipment, including computer and server room loads.
  - m. Energy efficient, Energy Star rated, motors with a minimum power factor of 0.85 at 100 percent load.
  - n. LED lighting for maximum efficiency
6. Coordinate with other construction disciplines to prevent omissions or field conflicts.

## F. Submittals

1. Each submittal shall be properly documented and based on program needs, the size and location of the facility, the connected load, and survey of actual conditions.
2. In addition to the submittals required, the following shall be submitted to MDC for review and approval by MDC.

#### Phase I: Schematic Design

1. A narrative describing the design intent for the electrical power generation and distribution system, lighting solutions and typical power and lighting layout of selected areas (i.e., classrooms, public rest rooms, hallways, etc.), shall be provided.

#### Phase II: Design Development

1. Floor Plans shall clearly indicate dimensions and locations of electrical utility company Transformers or Vault, Switchgear Room, Electrical, IT Rooms, and routing of incoming Electric and Telephone Utilities.
2. Preliminary rough order of magnitude (ROM) load summaries shall be shown for normal and emergency power.
3. Outline specifications, showing the intended sections to be used for the project, shall be provided.

#### Phase III: 50% Construction Documents

1. Review comments from MDC Facilities Management for Phase II submittals shall be responded to by the EOR and shall be complied with, to the satisfaction of the MDC Facilities Management department, prior to commencing work on Phase II.
2. Floor Plans shall indicate Room Numbers, Description (Name/Function of Room), light density in Watts per Square Foot, and lighting levels in Foot-candles, for each room/space shown.
3. Show location of Electrical Panels, TV, Fire Alarm, Intercom, Security, Surveillance, and Telephone/Data equipment. Show 1/4" scale or larger layouts of Switchgear Room and Electric Rooms with all equipment drawn to scale.
4. Show Lighting Layout for all spaces including Site Lighting. Show detailed information on all Lighting Systems, Device Locations for all Electrical Systems, and connections for all Mechanical Systems Equipment, including the interlock with the BAS of lighting occupancy sensors. This shall include all power and data connections for receptacles, computers, printers, telecommunications, and audio-visual devices.
5. Show overall Life Safety Plan, including Emergency and Exit Lighting, Fire Alarm initiation and notification devices and Intercom.
6. Provide riser diagrams for the following: Utility Source, Service Entrance, Distribution Equipment, Feeders, Panelboards, Telephone/Data, Fire Alarm, Intercom systems, access control, and surveillance systems.

7. Provide the following schedules:
  - a. "Panel Schedules" showing the following: load/ phase, conductor sizes, conduit sizes, trip ratings and the number of poles for each circuit breaker, total connected load (KVA), demand load (KVA), and total amperage.
  - b. "Feeder Schedules" showing the following: feeder identification, connected load, voltage, estimated length, conduit size, conductor size, and fed from.
  - c. "Transformer Schedules" showing the following: identification, size (KVA), K Factor Rating, Pri-Sec voltages, physical size and weight, mounting and housekeeping pads.
  - d. "Power Generation" showing the following: identification, size (KW / KVA), voltages, physical size and weight, mounting and housekeeping pads, fuel type, fuel storage.
  - e. For Photovoltaic systems show the following: Size (KW), panel total area, module type, inverter, mounting structure and other basic components.
8. Plans for all Lighting, Power, and Systems shall be on 1/8" scale (minimum). Lighting plans shall be on separate sheets from Power. Also, Fire Alarm systems shall be shown on separate drawings. Telephone/Data, Intercom, Surveillance access control and Security systems may be combined on the same drawing or be shown separately.
9. Reflected Ceiling Plans, showing Lighting, shall also show location of all devices including and not limited to ceiling diffusers, sprinkler heads, speakers, and strobes.

#### Phase III: 90% Construction Documents

1. Review comments from MDC Facilities Management for Phase III 50% Construction Documents submittal, shall be responded to by the A/E of record and shall be complied with, to the satisfaction of the MDC Facilities Management department, prior to commencing work on Phase III 90% Construction Documents.
2. Show all branch circuits assigned for electric power outlets, dedicated for equipment, and lighting.
3. Provide Computer Generated Photometric analysis for Normal and Emergency Lighting of all rooms. This shall include, Min/Max, Average, Max/Min, Average/Min ratios.
4. Provide completed and detailed Feeder and Transformer Schedules, as well as other equipment schedules revised from 50% review.
5. Provide detailed, filled and completed directories showing sizes, Mains, branch breakers and AIC ratings for Distribution type and power and lighting panelboards.
6. Electrical riser diagrams shall be provided for complete power distribution, Fire Alarm system, Data/telecommunication, access control, CCTV and surveillance system.
7. Voltage drop calculations for all feeders.
8. Fault current analysis and calculations in symmetrical RMS Amps at specified Voltage.
9. Selective coordination of overcurrent protective devices. Upon completion of electrical distribution installation,

the EOR shall provide a written certification that settings for all adjustable circuit breakers have been verified to match the values used for the Time Current Coordination (TCC) study.

10. Arc flash hazard analysis (AFHA) – present the following calculations for approval:
  - a. Flash protection boundary in inches
  - b. Incident energy in CAL/CM2
  - c. Working distance in inches
  - d. Required PPE level (0-4)
  - e. Shock Hazard voltage (AC)
  - f. Limited approach in inches
  - g. Restricted approach in inches
  - h. Prohibited approach in inches
  - i. Equipment identification
  - j. AFHA study date
11. Upon approval, provide instructions to fabricate labels for the following electrical equipment: service entrance, switchboards, distribution panelboards, Motor Control Centers (MCC's), Automatic Transfer Switches (ATS's), and fire pump controllers.
12. The phrase "ARC Flash Information", shall be written on a banner on top of the label

#### Phase III: 100% Construction Documents

1. Review comments from MDC Facilities Management for Phase III 90% Construction Documents submittal, shall be responded to by the A/E of record and shall be complied with, to the satisfaction of the MDC Facilities Management department, and incorporated into the 100% Construction Documents set for Building Department.
- G. All MDC projects shall be designed to comply with "LEED Silver" as a minimum requirement.

#### **26 08 00 Commissioning of Electrical Systems**

- A. System Testing and Analysis: Construction Documents shall clearly require the following:
1. All major electrical equipment and systems shall be tested, adjusted and balanced to verify the operation is in accordance with the design intent of the project.
  2. Factory Testing: Electrical System Equipment shall be factory tested prior to delivery to the Project Site.

3. Field-Testing: All Electrical Systems shall be field tested prior to being placed in service. The Contractor shall test the operation of all building Electrical Systems for a minimum period of two weeks. The process shall simulate a seasonal yearlong cycle of the actual operation of the building systems. The goal is to correct operating problems prior to the completion of the project, rather than when the school is occupied. The MDC representatives shall be invited to observe this process. Other required tests include, but are not limited to:
  - a. Fire Alarm/Detection System Testing and Certification
  - b. Security Systems
  - c. Emergency Power System
  - d. Power generation, monitoring and interface with BAS.
4. Acceptance Testing: The Construction Documents shall require Acceptance Testing be performed by a (NETA) International Electrical Testing Association, Inc. Certified Company. The following tests shall be performed in accordance with Acceptance Testing Procedures for Electric Power Distribution Equipment and Systems ANSI /NETA ATS 2009, and a report submitted to MDC Project Manager for review by MDC facilities Management.
5. As a minimum the following tests shall be performed:
  - a. Wire and Cable Resistance Testing
  - b. Electrical Bus Insulation Testing
  - c. Voltage Testing and Tap Setting
  - d. Thermo-graphic Testing
  - e. Ground Resistance testing (at Ground Rods leaders).
  - f. Emergency Power Systems Testing, including full Building Blackout Tests, and resistor load bank tests at 25%, 50%, 75% and 100% load for an hour each.
  - g. Short Circuit and Protective Device Coordination Studies
  - h. Thermo-graphic Surveys
  - i. Grounding System Testing (throughout building).
  - j. Ground Fault Protective System Calibration and Testing
  - k. Thermo-graphic Testing (to be done 4-months after System is in operation and during peak load of the System being tested).
  - l. Transient Voltage Recording and Analysis
  - m. Voltage and Current Waveform Harmonic Analysis and Investigation
  - n. Verification and spot measurements of final lighting systems installation for exterior and interior light levels to ascertain compliance with the original permitted photometric analysis, and in compliance with applicable sections of the FBC and local ordinances, shall be done by the engineer of record (EOR). At the conclusion of the spot measurements, the EOR shall issue a signed and sealed letter attesting to and certifying that actual field measurements commensurate with the permitted documents as well as all



applicable codes and ordinances. This shall be done separately for both normal and emergency lighting systems.

- o. Verification of short term and long term settings of all adjustable breakers shall be performed by the EOR, and the EOR shall issue a signed and sealed letter attesting to and certifying that actual field settings for ALL adjustable breakers, matched with values shown on the Selected Protective Device Coordination Study.

B. Closeout Documents:

1. Operating and Maintenance Manuals: Provide one digitally scanned copy and three (3) Bound copies of Operating and Maintenance (O&M) Manuals for each project. Manuals shall include, but are not limited to:
  - a. Descriptions of all Systems and Equipment.
  - b. Sequence of operation, when applicable.
  - c. O&M Data for All Systems and Equipment
  - d. Test Results
  - e. Wiring Diagram
  - f. Equipment Nameplate Data and Locations
  - g. Shop Drawing Submittals
  - h. Fabrication Drawings
  - i. Special Tools
  - j. As-Built Drawings
  - k. Utility rebate documentation needed in accordance with utility rebate program standards.

C. Training of MDC Facilities and Maintenance Personnel:

1. General: The General Contractor and factory-trained representatives shall train the MDC Maintenance staff in the proper operation and maintenance of All Systems and Equipment and shall explain All Warranties.
2. Outline: Prior to training of Owner Personnel, the Construction Manager (CM), or the General Contractor (GC) shall prepare a typed outline, listing the subjects that will be included in this instruction, and submit the outline for review by MDC, for approval four (4) weeks in advance of proposed training date.
3. Certification: At the conclusion of the training period, obtain the signature of each person being instructed on each copy of the approved outline to signify that he/she has a proper understanding of the operation and maintenance of the systems and resubmit the signed outlines to the MDC Facilities Management Project Manager.
4. Other Requirements: Refer to Divisions 13 and 16 of the Technical Specification Sections for additional operator training requirements.

## D. Warranties and Guarantees:

1. General: The Contractor shall guarantee all material and equipment are installed as per permitted construction documents, in compliance with applicable codes and with no defects in workmanship and material, for a period of 12 months after final acceptance of the work by the Owner. The contractor shall repair or replace any materials or equipment developing such defects within that time, promptly on due notice given by the Owner and at the General Contractor sole cost and expense, without affecting the campus daily operations.
2. Equipment: All equipment bearing a manufacturer's warranty, such as motors, starters, main switchgear, panelboards, transformers, controls and similar items, will be constructed to have an extended warranty to the Owner by the Manufacturer. Any such equipment that proves defective in materials or workmanship within the Warranty Period shall be replaced by the Contractor in accordance with the Manufacturer's Warranty.
3. Start-up: The Contractor shall provide training and equipment starting service for one calendar year after date of final acceptance of the work by the Owner, at the General Contractor's sole cost and expense.

**26 09 13 Electrical Power Monitoring**

- A. Overview: Defines meter types and their specific waveform capture capability, samples per cycle, including software features and reporting capability. Reporting and graphics should include but not be limited to power quality events graphed against the CBEMA curve, load profiles, and energy and demand reports.
- B. A higher end power monitoring meter should be connected on the load side of the utility main service entrance to be a mirror image of the utility meter.
- C. Design requirements are based on Siemens meters and power monitoring software based on functionality and meter capabilities. Other manufacturers like Schneider Electric Power Logic meters and EATON Company have similar performance functionality.
- D. Web enabled Enterprise level energy management software WinPM.Net or Equivalent
  1. Application features:
    - a. Web enabled – Safari, Chrome, and IE compatible
    - b. Standard and custom reports / graphics
    - c. Utilizes SQL Server database
    - d. Third party integration
    - e. Waveform Capture and Analysis

- f. Extensive Integrated Alarming
  - g. OPC and other protocol support
- E. Web enabled energy management software Power manager
- 1. Application features:
    - a. PAC series meters, SEM3, 3VA/3WL/ 3VL breakers
    - b. Standard Modbus device support • Integrated graphics, reports, alarming and trending
    - c. Web enabled
- F. SEM3 – Branch Circuit Monitoring
- 1. Web Enabled configuration with real time data
  - 2. 0.2% and 1.0% accuracy metering
  - 3. Completely modular design
  - 4. Meter one, two or three pole loads
  - 5. Monitor 50A to 2000A loads
  - 6. Solid or Split Core milliamp CTs
  - 7. 45 Meters per Controller
  - 8. Email, Alarms, Trending, Load Summary, Event & Data Logging • Embedded into Siemens PBDs, SWBDs and BusPlugs
  - 9. Wall mount enclosures for external retrofit applications
  - 10. Multi-Protocol support (Modbus RTU, Modbus TCP, BACnet MSTP, BACnet IP, SNMP, SMTP, and NTP)
- G. Power, Energy and Demand
- 1. Voltage/current: per phase, average
  - 2. Voltage/current: unbalance
  - 3. Power: real(kW), reactive(kVAR), apparent(kVA), power factor, frequency
  - 4. Energy: bi-directional, import, export
  - 5. Energy kWh: total, net
  - 6. Demand: block, sliding window
  - 7. Demand: thermal predicted
- H. Power Quality Analysis
- 1. Sag(Dip)/Swell disturbances monitoring

2. Voltage disturbance direction detection
3. High speed transient capture (17 $\mu$ s @ 60Hz / 20 $\mu$ s @ 50 Hz)
4. Harmonics (individual, even, odd, total) up to (THD only, 63rd depending on meter model)
5. Sampling rate, maximum samples/cycle (64 ,166 , 204 , 256, 1024 depending on meter model)
6. Flicker, harmonics to EN50160, IEC 6100-4-7 / 4-15
7. Configurable for IEEE 519-2014, SEMI/ITIC

I. Data and Waveform Logs

1. Triggered by setpoint, schedule, or external signal
2. Sequence-of-event logs or alarm logs, variable log depth
3. Minimum/maximum logs
4. Onboard Historical logging Memory Options based on model (4GB (6 Months), 320 MB, 2GB)
5. Email data and event logs
6. Waveform recording
7. Waveform in COMTRADE format with FTP
8. GPS time synchronization options based on model (NTP, SNTP, NTP/SNTP)
9. Time-stamps, resolution in seconds depends on model (  $\pm$ 1sec,  $\pm$ 0.1sec,  $\pm$ 1 millisecond)
10. Time synchronization - IEEE1588/IEC615888/PTP

J. Communication Ports, Protocols and I/O - Options available which vary by meter

1. USB ports 2 (Not activated)
2. RS-485-only ports
3. Ethernet ports
4. PROFIBUS ports
5. PROFINET ports
6. Modbus RTU Slave on serial ports
7. Modbus RTU Master on serial ports
8. Modbus/TCP on Ethernet ports
9. Modbus TCP Master over Ethernet
10. BACnet MS/TP
11. BACnet IP on Ethernet ports
12. SNMP
13. DNP 3
14. IEC 61850
15. DHCP - (IP v4/ IP v6) (IP v4/ IP v6)
16. RSTP

17. Secure protocols (HTTPS, SFTP, SSH, Secure Modbus) HTTPS
18. Ethernet Gateway: 31 other meters accessible via RS-485
19. Multiple masters over Ethernet
20. On-board web server - Realtime, Trending (CSV output)
21. On-board web server - Waveform display
22. Analog inputs (16)
23. Analog outputs (8)
24. Digital status/counter inputs (standard/optional add-ons) multiple options depending on meter model
25. Digital relay outputs (control/pulse)
26. Integrated display B/W, color options

K. Setpoints, Alarming and Control Setpoints (varies by meter)

1. Minimum response  $\frac{1}{2}$  cycle
2. Math, logic, trig, log, linearization formulas Grouping and/or,
3. Multi-condition alarms plus Email on alarm

L. Revenue Metering (varies by meter model)

1. ANSI C12.16 accuracy compliant
2. ANSI C12.20
3. EN50160 Compliance Reporting
4. IEC 61000-4-30 Class A/S
5. IEC 62053-22 replaces IEC 60687 0.2S compliant
6. IEC 62053-23, 24 compliant for Reactive Energy accuracy
7. IEC 62586-1 (new Power Quality standard)
8. IEC 60687 accuracy class compliant
9. ANSI class 10, IEC 1/10 (1A nominal, 10A max)
10. ANSI class 20, IEC 5/20 (5A nominal, 20A max)
11. Time-of-use
12. Transformer/line loss compensation

## 26 20 00 LOW VOLTAGE ELECTRICAL DISTRIBUTION

A. Site Location

1. Space planning documents and standards for equipment furnished by utility companies shall be incorporated into the construction documents. Locations for pad mounted transformers, vaults, metering devices and other utility items must be coordinated with the architectural design to avoid detracting from building's appearance or interfering with line of sight requirements.

#### B. Distribution System Voltage

1. 277/480 V, 3Ph, 4 Wire, secondary voltage shall be designated for heating, lighting, mechanical loads of one (1) Horsepower and larger, and as approved by MDC Facilities Management for other loads.
2. 120/208 V, 3 Ph, 4 Wire voltage shall be designated for convenient outlets and miscellaneous mechanical and kitchen loads, and as approved by MDC Facilities Management for specific applications.

#### C. Power Service Entrance

1. Service entrance shall be underground, in galvanized rigid steel (GRS) or concrete-encased Schedule 80 polyvinyl chloride (PVC) conduits. Overhead services are not allowed. Minimum cover to be 24". Two-hour rated Mineral Insulated (MI) Cable may be considered as approved by MDC Facilities Management on a case by case basis.
2. The service entrance shall be centrally located to allow shorter distribution feeders.
3. Service entrance, transformer pad, transformer vault, underground conduit, pull boxes, grounding, and other provisions for electrical utilities shall be provided and installed according to the utility company's requirements.
4. Coordinate, with MDC and Utility Company the point of service, and location and use of a pad mounted transformer or a vault, based on the following:
  - a. Service shall be supplied from a pad mounted transformer, whenever possible.
  - b. Consideration should be given to feasibility of connecting to an existing service to reduce utility operating costs.
  - c. Pad mounted transformer or vault location shall be based on site and load requirements, accessibility, and proximity to utility lines, and as required by the Electric Utility Company on site.
  - d. Pad mounted transformer or vault size shall be agreed to between the utility company and MDC Facilities Management, based on load requirements, provisions for future expansion, ventilation, and other utility requirements.
  - e. Pad mounted transformers shall be protected against physical damage by installing bollards, fencing, or other means as required by the project, and as approved by MDC Facilities Management.
5. Include on the drawings, configuration and routing of the utility company's underground primary service conduits, and/or duct banks, from a designated location by the utility company to a pad mounted transformer

or vault.

6. The A/E of record shall obtain, fill out complete, sign and execute documentation and service provider agreements between the utility company and MDC.
7. Ground-fault protection of equipment shall be provided on wye electric services of more than 150 volts to ground but not exceeding 600 volts phase to phase for each service disconnect rated 1000 amperes or more.

#### D. Switchboards

1. Main and distribution switchboards shall be protected by a main circuit breaker or fusible switch type depending on available fault current, coordination and ground fault system protection.
2. The main circuit breakers shall not exceed 3500 amperes, unless accepted by MDC on a case by case basis. Provide additional mains as required to meet load conditions
3. Breakers smaller than 100 Amps, shall not be used in switchboards with large frames and high interrupting capacity.
4. Surge Protection Devices (SPDs) shall be provided at the service entrances, at the main switchboards, distribution panels and lighting/power panels
5. Bus bars in switchboards, bus-ways, panel boards, and motor control centers shall be copper. All bus ducts shall also be copper.
6. Floor mounted switchboards and motor control centers shall be on 4-inch high concrete pads.
7. Size switchboards and distribution panels with a minimum of 20% spare capacity and 10% spare breaker/switch space or as required by the Florida Building Code (FBC), whichever is more stringent. Switchboards shall be sized for future expansion as required by program requirements.
8. Refer to Section 26 09 13 for power monitoring requirements.
9. All switchboards and panelboards shall be as manufactured by Square D/Schneider Electric, Eaton or Siemens. All panel boards to have bolt-on breakers.
10. All breakers 400 amps or above shall be adjustable trip.
11. All power, lighting and appliance panelboards shall have Door-in-Door design for ease of maintenance.

#### E. Grounding

1. Connect the grounding system of any facility or standalone building to its domestic water main entrance. Domestic water entrance piping shall be copper, and in continuous contact with earth for at least 20 feet, and below grade.
2. The underground water pipe shall be supplemented by additional grounding electrodes, bonded together to form a single electrode system. The maximum resistance to ground of any grounding source shall be limited to 5 ohms. The maximum ground resistance of each individual ground rod shall be 25 ohms.
3. Provide equipment grounding conductor from the main switchboard to all panel boards.

4. Feeders shall have copper grounding conductors. Feeder conduits shall not be used as ground paths.
5. Provide continuous grounding for microprocessor equipment.
6. Non-reversible exothermic welding type connections for bonding the grounding electrode conductor to the ground rod shall be used.
7. A grounding bus bar shall be provided in all switchboards and panelboards.

#### F. Main Electrical Rooms

1. Main Electrical Rooms (MER) guards the Service entrance Electrical Equipment. It shall be equipped with adequate space for code-required clearances as well as future expansions of the electrical system.
2. Switchboards shall be located in the Main Electrical Room. No piping, ducts, or equipment foreign to the electrical discipline shall be permitted to be installed in, enter, or pass through electrical rooms in accordance with the National Electrical Code. (NEC).
3. Work Space, the following clearances are required on new and renovation projects around switchgear:
  - a. 10 ft. in front minimum (may be shared with opposite facing switchgear).
  - b. 3 ft. in rear minimum (may use front accessible gear only then it would be 0 ft.).
  - c. 3 ft. on the ends minimum.
  - d. Renovation projects shall be evaluated on an individual per case basis.
4. Provide a minimum of two independent NEMA 3R quads GFCI outlets fed from at least two independent circuits from emergency power, and at least one NEMA 3R quad fed from normal power. MER shall be ventilated (and/or cooled) sufficiently for removal of the total heat load generated by all the equipment installed in the room. Lighting shall be provided from at least two independent luminaires and shall be fed from normal and emergency power. Do not feed the lighting system from the same circuit feeding the power outlets in the MER.
5. MER and Electrical Rooms within multistory buildings shall be stacked; these rooms shall not be located adjacent to mechanical shafts so as to avoid interference problems with ducts and conduits above the ceiling directly outside the Electrical Rooms.
6. Provide self-contained emergency. Lighting with battery packs, fed from emergency (safety to life)

#### G. General

1. Provide a main circuit breaker for each panel board according to code. Allocate a minimum of 20 percent spare capacity and 20% spare breaker space in all panel boards. Main switchboards and distribution panels shall have 10 percent spare capacity and 10% spare breaker/switch space. Provide a means of disconnect on both the primary and secondary sides of all transformers.
2. If a series rated system is used, it shall be in strict compliance with the NEC articles 110.9, 110.22, and



- 240.86.
3. Panelboards shall be of the type that will house only bolt-on type circuit breakers.
  4. Circuit breakers with less than 14 KAIC for 277/480 V and 10 KAIC for 120/208 V are not acceptable.
  5. Panelboards shall be located in electrical rooms with code required clearances and 3 inches minimum between panelboards.
  6. Mechanical Rooms, bathrooms, labs, and other rooms requiring floor drains or plumbing in or below the floor slab shall not be located above electrical rooms.
  7. Branch circuit panelboards shall have 42 circuits regardless of bus ampacity.
  8. All electrical rooms shall have a ground bus bar insulated from and attached to the wall.
  9. Panelboards shall have 100% neutral bus, a ground bus, and all buses shall be copper. Panelboards servicing non-linear, high harmonic load contents shall have a 200% neutral bus.
  10. Panels, feeders and transformers shall be appropriately designed and sized to compensate for additive neutral harmonic currents caused by non-linear loads. Installation of aluminum wound and k rated transformers shall be approved by MDC.
  11. A motor control center (MCC) with a transformer with 120-volt secondary for control circuits, "hand-off-auto" selector switch, and "on-off" showing lights in each starter shall be provided for large groups of motors.
  12. A tiered system of Surge Protective Devices (SPD's) shall be clearly indicated on the Construction Documents, for the Power Distribution Systems.
  13. SPD's shall comply with UL 1449 and ANSI / IEEE C62.41.
  14. Protection shall be provided at the main switchboard level and at the transformer secondary for:
    - a. Line to line
    - b. Line to neutral
    - c. Line to ground
    - d. Neutral to ground
  15. Clamping voltage shall be 120 percent of the nominal peak line voltage.
  16. Lightning protection shall be provided for all television antennas and flagpoles. Lightning protection system for buildings shall also be provided. Provide Surge Protective Device (SPD) at the main electrical switchgear level, telecommunications systems, access control equipment, fume hoods at laboratories, CCTV, and fire alarm systems.
  17. On the construction documents clearly indicate all control wiring and interlocking for the operation of all motor loads, as required by each motor circuit or dust collectors, fire suppression systems, air handling units (AHU's), exhaust fans or any other mechanical equipment.
  18. Install magnetic starters or thermal overload switches for roof fans or other similar equipment at an interior location. Provide an un-fused safety disconnect switch, in a NEMA 3R or other exterior NEMA type enclosure suited for the environment, on the roof near the equipment. Group multiple fans together when practical.
  19. Lightning protection, Surge Protection Devices, Wired remote control operation and a separate, dedicated,

circuit for the scoreboards in gymnasiums, and sports fields shall be provided.

20. In industrial education classrooms and shops, specify flex cord system from overhead (coiled) wire-ways to each workbench and to electrically driven machinery.
    - a. During normal operation, the power to the wire- way shall be through a keyed controlled magnetic contactor, "ON/OFF" at instructor's area.
    - b. Provide emergency shut-off of power from the instructor's station, and at other locations of the instructional space as required by The Florida Building Code latest edition (FBC).
  21. Install separate service disconnecting means for normal and emergency power feeding transfer switches to be accessible to MDC personnel.
  22. Provide power for electric vehicle charging stations at parking garages and parking lots. Consider using a load management system if applicable. Demand shall be based on anticipated parking duration determined in conjunction with campus staff.
  23. Provide power for car count system where applicable.
  24. Refer to architectural design criteria Division 11 11 36.13 for Electric Vehicle Charging Stations requirements.
- H. Voltage Drop, Short Circuits, Time Current Coordination (TCC) and Arc-Flash Studies
1. Allowable voltage drop shall be according to NEC 210-19(A) & 215-2(A). Total allowable voltage drop from service source to load shall be 5 percent. Branch circuits shall have a maximum voltage drop of 3 percent, feeders 2 percent.
  2. The symmetrical fault current at any distribution, lighting, or power panel board shall be calculated from the maximum available fault at service entrance, according to the utility company. Incorporate calculations on drawings next to Power Riser Diagram.
  3. For all new construction, complete building renovations, larger and/or more specialized electrical system design projects, and when so directed by MDC Project Manager, perform the following electrical system design studies:
    - a. Short circuit and overcurrent device coordination study: perform studies in accordance with IEEE "Red Book" standard 141 for all service and distribution equipment. Overcurrent device coordination study to include time-current plots for phase and ground overcurrent coordination. Provide settings for all adjustable-trip electrical circuit protective devices, such as circuit breakers, relays and voltage sensors; provide settings for all automatic transfer switches, standby power systems, variable speed drives, chillers and large powered mechanical equipment.
    - b. Arc-flash protection studies and determination of specific equipment Arc-flash labeling of the level of incident energy available and required personnel hazard protection, per IEEE 1584 and NFPA 70E requirements.

- c. Required studies shall include all electrical systems originating from the project primary service, through the service transformer(s) and distribution system down to the representative branch circuit level; include feeders and connections for major mechanical and other powered equipment. Where existing facilities are to be reconnected to new project distribution systems, include existing facility distribution systems in the studies.
- d. Study reports to be provided in computer-generated format using SKM Power Tools or EDSA software.

#### I. Cables and Conductors

1. Cables, conductors and wires shall be copper
2. Cables and wires in underground conduit shall be UL listed and labeled as "water resistant".
3. Aluminum conductors are not acceptable.
4. Cable insulation color shall comply with the color code required by MDC.
5. Solid insulated conductors are not allowed, unless approved by MDC.

#### J. Raceways

1. Underground secondary service entrance conduits from the utilities transformer shall be concrete encased
2. Conduits shall be sized according to NEC. Minimum size conduit shall be 3/4" diameter everywhere. Conduits underground shall not be smaller than 1.5" in diameter.
3. Conduit fittings shall be compression type. EMT may be used for interior conduits but set screw fittings are not acceptable.
4. Conduits shall be underground or concealed in walls or ceilings in normally occupied spaces. Exposed conduit, except in electrical, telecommunication, and mechanical rooms, requires MDC acceptance on a per condition basis.
  - a. Interior conduits shall be steel. PVC conduit can only be used at interior locations if embedded in concrete or under slabs on grade.
  - b. Exterior conduits shall be underground, GRS with two anticorrosive paint coats, or PVC Schedule 80, direct buried or concrete encased
  - c. Exterior exposed conduits shall be GRS and shall be accepted by MDC in writing.
  - d. Direct buried underground conduits can be installed for low voltage systems and feeders except for service entrance conduits. Maintain 24 inches minimum coverage below grade when using PVC and 18 inches minimum coverage below grade when using GRS. Refer to the minimum cover requirements on Table 300.5 of the NEC. Use proper spacers between conduits and 3-inch wide magnetically detectable electrical warning ribbon 12" above the underground installation.
  - e. Conduits running exposed inside electrical, mechanical rooms or other utilitarian spaces shall be GRS from floor level up to 8'-0" above finished floor. Above 8'-0", conduits installed exposed may be Electrical

Metallic Tubing (EMT).

f. Emergency power conduits shall be color-coded red. Refer to Communications Design Criteria for additional color requirements.

5. Conduits requiring concrete encasement shall comply with the following:

- a. Concrete encasement shall have 3-inch minimum cover on all sides and 2-1/2" minimum clear separation between power conduits.
- b. The minimum separation between power conduits and signal conduits in the same concrete encasement shall be 3 inches.
- c. The minimum depth of duct banks beyond the building perimeter shall be 24 inches to the top of the concrete encasement.

6. Surface raceways shall be metallic; non-metallic is not acceptable. The standard raceway is Wiremold 6000 / 4000 series.

7. Provide high strength Nylon pull strings inside all empty conduits.

8. Provide additional empty conduit stub outs from new panels to above ceiling spaces. The number of stub ups shall be based on 10% of the total number of poles for that panel. (i.e, 42 pole panel shall have four conduits from the panel, run inside wall, up to the ceiling space, stubbed out 6" above ceiling, and terminated.

9. Conduit shall be color coded for identification as follows:

Emergency Power ..... Red  
 Fire Alarm ..... Orange  
 Normal Power ..... No Color

K. Sleeves & Fire Stopping

1. Specify steel pipe sleeves for conduits or cables in new construction, or renovation of existing construction. Specify fire stopping to meet ASTM E814.

L. Pull Boxes

- 1. Provide underground pull boxes where sharp bends, branching, or more than four 90° bends are required. For long conduit runs, provide pull boxes every 200 feet maximum
- 2. Metal covers are not allowed, unless approved by MDC
- 3. Nonconcrete covers shall be bolt-down type
- 4. Provide a heavy-duty nonmetallic traffic type cover tier 22 where there is any possibility of vehicular traffic. For other areas, use tier 15.



5. Pull boxes in corridors or pedestrian traffic areas are not allowed

#### M. Wiring Devices

1. All exterior receptacles shall be duplex, weatherproof, and GFCI. Provide weatherproof covers that prevent water intrusion while they are in use.
2. Receptacles installed outdoors, in wet locations, science labs, staff toilet rooms and within 6 feet of water supplies shall have ground fault protection by a built-in or upstream protection device. This requirement does not apply to single receptacles serving only water coolers.
3. Provide dedicated 120V circuits with 20-amp breakers, for floor buffer machines, in corridors, with receptacles at intervals not to exceed 75 feet.
4. A minimum of 8 appropriately placed convenience receptacles shall be provided in each instructional space, 2 in each major wall. For other electrically operated equipment in the instructional space that may need dedicated receptacles or connections to a separate circuit other than the convenience receptacle circuits, refer to the program requirements for each project.
5. Connect a maximum of 6 desktops (monitor and CPU), per branch circuit based on program requirements. Load shall be based on 300 VA per station. If units of different ampacities are used, adjust accordingly to a maximum of 1920 VA.
6. Size neutral conductors to compensate for additive neutral harmonics caused by non-linear loads on shared neutrals. Circuits shall either have individual neutrals for each phase conductor or neutral conductors shall be upsized to compensate for neutral harmonic currents. For pre-wired modular furniture, consult with manufacturer.
7. Provide circuit breakers that simultaneously disconnect ungrounded conductors sharing a grounded conductor (neutral).
8. Dedicated branch circuits shall be provided for copiers, shared printers, kitchen or lounge appliances and other equipment requiring special circuits.
9. A maximum of six general purpose receptacles may be connected to one 20 Amp, 120 Volt circuit.
10. The wiring of 120V branch circuits extending more than 100 feet from the panel board to the nearest outlet shall be No.10 minimum.
11. Provide a GFCI receptacle at workstations in science classrooms.
12. Provide 2 channel surface raceways that may accept convenience outlets in classrooms and labs with a high concentration of electric equipment.
13. Provide emergency shut-off capability in science labs, industrial education, electronic labs, classrooms/shops, and other locations according to The Florida Building Code (FBC) latest edition.
14. Offset receptacles two feet away, do not install back to back, in common walls of adjacent music rooms to maintain room envelop sound ratings and use baffles and sound insulation materials to minimize sound transference through walls.
15. In computer labs, provide metal wall-mounted, 2-channel surface raceways for data/telephone, power. Free-

standing raceways (i.e., power poles) may be used if away from walls and pre-approved in writing by MDC Facilities Management.

16. In any spaces requiring floor devices, utilize dual channel/Combo devices. Under no circumstances shall branch conductors run surface mounted on the floor.
17. At auditoriums or multipurpose rooms, specify convenience receptacles at walls spaced at intervals not to exceed 20'-0".
18. Do not locate outlets in bulletin boards, tack boards, or marker boards.
19. Receptacle boxes at food service areas shall be NEMA 3R. They shall be located according to the following:
  - a. Wall mounted 84 inches above finish floor when behind refrigerators
  - b. Wall mounted 42 inches above finish floor to the centerline of a horizontal box when behind counters.
  - c. Floor mounted at freestanding equipment, based on equipment requirements:
    - 1) An outlet box with top at least 6 inches above finish floor
    - 2) 18 inch high conduit rough-in for hard wire connection
21. Provide one quad receptacle per computer station next to a voice/ data outlet
22. Provide a GFCI duplex receptacle at the compactor area 6'0" above finish floor and centered on the width of the compactor.
23. At shops and other locations with motor operated equipment, coordinate power and receptacle types and requirements according to manufacturer's requirements.
24. Provide a 120v GFCI duplex receptacle inside all custodial and mechanical rooms.
25. Tamper proof safety type receptacles shall be installed in childcare areas.
26. In storage rooms, provide the receptacles adjacent to the light switch at switch height.

#### N. Programmable Smart Panelboards

1. Based on program requirements, smart panelboards shall be considered as a first choice to control plug loads, lighting, and equipment.

#### O. Transformers

1. K-rated transformers: Specify K-rated transformers, power conditioning equipment or devices, or other disturbance mitigation methods for systems supplying outlets for computer terminals or other non-linear harmonic generating and/or sensitive equipment.
2. Provide units with copper windings and electrostatic shielding.
3. All dry-type transformers shall be "Energy Star", low impedance units with copper windings, amorphous iron or silicon steel core and type "HN" insulation, 115 degrees C temperature rise above 40 degrees C ambient.

4. All transformers larger than 75 KVA shall be floor mounted with vibration isolation pads between the unit and the supporting structure secured to a 4" high concrete housekeeping pad.
5. Transformers rated at 75 KVA or less may be wall mounted to save floor space for future expansion of electrical distribution system such added panels and transformers. Transformers shall not be hung from, or mounted to, overhead building structure unless specifically approved in writing by MDC and the structural engineer of record.

P. Harmonics

1. Line-side Mitigation: Provide equipment such as Harmonic Traps for equipment utilizing 6 pulse and 12 pulse power supplies, for all variable frequency drives, and appliances capable of generating harmonic frequency currents or voltages on their respective circuits of significant magnitude that would be harmful to the facility's electrical system I do not believe that this paragraph belongs here in the 'Transformers' section.
2. Comply with IEEE 519 compliance as related to voltage and current harmonics distortions.

Q. Cable trays for Electrical Equipment

1. Only steel hot-dip galvanized after fabrication or aluminum cable tray systems are permitted.
2. Ground cable trays according to NFPA 70 unless additional grounding is specified.
3. Cable trays with electrical power conductors shall be bonded together with splice plates UL listed for grounding purposes or with UL listed bonding jumpers.
4. Cable trays and accessories are to be provided as defined in NFPA 70 and marked for intended location, application and grounding

## 26 30 00 FACILITY ELECTRICAL POWER GENERATING AND STORING EQUIPMENT

A. Packaged Generator Assemblies

1. Emergency power shall be available in the event of failure of the normal power supplied to the facility. Emergency power shall be available within 10 seconds and shall be in compliance with NFPA-110.
2. Initial emergency power shall be provided from a separate service located ahead of the main service disconnect.
3. Backup emergency power shall be provided by the following:
  - a. Emergency Standby Generator.
4. When optional standby equipment is connected to an emergency system, the optional standby load shall be

on a separate transfer switch and circuit breaker. This breaker shall be coordinated with the emergency system over-current protection, so that no short circuit or other malfunction of the optional system will disable any part of the life safety branch of the emergency system. The life safety equipment shall have first priority to the power provided.

5. With regards to back up power generation the recommended strategy is to evaluate the feasibility of 100% back up capacity for new construction or complete remodeling for several reasons:
  - a. Maximize savings under FPL's load control program with the CDR rate rider.
  - b. Ability to continue normal operations in a building during a power failure.
  - c. Ability to resume classes after a storm prior to full FPL power restoration.

A Life Cycle Cost Analysis (LCCA) shall be provided to evaluate the feasibility of 100% back up capacity.

6. Provide emergency power to the following loads:
  - a. Fire alarm system
  - b. Bi-Directional Amplification (BDA) system
  - c. Emergency lighting and exit signs
  - d. Fire Pumps
  - e. MDF and IDF Rooms
  - f. Two-way communication system and back-up mini-split HVAC systems for Public Safety Department Offices.
  - g. Parking lot emergency phones ("blue phones").
  - h. Access control and CCTV surveillance
  - i. Laboratory fume hood controls.
  - j. Chemical storage exhausts systems
  - k. All other loads required by applicable codes, or by MDC Facilities Management Department.
7. In the event that 100% backup power is not provided, provide standby back up power at a minimum to the following loads:
  - a. Gate arms in parking lots
  - b. Roll-up doors in buildings
  - c. Walk-in freezers/ coolers and science lab refrigerators
  - d. Monitoring equipment
  - e. Sanitary lift stations (if applicable)
  - f. Elevators – one per bank other than braking system if not required by code (if applicable)
  - g. Security Systems



- h. All sump pumps
  - i. Utility outlets in electrical and mechanical rooms
  - j. Server rooms/ HVAC
  - k. Building Automation System (BAS)
8. Emergency generators for new construction shall be powered by diesel or natural gas if available.
- a. Liquefied petroleum gas (LPG) or compressed natural gas (CNG) from on-site aboveground tanks shall be considered if natural gas service is unreliable or unavailable in the area. Verify reliability with Gas Company serving the site.
  - b. Diesel can be used if generator size requires it. Utilize “belly” tanks or above grade double wall tanks in compliance with DERM requirements.
  - c. Underground fuel tanks are not allowed.
9. Loads on emergency power shall be hard wired and the entire emergency distribution system shall be completely independent and separated from the normal power distribution system. Electrical panels on the emergency system shall be labeled and identified according to specifications.
10. The emergency power shall be supplied by an emergency generator package consisting of an alternator coupled to an internal combustion engine, automatic transfer switch, battery charger, batteries, day tank and main breaker. A separate magnetic only circuit breaker shall be included in the generator package to feed the fire pump controller.
11. Generators shall be monitored with power monitoring meters and controlled by campus BAS using BACNET protocol in addition to the code-required annunciation and interfaces.
12. Generators/UPS Compatibility: When the project requires UPS's, coordinate compatibility with the specified UPS which will be used.
13. Equipment shall be a package of new and current equipment consisting of an engine driven electric generating set, engine start-stop control system and automatic load transfer control to provide automatic starting and stopping of the engine and switching of the load
14. Equipment shall be provided with critical level muffler and, if applicable, day tank and pump equipment.
15. Source Limitations: Obtain packaged generator sets and auxiliary components from a single manufacturer and a single source.
16. Prototype testing: Factory test engine-generator sets using the same engine model, constructed of identical or equivalent components and equipped with identical or equivalent accessories. Test in compliance with NFPA 110, Level 1 Energy Converters and IEEE 115
17. Project-Specific Equipment Tests: Before shipment, factory test engine-generator sets and other system components and accessories manufactured specified for this Project. Perform tests at rated load and power factors, including the following tests:

- a. Test components and accessories furnished with installed units, but which are not identical to those on tested prototype, to demonstrate compatibility and reliability.
- b. Full load run.
- c. Maximum power.
- d. Voltage regulation.
- e. Transient and steady-state governing.
- f. Single-step load pickup.
- g. Safety shutdown.
- h. Provide 14 days' advance notice of tests to allow for observation by MDC's representative.
- i. Submit factory test results within 10 days of completion.
- j. There shall be on site Resistor Load Bank testing of the engine generator at 25%, 50%, 75% and 100% of full load, for an hour each, for a minimum of four hours total. The monitoring data shall be compiled every 10-15 minutes, in a final report to be issued by the installer. MDC Facilities Maintenance shall witness the on-site load bank test.

18. Installer Qualifications: The manufacturer's authorized representative shall be trained and approved for installation of units specified for this Project; and is located not more than four hours' normal travel time from Installer's place of business to Project site.

19. Electrical Components, Devices, and Accessories: Shall be UL listed and labeled as defined in

20. NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.

21. Comply with ASME B15.1.

22. Comply with NFPA 37.

23. Comply with NFPA 70.

24. Comply with NFPA 110 requirements for Level 1 and 2 emergency power supply system.

25. Comply with UL 2200.

26. Engine Exhaust Emissions: Comply with applicable state and local government requirements.

27. Noise Emission: Comply with applicable state and local government requirements. Project criteria for maximum noise level at adjacent property boundaries due to sound emitted by generator set including engine, engine exhaust, engine cooling-air intake and discharge, and other components of installation shall not be more than 85 dBA three feet away from the generator.

#### B. Generator Product Standards

1. Provide product by one of the following, subject to compliance with specifications:

- a. Caterpillar; CAT Power Generation.
- b. Kohler Co.; Generator Division.

- c. Cummins Power Generation.
- d. MTU on Site Energy.

## 2. Tests and Inspections

- a. Perform tests recommended by manufacturer and each electrical test and visual and mechanical inspection for "AC Generators and for Emergency Systems" specified in NETA Acceptance Testing Specification. Certify compliance with test parameters.
- b. NFPA 110 Acceptance Tests: Perform tests required by NFPA 110 that are additional to those specified here including, but not limited to, single-step full-load pickup test.
- c. Battery Tests: Equalize charging of battery cells according to manufacturer's written instructions. Record individual cell voltages.
  - 1) Measure charging voltage and voltages between available battery terminals for full-charging and float-charging conditions. Check electrolyte level and specific gravity under both conditions.
  - 2) Test for contact integrity of all connectors. Perform an integrity load test and a capacity load test for the battery.
  - 3) Verify acceptance of charge for each element of the battery after discharge.
  - 4) Verify that measurements are within manufacturer's specifications.
- d. Battery-Charger Tests: Verify specified rates of charge for both equalizing and float-charging conditions.
- e. System Integrity Tests: Methodically verify proper installation, connection, and integrity of each element of engine-generator system before and during system operation. Check for air, exhaust, and fluid leaks.
- f. Exhaust-System Back-Pressure Test: Use a manometer with a scale exceeding 40-inch wg (120 kPa). Connect to exhaust line close to engine exhaust manifold. Verify that back pressure at full-rated load is within manufacturer's written allowable limits for the engine.
- g. Voltage and Frequency Transient Stability Tests: Use recording oscilloscope to measure voltage and frequency transients for 50 and 100 percent step-load increases and decreases, and verify that performance is as specified.
- h. Harmonic-Content Tests: Measure harmonic content of output voltage below 25 percent and at 100 percent of rated linear load. Verify that harmonic content is within specified limits.
- i. Noise Level Tests: Measure A-weighted level of noise emanating from generator-set installation, including engine exhaust and cooling-air intake and discharge, at four locations, and compare measured levels with required values.
- j. Coordinate tests with tests for transfer switches and run them concurrently.
- k. Test instruments shall have been calibrated within the last 12 months, traceable to standards of NIST, and adequate for making positive observation of test results. Make calibration records available for examination on request.

- l. Leak Test: After installation, charge system and test for leaks. Repair leaks and retest until no leaks exist.
- m. Operational Test: After electrical circuitry has been energized, start units to confirm proper motor rotation and unit operation.
- n. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.
- o. Remove and replace malfunctioning units and retest as specified above.
- p. Retest: Correct deficiencies identified by tests and observations and retest until specified requirements are met.
- q. Report results of tests and inspections in writing. Test reports shall be submitted to Engineer of Record (EOR), and MDC Facilities Management (FM) thru the project manager (PM). Record adjustable relay settings and measured insulation resistances, time delays, and other values and observations. Attach a label or tag to each tested component indicating satisfactory completion of tests.
- r. Infrared Scanning: After Substantial Completion, but not more than 60 days after Final Acceptance, perform an infrared scan of each power wiring termination and each bus connection. Remove all access panels so terminations and are accessible to portable scanner.
- s. Follow-up Infrared Scanning: Perform an additional follow-up infrared scan 11 months after date of Substantial Completion.
- t. Instrument: Use an infrared scanning device designed to measure temperature or to detect significant deviations from normal values. Provide calibration record for device.
- u. Record of Infrared Scanning: Prepare a certified report that identifies terminations and connections checked and that describes scanning results. Include notation of deficiencies detected, remedial action taken and observations after remedial action. Report shall be forwarded to EOR and MDC Facilities PM.

#### C. Generator Performance Standards

1. The electrical contractor shall be responsible to coordinate all trades to ensure the proper functioning of the entire system including but not limited to fuel supply, exhaust equipment and air transfer system. This coordination shall include furnishing all required information to other contractors with regard to fuel, exhaust and cooling system dimensions, pipe and duct sizes, etc. Electrical contractor shall furnish a dimensioned plan layout indicating all generator dimensions, roughing dimensions, piping layout, duct layout, tank locations and elevations and all required electrical wiring and interconnections. Provide a note to this effect in the project manual.
2. Provide operating and maintenance manuals complete with replacement parts data for standby emergency generator system.
3. Standby Emergency Generator shall be installed in accordance with the manufacturer's recommendations and in compliance with the requirements of NFPA and all pertaining codes.
4. Provide a 6-inch-high concrete pad under the generator set.

5. Furnish owner with manufacturer's certification and warranty assuring each item of equipment is complete and in good condition, free from damage, properly installed, connected, adjusted and tested as to full power rating, stability and voltage and frequency regulation.
6. The electric generator set shall receive the manufacturer's standard testing. Prior to acceptance of the installation, the equipment shall be tested to show it will start automatically, subjected to full load test; or that load which is available at the jobsite, shut down and reset. Prior to acceptance, the contractor at his expense shall correct any defects that become evident during this test.
7. On completion of the installation, an independent commissioning agent shall perform the initial start-up. At the time of start-up, operating instructions and maintenance procedures shall be thoroughly explained to operating personnel. Two copies of operating and maintenance instruction books shall be supplied for the electric set and such auxiliary equipment as may require it.
8. Generators shall be provided with isochronous governors for over cranking and speed control.
9. Generator grounding system, when three poles automatic or manual transfer switches are used with solid neutral conductor connections, shall be limited to grounding the generator frame.
10. Warranty: Standby electric generating set shall be provided by manufacturer and shall be warranted for a period of five (5) years from date of acceptance. Copy of written warranty shall be attached to shop drawing submittal.

#### D. Transfer Switches

1. Provide automatic transfer switches, non-automatic transfer switches, remote annunciator, and control panels through one source from a single manufacturer.
2. Transfer switches shall be monitored by existing campus BAS using BACnet protocol.
3. Switch Characteristics: Designed for continuous-duty repetitive transfer of full-rated current between active power sources.
  - a. Limitation: Switches using molded-case switches or circuit breakers or insulated case circuit-breaker components are not acceptable.
  - b. Switch Action: Double throw; mechanically held in both directions.
  - c. Contacts: Silver composition or silver alloy for load-current switching.  
Conventional automatic transfer-switch units, rated 225 A and higher, shall have separate arcing contacts.
4. Transfer switches shall be three pole with solid neutral connections. Four-pole automatic transfer switches (three phase poles and one neutral pole) shall be used where ground-fault protection is used, or if the generator is grounded. A separately switched, fully rated neutral pole may be needed to insure proper operation of the ground-fault relay.

## E. Emergency Service

1. Installation of a fire pump shall meet requirements of The National Electric Code Article 695.
2. Installation of emergency generator and fuel supply shall meet requirements of National Electrical Code - Article 700, and NFPA 110 (if applicable).
3. The emergency radio, telephone, critical IT/server rooms, and BAS Systems shall each have self-contained UPS type backup power sources to operate the system.
4. Provide emergency lighting to the following areas:
  - a. Interior corridors, ramps, and stairs in compliance with NFPA 101.
  - b. Instructional spaces, conference rooms, gymnasiums, and other student occupied areas
  - c. Group toilets, emergency generator room, main electrical room, and telephone rooms.
  - d. Other occupancies as required by NFPA 101 and The Florida Building Code latest edition (FBC).
  - e. Main electrical rooms, generator rooms and telecommunications rooms shall also be provided with self-contained emergency lighting fixtures with battery pack, in addition to the light fixtures connected to the emergency life safety systems.
5. The service entrance disconnect for normal electric power, from utility feeding an ATS shall be in a separate enclosure.
6. Illuminate means of egress to a minimum of not less than one (1) foot-candle, measured at the floor.

## F. Photovoltaic collectors: Consider the use of photovoltaics on all new projects and major remodeling. Projects to comply with FSEC Standard 203-17 Procedures for Photovoltaic System Design Review and Approval.

## G. Static Uninterruptible Power Supply

1. Generator/UPS Compatibility: If the project includes powering the UPSs from a generator, coordinate compatibility with the specific generator that will be used.
2. Automatic operation includes the following:
  - a. Normal Conditions: Load is supplied with power flowing from the normal power input terminals, through the rectifier-charger and inverter, with the battery connected in parallel with the rectifier-charger output.
  - b. Abnormal Supply Conditions: If normal supply deviates from specified and adjustable voltage, voltage waveform, or frequency limits, the battery supplies energy to maintain constant, regulated inverter power output to the load without switching or disturbance.
  - c. If normal power fails, energy supplied by the battery through the inverter continues supply-regulated power to the load without switching or disturbance.

- d. When power is restored at the normal supply terminals of the system, controls automatically synchronize the inverter with the external source before transferring the load. The rectifier-charger then supplies power to the load through the inverter and simultaneously recharges the battery.
  - e. If the battery becomes discharged and normal supply is available, the rectifier/charger charges the battery. On reaching full charge, the rectifier-charger automatically shifts to float-charge mode.
  - f. If any element of the UPS system fails and power is available at the normal supply terminals of the system, the static bypass transfer switch switches the load to the normal ac supply circuit without disturbance or interruption.
  - g. If a fault occurs in the system supplied by the UPS, and current flows in excess of the overload rating of the UPS system, the static bypass transfer switch operates to bypass the fault current to the normal ac supply circuit for fault clearing.
  - h. When the fault has cleared, the static bypass transfer switch returns the load to the UPS system.
  - i. If the battery is disconnected, the UPS continues to supply power to the load with no degradation of its regulation of voltage and frequency of the output bus.
3. Manual operation includes the following:
- a. Turning the inverter off causes the static bypass transfer switch to transfer the load directly to the normal ac supply circuit without disturbance or interruption.
  - b. Turning the inverter on causes the static bypass transfer switch to transfer the load to the inverter.
4. The UPS shall perform as specified while supplying rated full-load current, composed of any combination of linear and nonlinear load, up to 100 percent nonlinear load with a load crest factor of 3.0, under the following conditions or combinations of the following conditions:
- a. Inverter is switched to battery source.
  - b. Steady-state ac input voltage deviates up to plus or minus 10 percent from nominal voltage.
  - c. Steady-state input frequency deviates up to plus or minus 5 percent from nominal frequency.
  - d. THD of input voltage is 15 percent or more with a minimum crest factor of 3.0, and the largest single harmonic component is a minimum of 5 percent of the fundamental value.
  - e. Load is 50 percent unbalanced continuously.
5. Minimum Duration of Supply: If battery is sole energy source supplying rated full UPS load current at 80 percent power factor, duration of supply shall be 10 minutes unless the Owner's program requirements require more time in which case the duration of supply shall be as indicated.
6. Input Voltage Tolerance: System steady-state and transient output performance remains within specified tolerances when steady-state ac input voltage varies plus 10, minus 15 percent from nominal voltage.
7. Overall UPS Efficiency: Equal to or greater than indicated in the following table:

Nominal Overall UPS Efficiency Ratings			
Size Range of UPS Units	Efficiency at 100% Rated Load	Efficiency at 75% Rated Load	Efficiency at 50% Rated Load
30 KVA and Smaller	86	85	84
37.5 to 74 KVA	89	88	87
75 to 124 KVA	90	88	87
125 to 224 KVA	90	89	88
225 KVA and Larger	90	89	88

8. Maximum Acoustical Noise: maximum allowable values indicated in the following table:

Nominal Overall UPS Audible Noise Ratings		
Size Range of UPS Units	Maximum Noise Value	Distance at which Measured
10 KVA and Smaller	58 dB	36 inches (900 mm)
20 to 125 KVA	60 dB	48 inches (1200 mm)
150 to 300 KVA	78 dB	48 inches (1200 mm)
300 KVA and Larger	83 dB	48 inches (1200 mm)

9. Maximum Energizing Inrush Current: Six times the full-load current.



10. Maximum AC Output-Voltage Regulation for Loads up to 50 Percent Unbalanced: Plus or minus 2 percent over the full range of battery voltage.
11. Output Frequency: 60 Hz, plus or minus 0.5 percent over the full range of input voltage, load, and battery voltage.
12. Limitation of harmonic distortion of input current to the UPS shall be as follows:
  - a. Description: Either a tuned harmonic filter or an arrangement of rectifier-charger circuits shall limit THD to 5 percent, maximum, at rated full UPS load current, for power sources with X/R ratio between 2 and 30.
13. Maximum Harmonic Content of Output-Voltage Waveform: 5 percent rms total and 3 percent rms for any single harmonic, for 100 percent rated nonlinear load current with a load crest factor of 3.0.
14. Maximum Harmonic Content of Output-Voltage Waveform: 5 percent rms total and 3 percent rms for any single harmonic, for rated full load with total harmonic distortion up to 50 percent, with a load crest factor of 3.0.
15. Minimum Overload Capacity of UPS at Rated Voltage: 125 percent of rated full load for 10 minutes, and 150 percent for 30 seconds in all operating modes.
16. Maximum Output-Voltage Transient Excursions from Rated Value: For the following instantaneous load changes, stated as percentages of rated full UPS load, voltage shall remain within stated percentages of rated value and recover to, and remain within, plus or minus 2 percent of that value within 100 ms:
  - a. 50 Percent: Plus or minus 5 percent.
  - b. 100 Percent: Plus or minus 5 percent.
  - c. Loss of AC Input Power: Plus or minus 1 percent.
  - d. Restoration of AC Input Power: Plus or minus 1 percent.
17. Input Power Factor: A minimum of [0.70] [0.85] lagging when supply voltage and current are at nominal rated values and the UPS is supplying rated full-load current.
18. Electromagnetic interference emissions: Comply with FCC Rules and Regulations and with 47 CFR 15 for Class A equipment.

## 26 40 00 ELECTRICAL PROTECTION

### A. General

1. Lightning protection systems shall be included in all new buildings.
2. Lightning protection systems shall be designed and installed in accordance with NFPA 780, UL 96 and UL

96A.

3. Down conductors shall be protected against physical damage with approved raceways. Raceways shall be bonded to down conductors at both ends.
4. All grounding systems (electric, telephone, lightning protection, etc.,) are to be interconnected.
5. All metallic raceways, enclosures, frames and other non-current carrying metal parts of the electric equipment locations within 6'-0" of lightning rod conductors are to be bonded to same. Include a note in the project specifications to cover this.
6. All air terminals, conductors, fasteners, air terminal supports, etc. are to be manufactured from copper.
7. Ground rods shall be ¾" minimum diameter, 8 ft. long copper clad steel.
8. Installation of the lightning protection system shall be performed by qualified personnel certified by UL or LPI as a Master Installer/Designer, trained and approved for installation of units required for this Project.
9. Upon completion of the installation, the contractor shall furnish the Master Label issued by Underwriters Laboratories, Inc. for the system. If the protected structure is an addition to or is attached to an existing structure that does not have a lightning protection system, the contractor shall advise the Owner of the installation requirements on the existing structure to obtain the Master Label. If the existing structure does have a lightning protection system, the contractor shall advise the Owner of any additional work required on the existing system to achieve compliance with current UL Master Label requirements.

## 26 50 00 LIGHTING

### A. Illumination

1. Illumination levels shall be according to The Florida Building Code latest edition, general illumination requirements, and applicable IES Guidelines. The project for lighting design shall minimize glare on computer terminal screens and shall provide flexibility for furniture layout changes in open office areas.
2. Theater and any other specialty lighting shall be LED and shall be according to program requirements.
3. Comply with all requirements of LEED for all new and applicable remodeling projects.
4. Fixture types, lamp styles and fixture variations shall be standardized and kept to a minimum within a specific project.
5. Parking and site lighting shall be according to The Florida Building Code (FBC) requirements, local regulations, and program requirements.
6. Lighting of exterior corridors and building perimeter shall be designed to have normal lighting illumination levels required when occupied and security lighting when the facility is not occupied.
  - a. Provide security lighting to illuminate exterior walls of buildings, building entrances, service yards, parking lots, and other locations according to program requirements.
  - b. Security lighting shall be designed to provide visibility to all exterior elevations of the facility without

creating shadows. Lighting shall be focused toward the building and not illuminate adjacent property.  
c. Mount lighting at building perimeters such that they can be serviced from roof decks.

7. Lighting shall be 277V when possible.
8. All LEDs and electrical discharge luminaires shall be equipped with an internal in line fuse, and an adequate Surge Protection Device (SPD).
9. Luminaires shall have solid, protective lenses.
10. Exterior lighting fixtures shall be vandal resistant and weather proof with adequate IP rating for the application.
11. Provide impact resistant or protective covers at interior sports facility lighting fixtures and other locations where exposed lamps are subject to physical damage, according to program requirements for each project.
12. Wire guards or protective tubular shields, in place of solid lenses, are allowed at mechanical rooms, electrical rooms, telephone rooms, custodial closets, and other similar low traffic staff-only service spaces, accessible by authorized personnel.
13. Wall mounted luminaires shall be at least 7'6" above finish floor.
14. Locate luminaires within vertical reach of portable lifting machines.
15. Luminaires at stairs shall be over landings or mounted on walls.
16. Exterior emergency lighting shall be provided with vandal resistant housings. The luminaire shall allow access to test buttons without dismantling the fixture or removing the lens.
17. Light fixtures with bare exposed bulbs shall not be used for interior or exterior spaces.
18. Use Light Emitting Diode (LED) type fixtures for all new projects. For specialty areas where other types of lighting are programmatically required, approval must be obtained from the Facilities Department on a case-by-case basis.
  - a. All LED products shall have DesignLights Consortium (DLC) Certification.
  - b. All LED drivers shall be manufactured by Cree, Philips, or equivalent.
  - c. Provide 2' x 4' lay-in luminaire in acoustical lay-in ceilings.
  - d. The LED light source color shall be 4000 degrees K. for interior lighting
  - e. Operating life of the LED source shall exceed 50,000 hours at 25 degree C. ambient temperature.
  - f. Fixtures shall have five year warranty and in-line fusing.
  - g. Efficiency of LED light fixtures shall exceed 95%
  - h. LED fixtures shall be listed by a National Recognized Testing Laboratory (NRTL) recognized by OSHA.
  - i. Exterior lighting for parking lots, parking garages, sports facilities, etc. shall be LED with light source color of 4000 or 5000 degrees K
  - j. Emergency lighting fixtures with Battery packs and/or self-contained emergency fixtures with battery packs shall be provided in the following areas:
    - Electrical rooms.
    - Telecom/IT rooms.

- Generator rooms.
- Fire Pump Rooms.
- Other areas as requested by MDC Facilities Management Department.

19. If fluorescent lighting fixtures are used on an individual basis to replace existing in areas not otherwise remodeled use the following
- a. Fluorescent lighting fixtures shall be provided with electronic ballasts and T-5 or T-8, 4100 K color temperature, energy saver lamps. Electronic ballasts shall have at least a 5-year warranty and a total harmonic distortion not exceeding 15 percent.
  - b. Ballast / lamp combination shall have efficiency in excess of 75 lumens per watt (LPW).
  - c. Compact fluorescent lamps shall be 4100K color temperature and the wattage shall vary according to the application.
  - d. Use dual switching to achieve low level lighting instead of dimming ballast.
  - e. Use 4-foot long lamps.
  - f. Consider use of 4 foot LED lamps that are either plug and play using the electronic ballast or ballast bypass option.
  - g. The use of 2-foot long lamps is prohibited.
  - h. Provide independent support for lay-in grid fixtures installed in acoustical ceilings.
20. Incorporate lighting systems requiring less energy to operate while also improving the light quality in the learning environment.
- a. The cost of implementing new technologies shall be considered when selecting lighting systems.
  - b. The use of building design concepts that introduce natural lighting into the building to offset the use of artificial lighting shall be seriously considered. Special attention shall be paid to assure that natural lighting designs are compatible with intended areas of use:
    - 1) Specify lighting levels appropriate for tasks without providing excessive brightness
    - 2) Control glare and have a high VCP (Visual Comfort Probability > 70.)
    - 3) Reduce the amount of solar heat introduced into the building.
  - c. Assure areas are supplemented with artificial lighting and related controls to provide acceptable lighting when natural lighting is available at reduced levels.
  - d. Consider electric utility company rebates and incentives for the replacement of existing lighting systems.
  - e. LED lighting shall be considered for all new installations. LED lighting cannot be of Chinese manufacture.

21. Sodium vapor lights are not allowed at MDC Facilities.

B. Lighting controls

1. Lighting controls shall provide lighting at illumination levels appropriate to the task being performed and shall reduce the lighting level or turn off lighting when spaces are not occupied. Typical lighting control strategies which shall be evaluated to determine the most appropriate methods for each project shall include, but not be limited to:
  - a. Occupancy sensor switching devices shall be able to have immediate re-strike after power failure.
  - b. Multi-level switching or dimming for individual tasks and for floor areas (unoccupied or housekeeping functions).
  - c. Constant lighting level control systems (e.g. lumen maintenance/daylight compensation systems).
  - d. Wide area time program controls with local area override. Local zones shall not exceed 3,000 square feet and shall follow building structural bays.
2. Do not use panel-board circuit breakers as operating switches. Provide readily accessible local switches as required at main entrances of instructional spaces.
3. Provide Lighting Controls and Lighting Layout to permit two or more evenly distributed lighting levels in spaces greater than 400 SQFT. Dimming can also be utilized to achieve this.
4. Lighting Control for Instructional Spaces shall be accomplished by providing each luminaire with one lamp switching combination.
5. Lighting control for emergency lighting, if needed, shall be according to NEC-700-20 and 21.
6. Light switching in a space requiring emergency lighting shall have relays to allow on/off switching and to turn on emergency lighting automatically upon power failure. No battery packs are allowed.
7. Security/outdoor lighting shall be controlled by the facility's Building Automation System (BAS).
8. Indoor lighting for offices, classrooms, unoccupied spaces (i.e., conference rooms storage rooms, custodian rooms, etc.) shall be controlled locally (by toggle switches or occupancy sensors), and shall be overridden by the building automation system (BAS).
9. In common areas (i.e., hallways, public restrooms, etc.) Lighting shall be controlled via BAS with no local switching.
10. Exterior row of all parking garage lighting facilities shall be separately zoned with daylight sensor controls to maximize energy savings.
11. Front row of lighting (closest to white board or projection display) should be switched as a separate zone.
12. Consider daylight harvesting sensors and zones in the illumination design.
13. Provide switches with LED pilot lights for attic lights, roof lights, elevator/escalator pit lights, and remotely monitored or controlled devices and equipment. Tie all lighting to BMS.
14. Lighting located in locker rooms, assembly rooms, student toilets, covered walkways, corridors, exterior

lights, and unsupervised rooms accessible to students shall be remotely switched from the nearest secured area or closet and shall have switch identification. These shall also be tied to the BMS.

15. For multi- media classrooms provide a light switch combination for luminaires beyond the overhead projection line.
16. Use relays or contactors to control lighting loads in athletic fields and other areas. Relay or contactor operation shall be controlled by the MDC Building Automation System (BAS) thru BACnet protocol.)
17. Provide light switch combination for luminaires beyond the overhead projection line.
18. All lighting controls to be tied to BAS through BACNET. This includes all classrooms and switched lighting areas as well as general corridors, etc.
19. All new facilities at MDC must be designed to be certified as LEED Silver per the latest applicable version of the US Green Building Council. Lighting efficiencies and levels of control may require enhancements beyond those listed above in order to comply with these requirements.

C. Minimum Recommended Illumination levels

1. Illumination & Power Densities

- a. The illumination required for parking areas, building exteriors, and classroom units shall be in compliance with the FBC Chapter 423.
- b. Arrange illumination so that the failure of any single lighting component will not leave any means of egress in darkness. (FBC)
- c. Illuminate means of egress to minimum of not less than one (1) foot-candle, measured at the floor.
- d. For Illumination levels in interior and exterior spaces, not shown in the FBC, use the IESNA Lighting Design Guide.
- e. For lighting power densities in building exteriors and interiors use the FBC, Chapter 13 (Energy).

2. Illumination Levels

Note this list is not all inclusive. For a complete list of recommended illumination levels of illuminations refer to IESNA Lighting Design Guide and the FBC.

SPACE TYPE	HORIZONTAL (FC)	VERTICAL (FC)
<u>Interior Space</u>		
Reading White Boards	--	5
Reading – pen/ typed print	30	--
Reading – keyboard	30	--
Science Labs	50	30
Art Rooms	50	30
Lecture Halls	100	50



Classrooms	50	--
Corridors and Stairways	10	--

Minimum Lighting Levels for Parking Areas (FBC Chapter 423)

Parking Areas	1
Covered & Connected Walks	1
Entrances & Exits	2
Entrances	5
Building Surrounds	1

D. LED Lighting

1. When specifying luminaires, the first choice shall be LEDs, for both interior and exterior applications.
2. All luminaires shall be UL listed with a minimum of 5 years warranty and rated by IESNA testing standards LM-79 and LM-80. All luminaires shall be “Energy Star” certified.
3. All proposed LED luminaires for interior and exterior lighting shall be reviewed and approved in writing by MDC Facilities Management.

**NOTE: This division of the design criteria shall be included as part of Project Manual in the Construction and Contract Documents.**

**END OF DIVISION**

**27 00 00 COMMUNICATIONS**

**27 01 00 GENERAL**

- A. Comply with the latest editions of the Florida Building Code, Florida Fire Prevention Code, National Electrical Code (NEC) and all other required Codes and regulations.
- B. Low voltage systems of communication, data, security, and energy management are in this division due to the special expertise required for proper installation.
- C. Coordinate electrical and communication connections with architectural and other elements to eliminate omissions and field conflicts.
- D. Not all code requirements are listed within M-DC Design Criteria. Selected items are included for clarification or emphasis. Research and design according to applicable codes.
- E. Training of M-DC personnel for operation and maintenance of security and energy management systems shall be included in project specifications and coordinated with the M-DC project manager to occur at the project site at least 2 weeks before project acceptance.
- F. The Contractor shall furnish and install an empty conduit system with labeled pull strings for the following systems:
  - 1. Telecommunication System.
- G. All EMT conduit for Division 27 and 28 shall be color-coded for identification as follows.
  - 1. Fire Alarm .....Orange
  - 2. Security .....Blue
  - 3. Sound Reinforcement ..... Yellow
  - 4. Telephone/Data ..... Green
  - 5. TV .....Brown
  - 6. Controls .....Purple

**DIVISION 27**

**COMMUNICATIONS**

**This section contains the following:**

- 27 01 00 GENERAL**
  - 27 05 00 Common Work Results for Communications
- 27 10 00 STRUCTURED CABLING**
  - 27 11 00 Communications Equipment Room Fittings
  - 27 15 00 Horizontal Cabling
  - 27 16 00 Communications Connecting Cords, Devices and Adapters
- 27 40 00 AUDIO-VIDEO COMMUNICATIONS**





#### H. Submittal Requirements.

1. Coordinate the Locations and Methods of connecting telecommunication equipment rooms with required empty raceway systems with MDC ITS Department.
2. Size raceways (1" min.) for different Systems, to accommodate the various applications.
3. Floor Plans showing device locations.
4. Utility service location and routing
5. Telecommunications room and satellite wiring closets at 1/4" scale floor plans.
6. Conduit layout at overall site plan showing each existing and future building, telephone service to site, and conduits between the main telecommunications room and satellite wiring closets.
7. Electrical telephone outlets, over-head protectors and data outlets.
8. Electrical power legends for electrical outlets in the telecommunications room and satellite wiring closets and near data outlets.
9. Complete electrical specifications.
10. Completed electrical drawings coordinated with plans and specifications of structural, architectural, electrical, civil, laboratory equipment supplier, food preparation equipment supplier, and not-in-contract equipment to eliminate errors, conflicts, and omissions.
11. Complete riser diagram showing the location of every outlet and conduit sizes from the various wiring closets to the outlets. This shall include the conduits between the wiring closets and the main telecommunications room.
12. Electrical drawings and riser diagrams locating and indicating sizes of pull boxes and junction boxes used in the conduit systems.

#### I. All MDC projects shall be Design to comply with "LEED Silver" as minimum requirements.

### **27 05 00 Common Work Results for Communications**

#### A. Outside Plant (OSP) or Backbone cabling system

1. For new buildings, coordinate service point and conduit size with MDC ITS Department.
2. For renovations, consult MDC ITS Department to confirm capacity of existing OSP cable is adequate.

#### B. OSP Ductbank

1. New buildings shall have two conduit paths entering the building at two separate and distinct locations. Coordinate entrance pathways with MDC ITS Department.
2. The minimum number of conduits connecting the building Main Distribution Facilities (MDF) to the campus Main Communications Room (MCR) shall be at least three four-inch (3-4") conduits. More entrance conduits might be needed depending on the size and utilization of the building. Under no circumstance shall the

- number of conduits be less than two 4” conduits. Conduits will be used for copper and fiber optic cables.
3. The top of the conduit bank must be buried below the ground surface at a depth specified by local code.
  4. The fiber and copper cable communications conduit banks must be separated from other services as required by EIA/TIA and local code.
  5. Conduits shall be encased in concrete when:
    - a. Minimum conduit depth cannot be attained
    - b. Conduits pass under roads, driveways, or railroad tracks
    - c. Bend points might be subject to movement
  6. Underground conduits shall be installed in such a way that a slope exists leading away from the building to allow drainage and prevent the accumulation of water within the conduits.
  7. A detectable warning tape (containing metallic tracings) shall be placed 18 inches above all duct banks.
  8. Manholes and Pull Boxes
    - a. Provide manholes and/or pull boxes as follows:
      - 1) Where conduit section length exceeds 300 ft. (on a straight pull).
      - 2) Wherever a cable splice will be required as Indicated by MDC ITS.
      - 3) When bends exceed a total of 180 degrees or two Bends of 90°, a 4' x 4' x 4' pull box must be used.
    - b. Coordinate size of manholes and pull boxes with MDC ITS Department.
    - c. Concrete used for manhole structures shall be of at least 3,500 sq.lb./in strength. All maintenance holes will be properly grounded as required by EIA/TIA and NEC
    - d. Corrosion resistant pulling irons, cable racks, and manhole ladders shall be included in the installation of the manhole.
    - e. All manholes shall be equipped with a round ring and cover, clearly labeled "TELECOM", or "COMMUNICATIONS" only.
    - f. The number of conduits going in and out of the pull box shall not exceed eight.

## **27 10 00 STRUCTURED CABLING**

### **27 11 00 Communications Equipment Room Fittings**

#### **A. Main Campus Communication Room (MCR)**

1. This room shall serve as the demarcation point for all outside services coming into the campus. It will contain

2. All existing campuses have an MCR established.
- B. Main Building Distribution Facility (MDF)
1. Each building has a main communications/distribution room in which all of the network and telecommunications equipment that services the occupants of the building is located.
  2. This room may contain voice (backboards, riser cables, etc.) and network-enabled systems (routers, hubs, and switches), fiber, coaxial connections and UPS's.
  3. The minimum MDF room size is 10' x 15'. To the extent that it is possible, MDC prefers to have the Entrance Facilities and MCR/MDF in one single room.
- C. Intermediate Distribution Facility (IDF)
1. Each IDF contains voice and network equipment used to distribute the backbone's capacity to individual station jacks.
  2. IDF rooms shall be located such that no wall jack is further than 90 meters (295ft.) in actual cable length to the IDF patch panel.
  3. The minimum IDF room size is 100 square feet, preferably with a 10' X 10' footprint.
  4. In special-use buildings (as defined by IT), the equipment room floor space shall be based on the known number of workstations (not on usable floor area). This standard can be found in EIA/TIA-569 table 8.2-2.
- D. Only equipment directly related to the network and telecommunications system and its environmental support systems shall be located in Communications Rooms (MCR, MDF and IDF). Water and chiller lines cannot be run through the communications rooms. In addition, the following items shall not be located in CRs:
1. Batteries needed to support the Main Communication Room equipment
  2. Electrical power
  3. Transformers
  4. Motors and generators.
  5. UPS units over 30KVA MUST be housed in a separate room
- E. Location
1. Locate equipment rooms close to the main backbone pathway.
  2. Avoid locations that are restricted by building components that limit expansion such as elevators, utility chases, outside walls, stairwells or other fixed building walls.
  3. CRs shall be separated from rooms containing electrical power supply, transformers, motors and generators,

x-ray equipment, radio, or radar transmitters, and induction sealing devices.

4. IDFs MUST stack one on top of the other.
5. CRs shall be directly accessible from public corridors and spaces for unrestricted access by telecommunications. The footprint of the room shall be located as close to the middle of the floor space that it serves.

#### F. Room Fit-Out

1. Floors, walls and ceiling shall be treated to eliminate dust. Finishes shall be light in color.
2. A minimum of three walls shall be covered with rigidly fixed A-C plywood void free, 3/4" x 4' x 8' high, mounted vertically.
3. Plywood shall be fire rated, covered with two coats of medium gray paint and smooth on one wide with the smooth size exposed.
4. Access door into room shall be a minimum of 36 in. wide and 80 in. high and shall be fitted with a lock and card access.
5. Ceilings – The minimum ceiling height is 9 feet from finished floor to bottom of structure with no ceiling. Exception – Rooms that are plenum rated shall have a dropped ceiling; bottom of ceiling shall be no lower than 9 feet AFF.
6. Floor shall be seal coated and covered in static dissipating, medium gray VCT tiles unless otherwise specified by MDC IT Infrastructure department.
7. Floor live load shall be designed for 150 pounds minimum per square foot.
8. Fire Rating: Minimum 1-hour, including door
9. Fire Stopping – Comply with Section 10 of EIA/TIA-569.
10. *Sample included at the end of this section, refer to SK-27.1, Miami-Dade Collage MDF/IDF requirements.*

#### G. Electrical Requirements

1. Provide a minimum of two dedicated 20A, 110V AC duplex electrical outlets, fed from the building emergency power panel, provided inside the same junction box. The junction box shall be at a height of 18" AFF and 20" from the center line of the wall.
2. Final number of duplex circuits will be determined by the number of equipment racks in each room. Coordinate with MDC IT Department.
3. Provide convenience duplex outlets at 10 ft. intervals around the perimeter walls at 18 inches AFF.
4. If an emergency power source is available in the building, it is required that all dedicated circuits within each MDF/IDF to be fed from emergency power.
5. Provide a dedicated 15kVA UPS (or larger) for all MCRs in a campus. The actually capacity shall be determined on the specifics of each project. Coordinate with MDC ITS Department.

## H. Grounding

1. Racks and equipment shall have a grounding source according to EIA/TIA -569.
2. Provide a minimum #4 AWG conductor from the main grounding electrode to all CRs.
3. Provide ground bus, sized as needed for Telecom equipment. Minimum size shall be 4"Hx12"W (Model CPI 13622-010 or similar).

## I. Lighting

1. Lighting shall be a minimum of 50-foot candles measured 3 ft. above the finished floor.
2. Coordinate fixture location with rack location.
3. Locate light fixtures a minimum of 8.5ft above the finished floor. Exception - Light fixtures may have to be higher in some cases when ladder racks span the room.
4. Provide emergency lighting.

## J. Air Conditioning

1. Provide continuous and dedicated air conditioning 24 hours a day, seven days a week. The HVAC system shall maintain temperature 64°-75°, degrees Fahrenheit with 40% - 55% relative humidity.
2. Heat dissipation shall be based on 750 – 5000 Btu per hour per cabinet.
3. Provide a positive pressure differential with respect to surrounding areas.
4. HVAC shall be fed from standby power source

## K. Fire Protection

1. Sprinklers heads, when provided, shall be placed along the wall and not in the middle of the room.
2. Provide wire cages to prevent accidental operation.
3. "Dry pipe" sprinkler systems are allowed.

**27 15 00 Horizontal Cabling**

- A. Specific requirements that establish the cable pathways and cabling conduits for each project shall be coordinated with the MDC Information Technology Project Manager at the onset of the design phase for major renovations and new construction projects. Education Specifications Program for the project include communication requirements but may not be all-inclusive regarding communication facilities. A/E shall coordinate with MDC Facilities Project Manager, Campus Administration, and the MDC IT Department to coordinate all conduit and pathway requirements during design.

*Sample included at the end of this section, refer to SK-27.2, Miami-Dade Collage workstation requirements-*

*Telecom Division, for additional requirements*

B. Ladder racks and cable trays

1. MDC IT Department shall approve all cable routes.
2. Minimum cable tray width shall be 12”.
3. Cable trays shall be installed and grounded in accordance with the National Electric Code.
4. Cable trays shall be provided above dropped ceilings and run down hallways and corridors providing a pathway for communication cables from the data outlets to the communications closet.
5. Cable tray installation must be coordinated with all of other trades so that they are not obstructed by other equipment, i.e. air conditioning ducts, electrical conduit etc. and shall be easily accessible for the installation of cables and future changes to the communication systems.
6. Clearances shall be as follows:
  - a. 3 in. clear between the top of the ceiling tiles and the bottom of the cable tray.
  - b. 12 in clear on each side of the cable tray.
  - c. 6 in clearance between the top of the cable tray and any other utilities.

C. Conduits

1. Provide conduits and/or sleeves to interconnect CRs. The open ends of vertical conduits and/or sleeves must be located a maximum of 3 in. from the wall and extend a minimum of 1 in. above the finished floor.
2. To the extent possible, all vertical risers shall rise straight up through the building.
3. If hard ceilings are provided and cable trays cannot be used, conduit from the outlets shall extended to the closest accessible area (drop ceiling, access panel, etc.). When this is not possible, and only when no other alternatives are available, the conduit can be "homerun" to respective telecommunications room.
4. Provide pull boxes at intervals not to exceed 100 ft., and/or containing more than two 90 degree bends or if there is a reverse bend in the run.
5. Provide fish tape or pull cord end-to-end on all conduits
6. Wall and room conduits:
  - a. Provide 1 inch minimum EMT conduit shall be installed from each information outlet electrical box, "stubbed" up above the ceiling level pointing to the nearest cable tray.
  - b. Provide open ends of all conduits and/or sleeves regardless of size with plastic bushings (or grounding connectors as required by NEC). Bushing shall be readily accessible and not concealed within walls, behind ducts and/or blocked by equipment.
7. Minimum inside bend radius of conduit shall be as follows:

- a. 2”C and smaller: 6 times the internal diameter.
  - b. Larger than 2”C: 10 times the internal diameter.
8. Total pathway, regardless of media type, shall not exceed 90 m (295 ft) from the telecommunications outlets to the termination point.
  9. Maintain minimum 12” clearance from parallel runs of electric power or lighting conduits (480V or less)
  10. Maintain minimum 10’ clearance from parallel runs of power greater than 480V.
  11. Pathways for voice and data outlets shall be provided using a star topology from the communications room/closet serving that zone to every individual information outlet.
  12. Conduit shall be sized to not exceed 60% fill ratio for cable trays and 40% for conduits.
  13. All empty conduits/cable trays shall run concealed above ceiling, in wall partitions or underground within Facilities. No exposed/surface mounted raceways installed in finished areas, including exterior open Corridors, will be permitted. Cable trays, when provided, shall be installed above fully accessible ceiling only

#### 27 16 00 Communications Connecting Cords, Devices and Adapters

- A. Each office and Teacher Station at instructional spaces shall receive a minimum of one data outlet or more according to program requirements, with appropriate conduit.
- B. Each computer or printer shall have conduit terminating at a junction box. See program requirements for quantities at each space.
- C. Coordinate wireless access point locations with MDC IT Department.
- D. Coordinate telecom and AV requirements for Teacher Station with MDC IT Department and campus AV personnel.
- E. Provide conduit for each Code Blue phone location. Locations to be coordinated with MDC Security Department. Refer to SK-27.3, MDC Code Blue Phone Template and Installation Minimum Requirements, for rough-in information.
- F. Provide telephone drop for each elevator inside the machine room (or machine space) adjacent to the controller, at all HVAC/BMS controllers and adjacent to Fire Alarm Control Panel. *Sample included at the end of this section, refer to SK-27.4, Data & Voice Infrastructure for Equipment/Mechanical Rooms, for additional requirements.*

#### 27 40 00 AUDIO-VIDEO COMMUNICATIONS

- A. A/E shall meet with MDC Project Manager and Campus AV Department to determine AV scope and infrastructure requirements for each project.
- B. Provide in all lecture halls or auditoriums provisions for the hearing impaired as per Florida Building Code Chapter 2 “Assistive Listening Systems” and Florida Building Code table 219.3. below:

TABLE 219.3 RECEIVERS FOR ASSISTIVE LISTENING SYSTEMS		
Capacity of Seating in Assembly Area	Minimum Number of Required Receivers	Minimum Number of required Receivers Required to be Hearing-aid Compatible
50 or less	2	2
51 to 200	2, plus 1 per 25 seats over 50 seats <sup>1</sup>	2
201 to 500	2, plus 1 per 25 seats over 50 seats <sup>1</sup>	1 per 4 receivers <sup>1</sup>
501 to 1000	20, plus 1 per 33 seats over 500 seats <sup>1</sup>	1 per 4 receivers <sup>1</sup>
1001 to 2000	35, plus 1 per 50 seats over 1000 seats <sup>1</sup>	1 per 4 receivers <sup>1</sup>
2001 and over	55, plus 1 per 100 seats over 2000 seats <sup>1</sup>	1 per 4 receivers <sup>1</sup>

<sup>1</sup> Or fraction thereof.

**NOTE: This division of the design criteria shall be included as part of Project Manual in the Construction and Contract Documents.**

**END OF DIVISION**





### MIAMI DADE COLLEGE MDF/IDF REQUIREMENTS

MDF/IDF minimum room size shall be 10' x 11' by 8 feet 6 inches high and have a minimum of a one hour fire rated assembly (including the door). However, upon review of the architectural drawings and ES Specs, The MDF/IDF Infrastructure Project Manager may determine that a larger room size may be needed.

- a. In new construction, and where possible in renovation of existing facilities, the TR shall be "stacked" vertically in multi-story buildings. The pathways (conduits and cable trays) in the IDF shall be specified during design stage by the MDF/IDF infrastructure department.
- b. The room shall be permanently located and not subject to change due to building alterations or rearrangement of interior partitions.
- c. The floor space allotted should be of adequate size to accommodate fifty percent future expansion of the equipment.
- d. The room interior shall be designed to house only equipment directly related to the MDF telecommunications system and its environmental support systems.
- e. Another factor in determining room size (item 1) will be the expectations/decisions by others to have other non-telecommunications systems using the MDF/IDF rooms to house their equipment. Those other systems need to be evaluated as being absolutely necessary and acceptable to be collocated within the designated MDF telecommunications space before the final dimensions of the telecommunications equipment room is finalized.
- f. The room shall be directly accessible from public corridors and spaces for unrestricted access by telecommunications. The footprint of the room shall be located as close to the middle of the floor space that it serves. This is an attempt to eliminate any cable runs to be excessively long and possibly affect the quality of service to those devices at the end of those long cable runs.

2. All Equipment Rooms must be environmentally controlled 24 hours a day seven days a week. The rooms should have both building system HVAC supply, as well as, a transition unit to insure continuous operation. If a standby power source is available in the building, consideration should be given to connecting the HVAC system serving the telecommunications equipment room to the standby supply.
  - a. HVAC shall be included in the design of the room to maintain a temperature between 64 and 72 degrees Fahrenheit minimum.
  - b. A positive pressure differential with respect to surrounding areas should be provided.
  - c. The humidity must be maintained between 40 and 60 percent.
3. IDF rooms should be free of all safety hazards and should have no suspended ceilings. The walls must be continuous from floor to underside of the floor above. The space allotted shall be dry and free from the danger of flooding. No exposed water, gas, or steam pipes shall enter in or run through the room, especially overhead. No drains, ducts or conduits shall be permitted.
4. The room shall be isolated away from sources of electromagnetic interference. Special attention shall be given to electrical power supply transformers, motors and generators, entry equipment, radio or radar transmitters, and induction heating devices.
5. There shall be no automatic fire sprinklers except as required by building code. If sprinklers are required by code within the equipment area, the heads shall be wall mounted only and not above the equipment racks. Their location shall be reviewed with the MDF/IDF infrastructure Project Manager.
6. A minimum of three walls shall be lined with plywood backboards. All plywood backboards shall meet the following minimum requirements:
  - a. All plywood shall be A-C void free 1/2" x 4' x 8', mounted vertically.
  - b. All plywood shall be smooth on one side with the smooth side exposed.
  - c. The plywood shall be painted on all six sides with a medium gray color as per TIA 959B.
  - d. The bottom of the plywood shall be mounted at 3.5 inches A.F.F.
  - e. The plywood shall be securely anchored to the wall.
  - f. In new hollow wall construction solid blocking shall be installed and the plywood shall be fastened to the solid blocking with steel braces.
  - g. In existing hollow wall construction lagging bolts shall be used to fasten the plywood to the wall.
  - h. Use expansion anchors shall be used to fasten the plywood to solid concrete walls. NOTE: Tapcon type fasteners are not acceptable.
7. The walls, floor, and ceiling shall be finished in such a manner as to eliminate dust and static electricity. Walls and ceilings shall receive primer and finish coat of a light color paint.
8. Floors shall be steel coated and covered in static dissipating, medium gray VCT tiles. Unless otherwise specified by MDF/IDF infrastructure department.
9. A minimum lighting level of 60 foot candles maintained 3 feet off the floor must be provided.
10. Two dedicated circuits, 20A/120V each, going back to emergency power (EP) shall be provided inside the same JB.
  - a. The JB shall be as high as 18" A.F.F. and 20" from the center line of that wall, in the direction of where the rear of the racks will be facing. Exact location shall be reviewed and finalized with the MDF/IDF infrastructure Project Manager.
  - b. In certain circumstances, MDF/IDF infrastructure department may decide to install a non-metallic raceway to extend the electrical service to the base of the equipment racks. As needed, the electrical contractor shall provide the labor and materials needed to extend the electrical service from the JB on the wall to the racks.
11. General Purpose, 15A/120V each, grounded duplex receptacles shall be provided every ten linear feet. This number may change based on the final outcome of item 1.e.
12. Grounding shall be as per ANSI/TIA/EIA-607D 607A Sec. 6-2. A minimum #4 AWG conductor shall be provided to the main grounding electrode. An appropriate grounding busbar of at least 4"x1/2"x1/2" (Model CP 18422-010 or similar) shall be installed in each TR and bonded to the main grounding electrode.
13. The space for fiber and voice terminations shall be located on one continuous wall.

**GROUNDING BUSBAR DETAIL**

**TYPICAL FLOOR PLAN TELECOM EQUIPMENT**

EQUIPMENT LEGEND & SPECIFICATIONS	
□	TELECOMMUNICATIONS BUSBAR/BOARD FREE 3/4" A-C PLYWOOD VOID FREE 1/2" x 4' x 8' PAINTED ON ALL SIDES IN A MEDIUM GRAY COLOR AS PER TIA 959B
+	2-20A, 120V DEDICATED CIRCUITS GOING BACK TO EMERGENCY POWER (EP) (See item 1.1)
↓	1-20A, 120V GENERAL PURPOSE TELECOMMUNICATIONS EQUIPMENT GROUNDING BUSBAR AS PER ANSI/TIA/EIA-607D 607A SEC. 6-2 PROVIDE #4 CONDUCTOR TO MAIN GROUNDING ELECTRODE (See item 1.2)
□	2 LAMP FLUORESCENT LIGHT FIXTURE
▲	TYPICAL 4" x 8" EXTRA DEEP JUNCTION BOX FED BY (1) 1" STEEL/ALUMINUM ENDING IN A BOX WITH PLASTIC BUSHING POINTING IN THE DIRECTION OF CABLE TRAY OR IDF
↓	4" SLEEVES/PIPE STOPPING REQUIRED
□	NETWORK RADIO EQUIPMENT
□	ACCESS CONTROL PANEL LOCATION (SPEC BY OTHER), CORPSE PROTECTOR BLOCK, 1/2" BLOCK, WALL MOUNTED FIRE SPRINKLER LOCATION TO BE COORDINATE WITH MDF/INFRASTRUCTURE PM, # CONDUIT FIRE SEALING AND STOPPING REQUIRED, HVAC 24 HRB, 7 DAY AIR CONDITIONING-USE HVAC WALL REGISTER/DUCTS (OUT), HVAC 24 HRB, 7 DAY AIR CONDITIONING-USE HVAC WALL REGISTER/DUCTS (IN), NO CEILING FLEXDUCT OPEN TO ROOF SUB, FLOORING/FINISH DISSEMINATING MEDIUM GRAY VCT TILES, UNLESS OTHERWISE SPECIFIED BY MDF/TELECOM, COAX CABLE CONNECTION

**TYPICAL ELEVATION TELECOM EQUIPMENT**

**MDF/IDF REQUIREMENTS**

PROJECT NO. \_\_\_\_\_

CAMPUS: \_\_\_\_\_

BUILDING: \_\_\_\_\_

ROOM / LOCATION: \_\_\_\_\_

APPROVED BY: \_\_\_\_\_

DATE: 2/01/9

DRAWN BY: \_\_\_\_\_

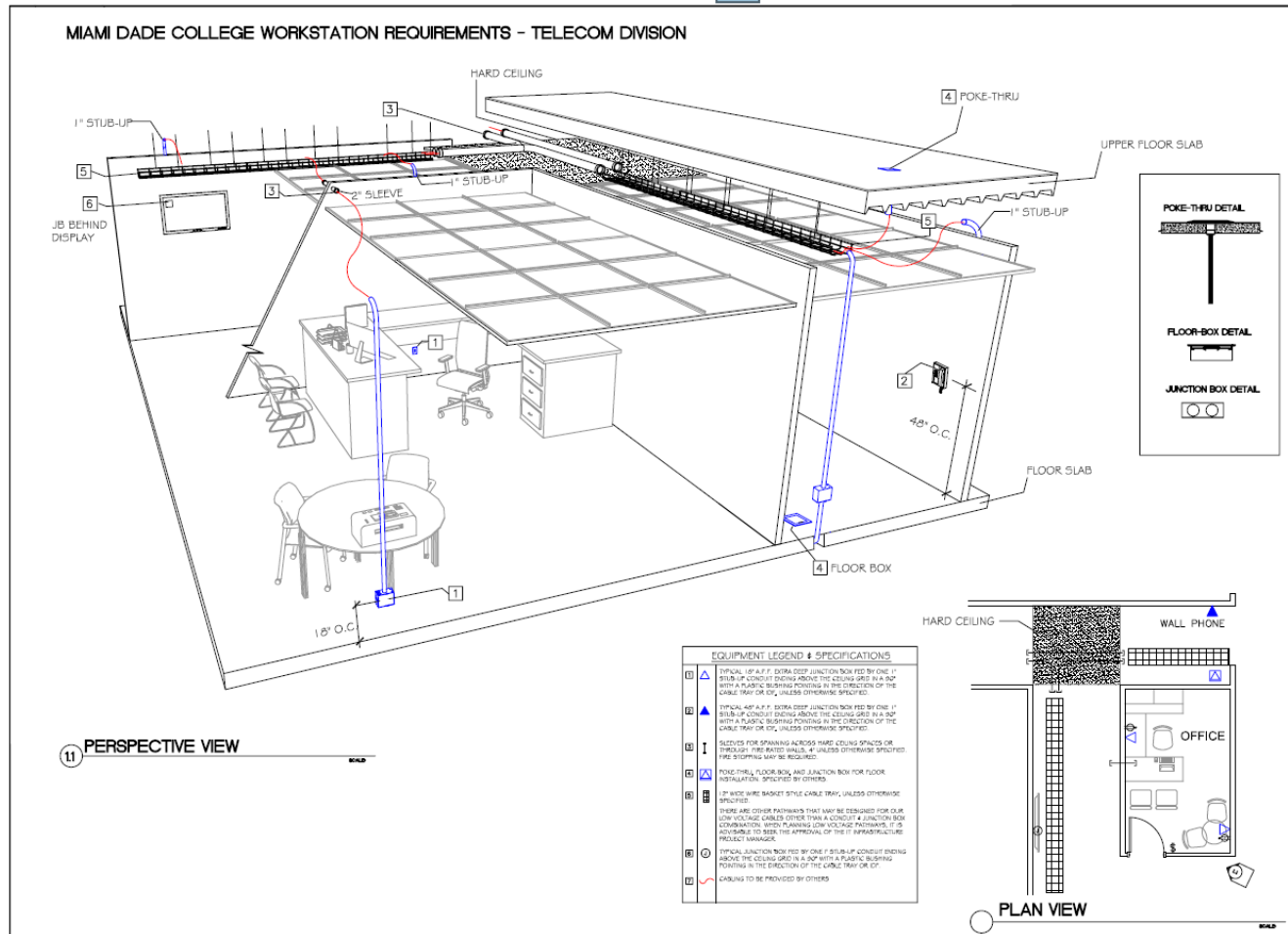
REVISIONS: \_\_\_\_\_

2/01/9

SHEET No. **1**

OF: **1**

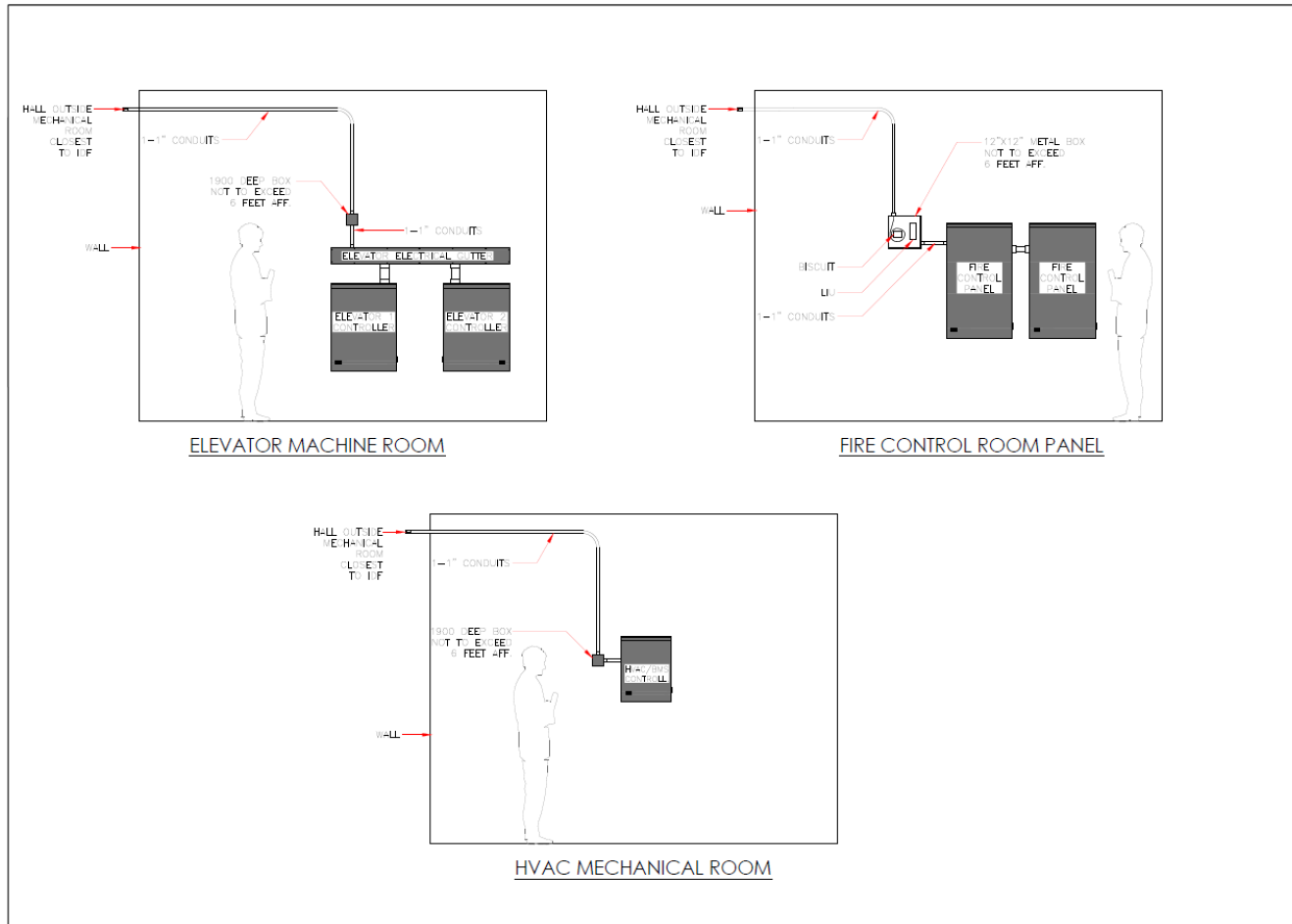
SK-27.1



SK-27.2







SK-27.4

**28 00 00 ELECTRONIC SAFETY AND SECURITY**

**28 01 00 GENERAL**

- A. Comply with the latest editions of the Florida Building Code, Florida Fire Prevention Code, National Electrical Code (NEC), National Fire Alarm Code (NFPA 72), ANSI A117.1, NFPA 90A, 90B and 96, Underwriters Laboratories (UL), and all other required Codes and regulations. The Florida Building Code latest (FBC) for fire alarms.
- B. Low voltage systems of communication, data, security, and energy management are in this division due to the special expertise required for proper installation.
- C. Coordinate electrical and communication connections with architectural and other elements to eliminate omissions and field conflicts.
- D. Not all code requirements are listed within M-DC Design Criteria. Selected items are included for clarification or emphasis. Research and design according to applicable codes.
- E. Training of M-DC personnel for operation and maintenance of security and energy management systems shall be included in project specifications and coordinated with the M-DC project manager to occur at the project site at least 2 weeks before project acceptance.
- F. The Contractor shall furnish and install an empty conduit system with labeled pull strings for the following systems:
  - 1. CCTV System
  - 2. Intrusion Detection System
  - 3. Card Access Control System
- G. All EMT conduit for Division 27 and 28 shall be color-coded for identification as follows:
  - Fire Alarm..... Red
  - Security..... Blue
  - Sound Reinforcement ..... Yellow
  - Telephone/Data..... Green
  - TV..... Brown
  - Controls ..... Purple

**DIVISION 28**

**ELECTRONIC SAFETY SECURITY**

This section contains the following:

- 28 01 00 GENERAL**
- 28 05 00 Intrusion Detection and Access Control
- 28 10 00 FIRE DETECTION AND ALARM SYSTEM**
- 28 20 00 VIDEO SURVEILLANCE**
- 28 40 00 LIFE SAFETY**
- 28 48 00 Emergency Response systems



- H. If cable tray is used on the project, a separate cable tray shall be provided for Intrusion Detection and Access Control. It shall not be shared with the Telecommunications cable tray.
- I. Submittal Requirements.
  - 1. Floor plan drawings indicating locations of all security devices, including card reader, locking devices, sensors, detectors, keypads, panels, power supplies, cameras, racks, etc. The designer or consultant shall establish a security plan based on his/her expertise and with input from the facility's users, and MDC Department of Emergency Management to determine the location of all security devices.
  - 2. Rough-in details for security devices indicating sizes and mounting heights of all junction boxes, conduit, power and raceways' pathways and requirements.
  - 3. Security systems components elevations indicating all power supplies, access control panels, alarm panels with quantities, manufacturer information and part numbers of all components and electronic boards within those panels.
  - 4. Complete scope of work associated with the systems being worked on. Including but not limited to Fire, CCTV, Access control, IT Networking, and all other systems associated with those systems.
  - 5. Complete wiring diagrams indicating connections to all security components and interconnection to other buildings, if applicable.
  - 6. For retrofit projects, thru the Facilities Project Manager, forward all design documents to the Department of Emergency Management, Office of Fire and Security for review. Approval from this department shall be granted, in writing, before commencement of any work.

#### **28 05 00 Intrusion Detection and Access Control**

- A. The designer or consultant shall fully comply with all sections of the specifications listed under Division 28 sections that apply to the project being designed and shall incorporate them into the design documents. Special conditions particular to the project, whether or not indicated in this specification section, shall be indicated in the design documents as to allow the contractor bidding the project to account for all issues affecting price and schedule within a reasonable (industry standard) level of accuracy.
- B. The designer or consultant shall adhere to all applicable door elevations and mounting details, from all details provided in this guideline, and incorporate them into their design documents. MDC standard details shall be modified to reflect special conditions applicable to the project being designed. This is especially important with storefront or glass wall installations, where supplied door typical do not reflect the exact setup of the doorway. The designer or Consultant shall in any particular situations in the project that require deviations from the standard, obtain written approval from the MDC Emergency Management, Office of Fire and Security.

- C. The designer or consultant shall coordinate with the project's electrical designer/engineer for all power requirements for fire alarms and security systems. The electrical design for the project shall include all power outlets, power junction boxes, and all raceways required for access control and alarm panels, power supplies, cameras and all other devices included in the scope of work for security and fire alarm systems.
- D. The designer or consultant shall coordinate with the project's architect and/or door hardware consultant on all locking and sensing devices mounted in door frames or doors, such that all doors and frames are prepared at time of fabrication at the factory, to accept embedded devices, wiring and other components to be installed within or on them. The end-result shall ensure the building users a system compliant with all applicable building codes and the level of safety and security in accordance with the requirements given to the designer or consultant by the users during the design process.
- E. Scope of work includes empty raceway system only. All access control equipment to be provided and installed by MDC. All raceways, gutters, ladder racks, etc. required in the Security Room shall be provided by the Contractor. Provide all power required for access control and intrusion detection system.
- F. Provide access control for the following doors:
1. Building perimeter doors as specified by MDC
    - a. All doors for entrances to offices and buildings shall be electrified.
  2. Telecom Rooms
  3. Classrooms
  4. Main Entrances to Departments and buildings
    - a. All doors for entrances to offices and buildings shall be electrified.
  5. Bursar's Office
  6. All large rooms that are subdivided into multiple smaller rooms
- G. Provide door monitoring at the following locations:
1. Emergency exit perimeter doors
  2. Secondary doors in Control Rooms/spaces labeled as exit only.
- H. Pathways for security systems shall be as follows:

1. Complete conduit run from security devices to security panels.
  2. Complete conduit run from security devices to cable tray system and complete conduit from cable tray system to security panels.
  3. Use of free-run cables shall be approved by MDC Office of Fire and Security on a case-by-case basis.
  4. Hollow molding, storefront frames, or door jambs shall not be used as raceway.
- I. Provide Intelligent System Controller (ICS) (iStar Ultra Door Controller System for new construction, iStar Pro for existing systems). No substitutions will be permitted. Indicate on design documents which ISC is applicable for the project, the location of the device and required quantities.
- J. Security enclosures shall have a key-lockable door and all doors shall be keyed alike. Cabinet openings shall initiate an alarm condition to the security monitoring system.
- K. Provide Emergency Exit By-Pass Pushbuttons at locations required by FFPC and FBC.
- L. Equipment Location
1. Control panels, power supplies and all other head-end components shall be located in a single, secured room within the building, with local access to staff.
  2. In multi-story buildings there may be equipment in such rooms on more than one floor.
  3. Security rooms shall not contain mechanical or elevator controls equipment.
  4. In lieu of a dedicated security room located on each floor, a Telecommunication Room, can be used with approval from MDC telecommunications. A variance request must be submitted if the proposed location of a Software House device is within a Telecommunications Room.
  5. All components shall be contained in enclosures, each of which shall be mounted on backboard of 4'x8' plywood  $\frac{3}{4}$ " thick painted grey with fireproof paint
- M. Devices
1. Indicate on drawings mounting height to bottom of device for all pendant- and wall-mounted devices.
  2. All doors with access control shall be associated to one of the door types indicated in Division 8. Coordinate additional door types with MDC Office of Fire and Security as required.
  3. Provide detail on drawings for each door type indicating all required components and all conduit and box requirements. Sequence of operation for each door shall be indicated.
  4. Final locations of all card readers and door status monitors and other access control devices shall be approved by MDC Office of Fire and Security.



**28 10 00 FIRE DETECTION AND ALARM SYSTEM**

- A. All new buildings, and buildings undergoing major renovations, shall be equipped with a complete fire alarm system which meets Florida Building Code, Chapter 11 Accessibility Code for Building Construction (Section 11-4.28) and current code requirements. Provide all hardware necessary to tie-in with the existing campus monitoring system.
- B. Every building shall have a separate fire alarm control panel. All shall report back to main panel in Public Safety.
- C. The system for new facilities shall be addressable, Simplex 4100U/ES.
- D. Provide programmable central fire control panel with programmable field devices. Fire control panel shall meet NFPA 72 detector sensitivity readout/printout requirements. A history of a minimum of 200 events shall be readable on the fire alarm control panel display (200 events for alarm and 200 events for trouble).
- E. Control panel shall be located at the building entrance. If not feasible, locate annunciator panel where the fire department will enter building. Annunciation panel shall duplicate all functions of the fire control panel.
- F. Renovations: When the existing fire alarm control panel does not support the type of renovation being performed in a building, a second (or third) fire alarm control panel shall be installed. The fire alarm control panels installed for the renovation shall be of sufficient capacity to handle the entire building when the existing fire system(s) is (are) changed.
- G. Fire alarm system shall be a voice evacuation system with Mass Notification. Coordinate requirements with OEM during design.
- H. Devices:
  - 1. Audio/Visual devices shall be combination audible alarm and strobe light there should be no single strobe.
  - 2. The audible alarm shall be a speaker, not a bell or horn, as a bell could be confused with a class bell.
  - 3. Speakers and lights shall be provided in machine rooms and loft/attic areas that have mechanical equipment or work areas.
  - 4. Speakers should be adequate for the locations they are placed. Speakers for exterior locations should be rated for the locations they are placed and to provide adequate coverage of the area and be intelligible.
    - a. Interior Speaker locations: Space the speakers at twice the ceiling height. If the ceiling is 12 feet high, space the speakers 24 feet apart (Hallways, Suites, Conference rooms, Cafeterias, lounges and Interior

- areas that are highly occupied. (Must be approved by Office of Fire and Security)
- b. Exterior Speaker Locations: Spacing for exterior speakers will depend on location and other factors. (Must be approved by Office of Fire and Security).
5. Coordinate audio/visual alarms with locations of classroom projection screens.
  6. Provide ADA 110 candelas strobes, in addition to horns, in areas where a hearing-impaired person may be separated from a normal hearing person in the following places:
    - a. Individual toilet rooms and group toilet rooms.
    - b. Corridors, lobbies, meeting rooms, and other general usage areas.
    - c. Specific areas designated for the deaf.
    - d. Classrooms.
    - e. Other spaces according to The Florida Building Code latest (FBC).
  7. Provide complete speaker coverage at parking areas. Speakers shall be Hyper Spike by Ultra Electronics and UL 1480 listed. Coordinate speaker locations with manufacturer recommendations.
  8. Sensors: All fire and smoke alarm sensors shall be resettable and addressable.
  9. Manual Pull Stations: Provide manual pull stations:
    - a. In corridors serving science labs and other high-risk locations as determined by project specific life safety conditions.
    - b. At all exits from rooms with capacities of 50 or more.
    - c. At all other locations required by FBC.
    - d. Pull stations shall be provided with transparent impact resistant UL listed protective covers, unless located by the intercom console. At new construction, provide recessed pull stations, when allowed by wall conditions, according to manufacturer's requirements.
  - I. Air Handling Unit Shutdown Relay: Air Handling Units shall shut down upon activation of the fire alarm system. AHU shutdown relay shall be supervised and labeled on both devices and panel.
  - J. Junction Boxes and Conduit: All junction boxes on the fire alarm system shall be painted fire-truck red and all conduit shall be red. Existing boxes shall be changed to standard red color.
  - K. Provide a Digital Alarm Communicator Transmitter (DACT) for digital, secondary reporting to Public Safety. Consult Office of Fire and Security regarding the manufacturer and model required.
  - L. Duct-Mounted Smoke Detectors: If duct-mounted smoke detectors are not immediately visible from inside the mechanical room, then provide a remote, labeled L.E.D indicator for each detector, mounted in a convenient,

visible location. Non-radioactive smoke detectors and duct detectors are preferred (i.e. photoelectric). Provide stand-alone, duct mounted smoke detectors where no fire alarm system is present. The operation shall be to shut down the unit and provide notification.

M. Wiring:

1. Wiring shall be enclosed in dedicated, metallic conduit and labeled "FA".
2. Circuit styles shall be Class B according to NFPA 72.
3. Provide separate power for speakers and lights, so that lights can be checked without sounding speakers.

N. Fire alarm systems shall be powered by dedicated circuits from emergency panels according to The Florida Building Code latest edition (FBC) and NEC 700.

O. Automatic Detection Devices.

1. Smoke detectors are not required in occupied or staff supervised areas.
2. Install smoke or heat detectors as required by The Florida Building Code latest edition (FBC) and NFPA 72 at the following locations.
  - a. Storage rooms.
  - b. Custodial closets.
  - c. Mechanical rooms.
  - d. Under wood structure stages.
  - e. A/C equipment room.
  - f. Concealed spaces between ceilings and floors or ceilings and roofs with combustible materials.
  - g. Smokestop doors.
  - h. At other locations according to code requirements.
  - i. Elevators lobbies.
  - j. Computer labs.
  - k. Electrical rooms.
  - l. Above the main fire alarm panel.
  - m. Chemical labs (smoke detectors and gas detectors).
3. In place of smoke detectors at locations with smoke, fume, or dust generation during normal activities, provide fixed temperature/rate of rise heat detectors according to NFPA 72.
4. Monitor sprinkler system water flows and tamper switches and the power, run, and fail supervisory circuits of fire pump controllers.
5. Specify 195-degree fixed temperature heat detectors at kiln rooms.

6. Smoke detectors heads shall be installed after the construction is completed and the building is dust free.

P. Sequence of Operation.

1. Manual activation of any pull station or automatic activation of any area smoke detector, duct detector, heat detector, or water flow switch shall cause an alarm to be transmitted instantaneously to accomplish the following:
  - a. Display alarm at the control panel in the facility.
  - b. Transmit an alarm signal to Public Safety.
  - c. Sound horns complying with applicable codes throughout the facility.
  - d. Energize visual alarms complying with applicable codes throughout the facility. Visual alarms shall be non-silenceable.
  - e. Shut down ventilation and air handling units according to The Florida Building Code (FBC). Except high rise buildings with smoke evacuation system.
  - f. Release magnetic door holders in the protected fire zone area in alarm.
2. The activation of required smoke detectors in elevator lobbies, elevator shafts, or elevator machine rooms shall cause elevator cars to return nonstop to a designated lobby level. No other alarm-causing device shall capture the elevator.
  - a. If the smoke detector at the designated lobby level is activated, the cars shall return to an alternate level pre-accepted by authority having jurisdiction.
  - b. Comply with State Fire Marshall Rule 4A-47 and ANSI A117.1.
  - c. Provide warning lights for elevator lobbies according to ANSI A117.1.
  - d. At projects with either elevator ADA upgrades, a replacement fire alarm system, or an upgraded fire alarm system, verify and ensure elevator controllers, necessary equipment, and connections comply with recall and fire service requirements. A simple expansion of the system or adding devices or zones will not require recall and fire service compliance modifications.
3. Interface with the air handling equipment for emergency shut-off.
4. Interface with fuel shut-off system and with hood fire suppression system and provide the required component and supervised control wiring, with any signal originating from hood fire suppression system complying with the following:
5. Activate the fire alarm system.
  - a. Close the solenoid gas valves serving the equipment under the activated hood fire suppression system.
  - b. Activate local alarm (audible and visual per valve) on the fuel shut-off system.

- c. Hood exhaust fan shall continue to operate, unless required to be shut down by the hood manufacturer.
- d. Initial and backup sources of power shall comply with requirements of – The Florida Building Code latest (FBC) and NFPA 72.
- e. Shut down electrical power under the hood area according to NFPA.
- f. Shut down supply air according to NFPA.

Q. System shall include recall signal and reset button.

R. Emergency mass notification system to be connected through fire alarm and to respond to fire alarm sequence.

## 28 20 00 VIDEO SURVEILLANCE

A. Provide CCTV coverage for the following locations at a minimum. Coordinate with MDC Office of Fire and Security for additional locations that may be required. Final camera layout shall be approved by MDC Office of Fire and Security.

1. Interior:

- a. Main Entries and Exits
- b. Emergency exits (exterior view)
- c. Common Areas and Hall ways
- d. ATM and Store front entrances
- e. Department areas and entrances
- f. Cafeteria and eating area

2. Exterior:

- a. Parking lot and garage entrances and exits
- b. Building Perimeters and exterior access doors
- c. Common areas

B. Provide one data drop and pathway from each camera location to the IDF Room. Refer to MDC Telecommunications requirements for pathways shall apply to CCTV data drops as well.

C. Power Requirements

1. Provide two independent 208V, 30A circuits to CCTV cabinet. Power shall be fed a standby emergency panel

and from a central UPS, if one is being provided for the building.

- D. Mounting height: All cameras located within corridors or common spaces shall be mounted a minimum of 6'-8" AFF.
- E. Provide storage for 30 days.

**28 40 00 LIFE SAFETY**

**28 48 00 Emergency Response Systems (Blue Phone)**

- A. All MDC campuses have an emergency phone system "Blue Phone". For all new projects the A/E shall coordinate new "Blue Phone" locations with the Office of Emergency Management (OEM), IT, campus administration, and public safety on locations and security camera call up integration with emergency phones. The Office of Emergency Management (OEM) reviews all security related matters under construction for CPTED principles and Safe School Design. All emergency phones installed on any College site is manufactured by Code Blue. MDC IT specifies the specific model based on each project and application.
  - 1. General Placement: The emergency phones shall be placed in areas easily identifiable, properly illuminated and where the individual using them has the ability to "escape" if they were to feel threatened while calling for help/assistance.
  - 2. Inside Parking Garages: Following the general placement concept above, emergency phones inside Parking Garages shall be placed at each stairwell entrance or elevator lobby at all floors. **Blue light beacon is required.**
  - 3. Inside Parking Lots: Following the general placement concept above, emergency phones inside Parking Lots shall be placed no less than 200 ft. from each other. The equipment used has to include an area light to provide appropriate illumination where the phone is located. **Blue light beacon is required.**
  - 4. Open Plazas and Green Areas: Open Plazas and Green areas shall follow the same concepts and parameters as for Parking Lots above. **Blue light beacon is required.**
  - 5. Inside Office/classroom buildings: Following the general placement concept above, emergency phone shall be installed by the elevator lobby(ies). Recessed mounting is preferred for aesthetics. Exposed conduits and or boxes will not be allowed in new construction. **No Blue light beacon is required.**
  - 6. Provide power and data as required. In parking garages connect to the emergency generator lighting circuits, at parking lots, open plazas and green areas provide photovoltaic panel and cells.



**NOTE: This division of the design criteria shall be included as part of Project Manual in the Construction and**



Contract Documents.

END OF DIVISION

**31 00 00 EARTHWORK****31 01 00 GENERAL**

- A. All work shall be designed by a Professional Civil Engineer licensed in the State of Florida.
- B. The design of the Earthwork must be implemented so there is minimum impact on adjacent buildings, paved areas, vegetation or existing waterways and aquifer. The Design Professional shall specify that all excavation be implemented safely and in compliance with the Trench Safety Act. The Design Professional shall specify the Termite Control and note that all work shall comply with EPA Regulations.
- C. The design of the Earthwork and Auger Piles shall complement other disciplines designs in a sustainable and reliable fashion.
- D. MDC Campus and MDC Buildings Earthwork and Structural Systems must be designed to comply with the following objectives:
1. Sustainable Design
  2. Minimum elevations of finished on-site grading and building lowest finished floor elevations shall comply with highest elevation requirements of:
    - a. Federal Emergency Management Agency (FEMA)
    - b. Federal Standard 44 CFR (National Flood Insurance Program)
    - c. Miami-Dade County Permitting, Environment and Regulatory Affairs - Natural Resources Regulation & Restoration Division
  3. Solutions with the best value considering a life cycle cost analysis to account for total project cost
- E. During the life span of a typical MDC building, many minor and major alterations are necessary. The flexibility to adjust to alterations easily must be designed into the building and underground systems from the outset. The design of the Underground systems shall provide enough capacity for future additions or renovations and allow modifications to be made in one area without causing major disruptions in other areas of the site. It is MDC's goal to build facilities equipped with the latest advances in technology. Making this concept a reality requires a comprehensive design for engineering systems that goes beyond the requirements of the immediate building program. It also requires a higher level of integration between architecture and engineering systems than one

**DIVISION 31****EARTHWORK**

**This section contains the following:**

<b>31 00 01</b>	<b>GENERAL</b>
<b>31 10 00</b>	<b>SITE CLEARING</b>
31 10 01	Dig Permits
<b>32 20 00</b>	<b>EARTH MOVING</b>
31 23 00	Excavation, Backfill, and Compaction
31 23 19	Dewatering
<b>31 30 00</b>	<b>EARTHWORK METHODS</b>
31 31 00	Soil Treatment
31 31 16	Termite Control
<b>31 60 00</b>	<b>SPECIAL FOUNDATIONS AND LOAD-BEARING ELEMENTS</b>
31 62 13	Concrete Piles



would usually expect in an office building. The design of the underground systems and other building components shall all be combined to produce a building that meets the programmed sustainability rating (LEED rating) of the specific project. In addition, the design work shall be done in accordance with all rules, regulations, and requirements of all authorities having jurisdiction.

- F. The Design Professional must ensure that all submittals and shop drawings are coordinated with other disciplines.
- G. Site clearing, dewatering, earthwork, excavation and termite control shall comply with the requirements of the applicable authorities having jurisdiction and with the in-force edition at the time of the project of the following codes and standards:
  - 1. Trench Safety Act - Florida Statutes, Chapter 553, Part VI
  - 2. Occupational Safety and Health Administration (OSHA) - Excavation Safety Standards
  - 3. American Society of Testing and Materials (ASTM) Standards
  - 4. Miami-Dade County Permitting, Environment and Regulatory Affairs
  - 5. Miami-Dade County Department of Public Works
  - 6. State of Florida Department of Environmental Protection (FDEP)
  - 7. Environmental Protection Agency (EPA) Regulations
- H. Auger Pile Design shall comply with the requirements of the applicable authorities having jurisdiction and with the in-force edition at the time of the project of following codes and standards:
  - 1. American Society of Civil Engineers – ASCE-705
  - 2. American Concrete Institute – ACI-301 and ACI-318

### 31 10 00 SITE CLEARING

- A. The Design Professional shall design the site clearing to include the following:
  - 1. Protection of all vegetation to remain. If an endangered plant species is found, provide an undisturbed area around it as required by FDEP.
  - 2. Removal of vegetation as required.
  - 3. The clearing and grubbing of obstructions, trees, shrubs and other vegetation, including grinding stumps and removing roots and debris.
  - 4. The stripping and stockpiling of topsoil and the removal of surplus topsoil.
  - 5. The Removal of existing above and below grade site improvements.

6. The disconnection, capping or sealing, and removal of site utilities.
7. The installation of temporary erosion and sedimentation control measures.

### 31 10 01 Dig Permits

- A. Requirement for Permit: Prior to commencing any excavation, grading, trenching, boring (jacking or directional), or other related activity that involves penetration of the ground surface on all of MDC campuses, persons (including Builder) performing such operations are required to call Sunshine State Dig Permit 1-800-432-4770.
- B. Responsibility for Damage: Contacting Sunshine State Dig in no way transfers any responsibility or liability for the Builder's actions to the College. The Builder remains responsible for any and all expenses associated with the repair of utility lines damaged by the Builder and is responsible to fully restore all landscape features such as pavement markings, turf, mulch, trees, shrubs, curbs, sidewalks, roads and irrigation to original condition.
- C. There may exist on-site utilities that are private and Sunshine State Dig Permit may not have records or information. The Design Professional shall contact the MDC Project Manager for latest available utility information and may need to contract a utility locating company.

### 31 20 00 EARTH MOVING

- A. The Design Professional shall design the Earth Moving as follows:
  1. Design the preparation of subgrades including cutting and filling, as necessary, and compaction for slabs-on-grade, sidewalks, pavements, turf and grasses, and plants.
  2. Specify the methods for excavation, backfill and compaction for buildings and structures.
  3. Design of Subbase course, including compaction for concrete walks and concrete pavements.
  4. Design of Subbase course and base course, including compaction, for asphalt paving.
  5. Design of Subsurface drainage backfill for walls and trenches.
  6. Specify the methods for excavation, backfill and compaction of trenches for utilities and pits for buried utility structures.
  7. Specify that explosives are not allowed.
  8. Design of usage of drainage geotextiles and separation geotextiles wherever are necessary.
  9. Excavation:
    - a. Excavation design shall cause minimal disturbances to adjacent occupied areas.
    - b. Specify hand-excavation in tree and plant protection zones.

- c. Specify the disposal of Surplus and Waste Materials:  
Satisfactory soil to designated storage areas on Owner's property, waste materials and unsatisfactory soil off Owner's property.

B. Compaction as recommended by the geotechnical report or as follows:

- 1. Required compaction of subbase, subbase courses and surfaces as a percentage of maximum density as obtained by test procedures of ASTM D1557.
- 2. Compaction shall be as follows:

Under structures and building slabs, except footings, each layer.	95%
Under footings, top one foot of cut each layer of fill.	100%
Under pavements and sidewalk areas, top 12 inches, each layer.	95%
Under pavements and sidewalk areas, below 12 inches, each layer.	90%
Under landscaped areas, each layer.	85%

C. Testing requirements.

- 1. Testing: By MDC engaged agency.

**31 23 00 Excavation, Backfill and Compaction**

A. General:

- 1. All underground piping and electrical systems shall be inspected by MDC, which shall also witness all hydrostatic pressure testing before backfilling. The Builder must make requests for MDC inspection and witnessing well in advance.

B. Materials:

- 1. Sand and gravel shall be clean; all backfill products shall be free from foreign matter.
- 2. Specify mortar grade sand; gravel size should range from No. 4 screen retention to 1".



## C. Execution:

1. Specify pipe bedding procedures designed to prevent beam failure.
2. Sand backfill shall be compacted in layers to 12" above pipe.
3. All underground utilities and piping shall have identifying marker tape. All non-metallic pipe installed underground (except pipe containing electrical lines) shall have a tracer wire attached to the pipe. Refer to other sections for the requirements relating to the identification of underground utilities and piping.
4. All trenches and similar excavations shall be filled, compacted, and permanently resurfaced within, and not to exceed, 72 hours of completion of all work, testing, and inspections, unless exception is made by MDC Project Manager.

## D. Safety:

1. Comply with all OSHA requirements.
2. It is the Contractor's responsibility to install and maintain adequate barricades to protect the public; simple stanchions are not adequate for unmanned sites. Excavation left unattended for any length of time are required, at a minimum, to have mesh orange safety fencing surrounding the working area. Excavations left overnight require lighting (flashing or steady burn) at each corner of safety fence and every 25 feet (or less) as applicable.
3. The MDC Project Manager shall be contacted in the event of potential safety issues and violations.
4. Provide all submittal and cost data, on payment breakdown, as required by the Trench Safety Act.

**31 23 19 Dewatering**

## A. Dewatering shall be designed by the Contractor as follows:

1. Contractor to be supplied with a copy of the geotechnical report.
2. Contractor to survey adjacent construction for settlement before and during dewatering.
3. Contractor to maintain water level as deep as necessary below bottom of excavation.
4. Contractor to comply with the regulations of Miami-Dade County Permitting, Environment and Regulatory Affairs and the Miami-Dade County Department of Public Works.

**31 30 00 EARTHWORK METHODS****31 31 00 Soil Treatment**

- A. Soil treatment shall be required under all footings, slabs on grade, and sidewalks that adjoin new or existing buildings. Soil treatment shall not be applied until excavating, filling, compacting, and grading operations are complete.
- B. Soil treatment is also required beneath all components of modular structures being conveyed to the campuses for occupancy for more than one year. (This requirement does not apply to temporary construction office or storage trailers owned by the Builder and removed after completion of a project, or, temporary, leased, non-MDC owned modular structures to be occupied for less than one year.) All components of the structure that come into contact with soil, such as piers, footings, grade beams, slabs, stairs, decks, ramps and skirting shall have the adjacent soil treated. Treatment shall take place during the set-up process, thereby allowing more complete access for treatment of areas conducive to termite invasion.
- C. The Contractor shall exercise caution to prevent disturbance of the treated area. If any area is required to be re-treated, through no fault of the Owner or Architect/Engineer, it shall be done at the Contractor's expense.

#### **31 31 16 Termite Control**

- A. Termite Control as follows:
  - 1. The installer shall be licensed according to regulations of authorities having jurisdiction.
  - 2. Termicide installation shall comply with all required EPA regulations.
  - 3. The Warranty Period shall be five (5) years.
  - 4. Maintenance shall continue for twelve (12) months.

### **31 60 00 SPECIAL FOUNDATIONS AND LOAD-BEARING ELEMENTS**

#### **31 62 13 Concrete Piles**

- A. Piles shall be installed under the supervision of a qualified professional geotechnical engineer. Design Professional shall design the auger intrusion mortar cast in place piles as follows:
  - 1. Design Loads: As required for particular application.
  - 2. Quality Assurance:
    - a. Grout cubes during construction.
    - b. Evidence auger weight is sufficient to penetrate soil profile.

## 3. Materials

- a. Steel Reinforcement: Deformed reinforcing bars.
- b. Pile Accessories:
  - 1) Sheet metal collars at cut-off.
  - 2) Spacers to maintain vertical reinforcing in position.

## 4. Concrete: As required by pile capacity.

## 5. Installation:

- a. Static pile tests to verify augering criteria and pile lengths and to confirm allowable load of piles.
- b. Damaged or defective piles withdrawn.
- c. Pile installation records compiled by qualified professional geotechnical engineer.

## 6. Field quality control

- a. Special Inspections: Pile foundations.
- b. Testing: By Owner engaged agency.
- c. Pile installation records compiled by qualified professional geotechnical engineer.

**NOTE: This division of the design criteria shall be included as part of Project Manual in the Construction and Contract Documents.**

**END OF DIVISION**

**32 00 00 EXTERIOR IMPROVEMENTS**

**32 01 00 GENERAL**

- A. New facilities or additions to an existing facility require a comprehensive site analysis of the proposed project to identify opportunities, constraints, and any other design issues requiring resolution inclusive of topography, off-site/on-site utilities and specific demolition process where applicable.
- B. Site analysis shall address:
  - 1. Existing topography, soil conditions, percolation and drainage.
  - 2. Sun exposure of proposed facility and spaces.
  - 3. Natural areas and existing landscaping within the site to be preserved.
  - 4. Prevailing breezes.
  - 5. Utilization of solar, wind and geothermal energy considerations.
  - 6. Existing and proposed accesses to site.
  - 7. Noise control to and from site
  - 8. Vibration and Settlement
  - 9. Views to and from site.
  - 10. Compatibility to adjacent and proposed land uses and buildings.
  - 11. Pedestrian and vehicular on-site and off-site circulation.
  - 12. Site features of historical or sociological significance.
  - 13. Existing roads and utilities.
  - 14. Provisions for relocatable buildings and future expansion as stated in this Design Criteria, or when required by the Educational Specifications.
- C. The following energy conservation and environmental concerns shall be addressed:
  - 1. Use of xeriscaping.
  - 2. Water efficient irrigation systems.
  - 3. Limited use of hard surface areas.
  - 4. Use of landscaping for shading facility.
  - 5. Additional suggestions to help MDC continue to be a leader in energy conservation and environmental concerns.

**DIVISION 32**

**EXTERIOR IMPROVEMENTS**

**This section contains the following:**

- 32 01 00 GENERAL**
- 32 02 00 Civil
- 32 10 00 BASES, BALLASTS, AND PAVING**
- 32 10 01 General
- 32 10 02 Paving and Surfacing
- 32 10 03 Electric Vehicle Supply Equipment Requirements
- 32 10 04 Protection of the Work
- 32 10 05 Repair of Pavement
- 32 12 16 Asphalt Paving
- 32 13 13 Concrete Paving
- 32 13 16 Decorative Concrete Paving
- 32 13 73 Concrete Paving Joint Sealants

*(Continues)*



D. Site design shall incorporate the latest design requirements of:

1. Florida Building Code (FBC).
2. Americans with Disabilities Act and Accessibility Guidelines (ADA).
3. American Association of State Highway Transportation Officials (AASHTO).
4. American National Standards Institute (ANSI).
5. American Society for Testing and Materials (ASTM).
6. American Water Works Association (AWWA).
7. Board of Fire Underwriters (BFU).
8. Miami-Dade County Public Works Department (M-DCPW).
9. Florida Department of Transportation (FDOT).
10. Florida Department of Education (DOE).
11. Florida Department of Health (DOH).
12. Florida Department of Agriculture and Consumer Services (DOA).
13. Florida Department of Environmental Protection (FDEP).
14. Miami-Dade County Department of Regulatory & Economic Resources (RER).
15. National Arborist Association (NAA).
16. U.S. Consumer Products Safety Commission (CPSC).
17. Handbook for Public Playground Safety by the U.S. Consumer Product Safety Commission.
18. Other agencies having jurisdiction.

**32 00 02 Civil**

A. Site Access.

1. Provide safe access by pedestrian and vehicular traffic.
2. Site design shall minimize traffic impact upon the surrounding community by proper coordination with existing off-site traffic systems.

B. Flood Criteria.

1. Minimum elevations of finish on-site grading and building lowest finish floor elevations shall comply with the highest elevation requirements of:
  - a. Federal Emergency Management Agency (FEMA).
  - b. Federal standard 44 CRF (National flood Insurance Program).
  - c. Miami-Dade County Permitting, Environment and Regulatory Affairs - Natural Resources Regulation & Restoration Division

32 14 00	Unit Paving
32 14 43	Permeable Unit Paving
32 17 13	Parking Bumpers
32 17 16	Manufactured Traffic-Calming Devices
32 17 23	Pavement Markings
32 18 01	Athletic Fields and Hardcourts
<b>32 30 00</b>	<b>SITE IMPROVEMENTS</b>
32 30 01	Bicycle Facilities
32 30 02	Guardrails
32 30 03	Traffic Signage
32 30 04	Traffic Signals
32 30 05	Vision Triangle
32 31 00	Fence and Gates
32 31 13	Chain Link Fences and Gates
32 31 19	Decorative Fences and Gates
32 33 00	Site Furnishings

*(Continues)*





2. Variance from flood management criteria is not allowed.

C. Safety.

1. A/E design shall provide for public safety, the safety of adjacent structures, and protection of existing conditions to remain during construction.

D. Earthwork.

1. Comply with the requirements of Division 31 00 00 “Earthwork.”
2. Comply with the requirements of the Trench Safety Act, sections 553.60 through 553.64 Florida Statutes.
3. Construction documents shall note “TRENCH WORK SHALL COMPLY WITH THE OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION EXCAVATION SAFETY STANDARDS, 29 C.F.R.S. 1926.650 SUBPART P”.
4. Construction documents shall identify and locate play fields and landscape areas with earthwork requirements different from building, paved areas, and utility earthwork requirements.
5. Proposed paving and grading contours and tie back to existing grades at the perimeter of the project shall be shown on construction drawings.
6. See Landscape in this division for tree protection.
7. Coordinate on-site and off-site earthwork next to MDC perimeter. Provide plans, sections and details required for a timely completion.
8. Prevent impermeable zones from forming.

E. Coordination with Local Governments.

1. Pursuant to Florida Statutes, the MDC and non-exempt local governments are required to ensure that plans for the construction and opening of public educational facilities are coordinated with other necessary services.

F. Traffic Study Report - A Traffic Study Report may be required for new MDC facilities and for some addition projects that increase student stations at an existing facility.

1. The A/E shall utilize the most recent Site Plan and all other information and drawings required to perform the Traffic Study.
2. The A/E shall meet with the Miami-Dade County Department of Public Works to ascertain the scope of the Traffic Study required.
3. The A/E shall not incorporate the recommendations from the Traffic Study until written approval has been received from MDC. The A/E shall incorporate all of the required information onto the construction

**32 80 00 IRRIGATION**

**32 80 01 GENERAL**

- 32 81 00 Irrigation Components and Guidelines
- 32 82 00 Irrigation Pumps
- 32 84 00 Planting Irrigation
- 32 84 13 Drip Irrigation

**32 90 00 PLANTING**

**32 90 01 GENERAL**

- 32 91 00 Planting Preparation And Guidelines
- 32 91 13 Soil Preparation
- 32 91 13.16 Mulch
- 32 91 13.19 Planting Soil Mixing
- 32 91 16 Planting Soil Stabilization
- 32 91 19 Landscape Grading
- 32 92 00 Turf and Grasses
- 32 93 00 Plants
- 32 96 00 Transplanting

*(Continues)*



- documents once approval has been received from MDC.
- 4. The A/E shall attend additional meetings including the DIC meeting(s) to resolve all of the issues relating to the Traffic Study Report.

**32 10 00 BASES, BALLASTS, AND PAVING**

**32 10 01 General**

A. Pavements, Signage, Road and Traffic Control Improvements.

- 1. Life cycle cost analysis shall determine use of:
  - a. Asphalt concrete paving.
  - b. Portland cement concrete paving.
- 2. Locate utility poles and signage clear of traffic lanes.
- 3. Required public right-of-way improvements shall comply with M-DCPW and FDOT where applicable for permits, approvals and reviews.
- 4. Milling:
  - a. Milling shall be according to Florida Department of Transportation Standard Specification for Road and Bridge Construction – latest edition.
  - b. Milling shall be according to Florida Department of Transportation Standard Specification for Road and Bridge Construction – latest edition.
  - c. Milling may occur at the following locations:
    - 1) At signalized intersections.
    - 2) At areas with existing curbs and gutters, valley gutters, median curbs, traffic separators, etc.
    - 3) At lanes to achieve required cross slope.
    - 4) According to MDC due to existing or unforeseen conditions.
  - d. Milled areas deeper than 1 inch shall have an asphalt wedge where the milled surface meets the existing asphalt grade to minimize vehicular impact.
  - e. Resurfacing of milled areas shall be completed within 3 calendar days of the milling operation to minimize pothole development and inconveniences to the motoring public.
- 5. Provide the required signage and other traffic control devices located on right-of-ways in accordance with

**PLANTING GUIDELINES**

**32 93 00 B GENERAL**

- 32 93 00 B.1 Tree Replacement Notes and Guidelines
- 32 93 00 B.2 Recommended Planting Lists
- 32 93 00 B.3 Prohibited Planting List
- 32 93 00 B.4 Typical Landscape Details (SK-32.01- Sk-32.11)



FDOT, Miami-Dade County Public Works (M-DCPW) requirements and Manual of Uniform Traffic Control Devices (MUTCD) latest edition.

6. Traffic control and site signage shall comply with:
  - a. FDOT “Standard Specifications for Road and Bridge Construction”.
  - b. MUTCD
7. Locate signage clear of traffic lanes.
8. Provide road markings along drives and service areas to indicate fire lanes, no parking zones, loading zones and pedestrian crossings, etc.
9. Provide traffic signs which clearly indicate traffic flow requirements - examples:

BUS TRAFFIC ONLY - NO OTHER VEHICLES  
VISITORS TRAFFIC ONLY

- B. Concrete Slabs-on-grade, Sidewalks, Curbs and Gutters, and Wheel-stops.
  1. Sidewalks, sloped paved areas, and curb cuts shall comply with M-DCPW and ADA.
  2. Sidewalks that may be subject to maintenance trucks and other vehicular traffic, shall be a minimum of 6 inches in thickness.
  3. The grading of adjacent landscaping materials or paved surfaces shall not permit storm water run-off to pond near, or sheath across adjacent walks.
  4. Provide expansion and control joints as needed to prevent and control cracking, but as a minimum, provide the following:
    - a. Sidewalks shall be provided with saw-cut or formed control joints at intervals not to exceed 5 feet.
    - b. Expansion joints shall be provided at intervals not to exceed 20 feet, and as follows:
      - 1) At change in direction of the sidewalk.
      - 2) Where sidewalks abut concrete curbs and driveways.
      - 3) Where sidewalks come in contact with walls, columns, footings and similar structures.
    - c. Slabs-on-grade shall be provided with control joints not to exceed intervals of 15 feet in any direction.
  5. Slope paved areas as needed to provide positive drainage, but not exceeding a cross slope of 1:50 at accessible routes for the disabled.

### 32 10 02 Paving and Surfacing

## A. Design Requirements:

1. Applicable Design Standard: Roadway construction shall be designed in accordance with the latest edition of the “Design Standards for the Design, Construction, Maintenance and Utility Operations on the State Highway System” and the “Manual of Uniform Minimum Standards for Design, Construction, and Maintenance for Streets and Highways (commonly referred to as the “Florida Greenbook”),” Florida Department of Transportation. To minimize the impact of thermal gradient differences between developed and undeveloped areas, designs shall incorporate a minimum of 50% of the site hardscape (roads, sidewalks, parking lots, etc.) in high-albedo or open grid paving materials or be shaded within five years of occupancy. Combinations of these strategies are permitted. The use of recycled asphalt paving and landscaping materials is encouraged to maximize the reuse of materials.
2. Design Guide For Bicycle Facilities: Bicycle lanes and paths should be designed in accordance with the latest edition of the “Florida Bicycle Facilities Planning and Design Handbook,” issued by the Florida Department of Transportation and the “Guide for the Development of Bicycle Facilities” published by the American Association of State Highway Officials (AASHTO).
3. Design Guide for Pedestrian Facilities: Pedestrian pathways, crossings and other facilities should be designed in accordance with the latest edition of the “Florida Pedestrian Facilities Planning and Design Handbook,” Florida Department of Transportation.
4. Design Guide for Traffic Control Devices: As required by Title 23 of the Code of Federal Regulations, Part 655.603, all traffic control devices including signs, signals, markings and other devices used to regulate, warn or guide traffic placed on, over, or adjacent to a street, highway, pedestrian facility, or bikeway shall be designed and installed in accordance with the latest edition of the “Manual on Uniform Traffic Control Devices (MUTCD),” U.S. Department of Transportation. Additional guidance for Florida-specific applications can be found in the “Traffic Engineering Manual,” Florida Department of Transportation.
5. Online Resources: Most publications of the Florida Department of Transportation (FDOT) are available at [www2.dot.state.fl.us/proceduraldocuments](http://www2.dot.state.fl.us/proceduraldocuments).
6. Requirement for Design By Professional: Roadway design, including bicycle lanes (on-road) and paths (off-road), shall be by a Florida-licensed professional engineer.

## B. Roadway Construction:

1. Applicable Technical Specifications for Construction: Construction procedures shall follow the usual practices of the Florida Department of Transportation for work of similar character and extent. The provisions and specifications of the latest versions of the “Standard Specifications for Road and Bridge Construction, Division II and Division III,” and “Plans Preparation Manual, Volume I and II,” Florida Department of Transportation shall apply, where applicable, except where modified herein or specifically designated otherwise. References to compensation do not apply. Where reference is made to the

"engineer," substitute the appropriate representative of the Physical Plant Division.

2. Minimum Requirements: New pavement sections should have a minimum 6" base of Florida Limerock, compacted to 95% of maximum density. Paving should be 1 1/4" (minimum) Type SP-12.5 Asphaltic Concrete.

C. Road Closures and Traffic Maintenance:

1. In no case shall a road be closed in its entirety. At least one lane of traffic will be maintained at all times. Special permission for an off-road detour may be granted in some cases; permission shall be obtained through the College's Project Manager.
2. Traffic control measures such as barricades and flagman shall be provided in accordance with maintenance of traffic standards of the Florida Department of Transportation and Part 6 of the MUTCD.
3. Pedestrian Traffic: Pedestrian traffic affected by roadway construction shall be guided as necessary toward a safe alternate route as required by the Manual on Uniform Traffic Control devices for Streets and Highways.
4. An ADA-compliant alternate path of travel shall be operational prior to the start of any project and shall be maintained throughout the duration of any construction project.
5. An alternate path of bicycle travel shall be maintained throughout the duration of any construction project.

D. Bicycle Lanes and Paths:

1. Provision Requirement: All new road construction, or major reconstruction of existing roads, shall accommodate bicycle traffic through the provision of on-road bicycle lanes or off-road bicycle paths. On-road bicycle lanes are preferred.
2. Connection Requirement: New bicycle lanes and paths shall connect to existing bicycle lanes and paths.
3. Lighting Requirement: New bicycle lanes and paths shall be adequately lit. Consult with Section 16500 within these Standards regarding lighting design.
4. Bicycle Lane Construction: On-road bicycle lane construction shall not differ in construction (i.e. type of materials used, level of compaction, or cross-sectional thickness of materials) from adjacent vehicle traffic lanes. Bicycle lanes shall be designed and constructed in accordance with the "Guide for the Development of Bicycle Facilities" published by the American Association of State Highway Officials (AASHTO) and the "Florida Bicycle Facilities Planning and Design Handbook," issued by the Florida Department of Transportation.
5. Bicycle Path Construction: Off-street shared-use paths for use by bicyclists shall be a minimum 10' wide path consisting of a minimum 4" thick Florida Limerock base with a minimum 1" thick Type SP-9.5 asphaltic concrete surface course. Although the above- described section is acceptable, a concrete bicycle path is preferred due to its durability and ease of maintenance. Bicycle paths that are anticipated to carry some degree of motor vehicle traffic for service, emergency or other purposes, shall be constructed with surface and base specifications provided in this section for service drives. Off-street shared-use paths for use by

bicyclists shall be designed and constructed in accordance with the "Guide for the Development of Bicycle Facilities" published by the American Association of State Highway Officials (AASHTO) and the "Florida Bicycle Facilities Planning and Design Handbook," issued by the Florida Department of Transportation.

E. Service Drives:

1. Concrete Construction

- a. Concrete service drive roadways shall be a minimum 6" thick.
- b. A light broom finish is standard.

2. Asphalt Construction: Asphalt service drives shall have a minimum 8" base of Florida Limerock, compacted to 95% of maximum density. Paving shall be a 2" minimum of Type SP-9.5 Asphaltic Concrete.

F. Sidewalks:

1. General: Separate sidewalks shall be provided with all new road construction, or major reconstruction.

2. Construction Requirements:

- a. Concrete sidewalks shall to be a minimum of 4" thick (6" thick in areas subject to traffic).
- b. Sidewalk width shall be a minimum of 5' and shall match surrounding sidewalk patterns and widths. Sidewalks adjacent to roadways shall be separated by a minimum 3' wide planting strip. Where physical constraints require that sidewalks be constructed immediately adjacent to roadways, they shall be constructed of a minimum 6' width.
- c. Expansion joints shall be a maximum of 20' apart, with saw cuts a maximum of 5' apart.
- d. Brick and precast unit paving materials are encouraged in public spaces such as major entry areas, important connector zones and as visual extension of architectural surface and color in contrast to expanses of concrete. Materials and colors shall be selected that are compatible with the surrounding architecture and promote continuity.
- e. Special attention shall be paid to ADA compliance when these materials are used in order to ensure uniformity of surface, necessary curb ramp treatments, and other such provisions. High compressive strength pavers with minimum water absorption are recommended. Adequate base materials need to be provided under all pavement as needed for stabilization and to support anticipated loads. Use of removable interlocking pavers set without mortar joints is recommended in areas where future repairs or access to underground utilities is anticipated.
- f. Annunciators: Shall be provided as required per ADA.

G. Surface Parking Lots:

1. While surface parking lots will typically be constructed of asphalt, alternative permeable surfaces such as turf blocks should be considered wherever practical to mitigate stormwater impacts.
2. To provide a landscape area for parking lot canopy shade trees and to reduce the expanse and visual impact of parked cars, planting medians shall be integrated into parking lots. Such planted medians can be placed on the end of parking aisles or designed as interior and median islands, but their placement shall be coordinated with the parking lot lighting plan in order to minimize disruption of the lighting distribution due to planted islands with shade trees. Planted islands and medians should accommodate shade trees and be delineated with curbs to prevent vehicles from parking on the planting island.
3. Surface parking lots shall include a pedestrian circulation system that provides access from the parking area to the building entrance, major bus stops or other critical access points. The circulation system shall be adequately lit and appropriate signed and marked in accordance with this and other sections of these Standards. Shrub material taller than two feet in height is not recommended along pedestrian walkways within surface parking lots.
4. Parking areas shall be fully curbed, except behind wheel stops. Use poured-in-place concrete or reinforced extruded curbing.
5. Provide pre-cast wheel-stops to comply with applicable Miami-Dade County requirements.

#### H. Vanpool/Carpool Parking

1. Preferential parking for vanpool/carpool shall be provided for all parking areas having fifty (50) or more parking spaces as follows:
  - a. At least ten (10) percent of the minimum employee or student spaces required shall be designated for exclusive use by vanpools/carpools.
  - b. Spaces reserved for exclusive use by vanpools/carpools shall have a minimum width of nine and one-half (9 1/2) feet and be clearly marked for vanpool/carpool use.
  - c. Vanpool/carpool spaces shall be generally located closest to the primary entrance for employees or students utilizing such spaces but not closer than spaces for accessible parking or visitor parking. For parking areas with more than twenty (20) required vanpool/carpool spaces and more than one primary entrance, fifty (50) percent of all of the required vanpool/carpool parking may be clustered in one or more centralized, convenient locations.
2. In case of enlargement of a building or a change in the use of a building, the number of parking spaces required shall be based on floor area or capacity of the entire use of the building. If the building is part of a larger existing use with multiple buildings, only the subject building shall meet the parking requirements.
3. Reduction of Minimum Off-Street Parking Based on Vanpool/Carpool as follows:

- a. Parking Areas having fifty (50) or more parking spaces may reduce total minimum parking space requirements by two (2) standard spaces for every one (1) vanpool/carpool space provided.

**32 10 03 Electric Vehicle Supply Equipment Requirements**

A. All new parking garages and surface parking lots shall be provided with Electric Vehicles Charging stations. (EVSE) in accordance with Florida Building Code and Miami-Dade County Ordinance Section 33-122.5 as per the following provisions:

1. Definitions.
  - a) Electric Vehicle or EV shall mean any vehicle that operates either partially or exclusively on electrical energy from an off-board source that is stored on-board for motive purpose.
  - b) Electric Vehicle Supply Equipment or EVSE shall mean a unit of fueling infrastructure that supplies electric energy for the recharging of electric vehicles and plug-in hybrids.
  - c) EVSE Space shall mean a parking space equipped with, at a minimum, Level 2 EVSE that is capable of charging electric vehicles.
  - d) EVSE-Ready Space shall mean a parking space with full circuitry installed in accordance with the Florida Building Code and ready for the charger to be connected.
2. Required Number of EVSE Spaces and EVSE-Ready Spaces. The number of required EVSE Spaces or EVSE-Ready Spaces shall be determined based on the total number of parking spaces, as shown in the table below. EVSE Spaces shall count toward parking requirements; however, in no event shall providing such spaces reduce the number of parking spaces for the physically disabled below the quantity required.

Total Number of Required Parking Spaces	Minimum Required EVSE-Ready Spaces (On or after January 1, 2022) *
Up to 9 spaces	0
10 or more	20 percent of the required parking spaces, but in no event less than 1 EVSE-Ready Space.
* In the event of a fraction, the number shall be rounded up.	





- a. Signage and Markings. All electric vehicle parking spaces shall be prominently designated with a permanent above-ground sign which shall conform to Figure 1 below entitled "Electric Vehicle Charging Station Sign." The bottom of the sign must be at least 5 feet above grade when attached to a building, or 7 feet above grade for a detached sign. The property owner or operator may establish the hours during which vehicles may be charged and the length of charging time permitted per vehicle, provided such information is depicted on the sign in the manner shown in the figure below.

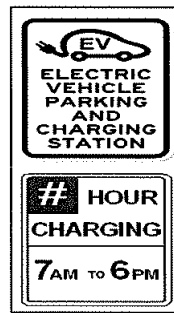


Figure 1. Electric Vehicle Charging Station Sign

#### 32 10 04 Protection of the Work

- A. Temporary Barricades: Throughout the duration of the Contract, the Constructor shall provide temporary barricades, properly lighted, to keep traffic off the current portion of the work. Barricades must be rigid. Tape or ribbon barricades allowed only as a supplement to rigid barricades.
- B. Protection of Adjacent Surfaces: The Constructor shall protect exposed surfaces adjacent to the work from physical damage resulting from construction activities, and from becoming stained during application of paving materials. The Constructor shall clean, repair, or replace, as required, surfaces damaged during the course of the work at no additional expense to MDC.
- C. Protection from Graffiti: Newly poured concrete roads, streets, curbs, or sidewalks shall be protected and guarded

from graffiti from passersby until the concrete has cured to resist such molestation. Failure to prevent graffiti, or other such vandalism, shall result in the new concrete being removed and replaced. This requirement shall warrant the Constructor in taking the necessary steps in preventing such incidents, which shall include guarding the project after normal working hours.

### 32 10 05 Repair of Pavement

#### A. General:

1. All roads, streets, service drives, or sidewalks, whether concrete or asphalt construction, shall be restored (repaved) within 3 days from the time of backfilling and compaction.
2. Cuts made through any paved surface shall be made by saw cutting and must be repaired in a non-discernible fashion.
3. The cross-sectional thickness of materials used in repairing a section of roadway shall match the adjacent roadway.

#### B. Concrete Pavement:

1. Cuts through concrete shall be repaired by replacing the section between the nearest two joints - either construction or expansion.

#### C. Asphalt Pavement:

1. Cuts through asphalt shall be repaired so that depressions or humps do not develop. If they do, they shall be corrected, at the Constructor's expense.
2. Asphalt and base compaction by "normal traffic" is not permitted. Proper compaction for the depth of the cut is required.

#### D. Repair of Pavement Markings:

1. When cuts are made through any paved surface and the cuts extend through the pavement markings, the replaced pavement shall be marked to match the existing.

### 32 12 16 Asphalt Paving

#### A. The Design Professional shall design the asphalt paving as follows:

1. Asphalt materials:
  - a. Asphaltic concrete surface as per FDOT Section 916.
  - b. Limerock base as per FDOT Section 911
2. Design mixes:
  - a. Asphaltic concrete pavement as per FDOT Section 334.
3. Installation:
  - a. General construction requirements as per FDOT Section 330.
  - b. Milling of existing asphalt pavement as per FDOT Section 327.

### **32 13 13 Concrete Paving**

- A. The Design Professional shall design the concrete paving, which includes concrete pavement, curbs, curb and gutter, valley gutter and concrete sidewalks, as follows:
1. Materials:
    - a. Portland cement, water, admixtures and curing materials as per FDOT Sections 921, 923, 924, and 925.
    - b. Limerock base as per FDOT Section 911.
  2. Installation:
    - a. Portland cement concrete as per FDOT Sections 346, 347 and 350.
    - b. Sidewalks within vehicular use areas or subject to vehicular traffic:
      - 1) Six (6) inches thick
      - 2) Expansion joints shall not exceed twenty (20) feet
    - c. Sidewalks for pedestrian use only:
      - 3) Four (4) inches thick.
      - 4) Unreinforced with troweled joints.
      - 5) Expansion joints shall not exceed twenty (20) feet and shall be the full thickness of the walk.
      - 6) Control joints shall not exceed five (5) feet and shall be troweled to a depth of 1/3 that of the

thickness of the walk.

- d. Curbing to comply with FDOT Index No. 300.

### **32 13 16 Decorative Concrete Paving**

A. The Design Professional shall design the decorative concrete paving as follows:

1. Materials:

- a. Portland cement, water, admixtures and curing materials as per FDOT Sections 921, 923, 924, and 925.
- b. Limerock base as per FDOT Section 911
- c. Colors compatible with Portland cement admixtures and curing materials.

2. Installation:

- a. Portland cement concrete as per FDOT Sections 346, 347 and 350.

### **32 13 73 Concrete Paving Joint Sealants**

A. The Design Professional shall design the concrete paving joints materials as follows:

1. Materials and Installation:

- a. Concrete joint sealants as per FDOT Section 932.

### **32 14 00 Unit Paving**

A. The Design Professional shall design the unit paving as follows:

1. Materials:

- a. Standard paver shall be Oldcastle Coastal or approved equal by the MDC Project Manager.

2. Colors:

- a. Paver samples and color to be submitted to MDC Project Manager for approval as selected for each campus.
3. Sizes:
    - b. Standard manufacture's square or rectangular sizes, no polygonal allowed.
  4. Design requirements:
    - a. Color mixing allowed in borders, band or geometrical patterns; random mixing is prohibited.
    - b. Herringbone pattern using Beige pavers without aggregate is preferred where subject to vehicular traffic, paver size as required for best resistance to vehicular loads.
    - c. Design layouts to avoid or minimize paver cutting.
    - d. A sampler paver must be submitted before work is approved to begin.
  5. Installation:
    - a. Per manufacture specifications.
    - b. Standard design can be changed only when authorized by the MDC Project Manager. Joints should be broom in using round silica sand for compaction. The sand must be broom sweep into the paver's joints to maintain their position in the hardscape. The pavers and the concrete band will evenly meet with no tolerance greater than an eighth (1/8) of an inch for conformance with ADA.
    - c. Provide a one (1) inch sand bed.
    - d. Simulate heavy rain conditions to judge uneven settlement, and re-level pavers as necessary. Inspect pavers again 30 days after acceptance by MDC and make further leveling adjustments if uneven settlement is detected.

### 32 14 43 Permeable Unit Paving

- A. The Design Professional shall design the permeable unit paving as follows:
  1. Materials:
    - a. Standard paver shall be Oldcastle Coastal or approved equal by the MDC Project Manager.
  2. Colors:

- a. Paver samples and color to be submitted to MDC Project Manager for approval as selected for each campus.
3. Sizes:
    - a. Standard manufacture's square or rectangular sizes, no polygonal allowed.
  4. Design requirements:
    - a. Color mixing allowed in borders, band or geometrical patterns as approved by MDC campus; random mixing is prohibited.
    - b. Design layouts to avoid or minimize paver cutting.
    - c. A sampler paver must be submitted before work is approved to begin.
  5. Installation:
    - a. Per manufacture specifications.
    - b. Standard design can be changed only when authorized by the MDC Project Manager. Joints should be broom in using granite chips for compaction. The granite chips must be broom sweep into the paver's joints to maintain their position in the hardscape. The pavers and the concrete band will evenly meet with no tolerance greater than an eighth (1/8) of an inch for conformance with ADA.

### 32 17 13 Parking Bumpers

- A. The Design Professional shall specify the parking bumpers as follows:
  1. Product: Parking bumpers:
    - a. Concrete wheel stops:
      - 1) 4,000 PSI minimum compressive strength.
      - 2) 6 inches high by 8 inches wide by 72 inches long.
      - 3) Provide chamfered corners, transverse drainage slots on the underside and a minimum of two factory-formed or drilled vertical holes through wheel stop for anchoring to substrate.
      - 4) Assigned/labeled parking bumpers must be indicated on drawings. Assigned/labeled parking bumpers will include but not limited to "SERVICE", "VISITOR", "RESERVED". Coordinate with MDC for additional requirements.

## 2. Installation:

- a. One parking bumper per parking stall.
- b. Five eighth (5/8) inch round reinforcing bars driven eighteen (18) inches into the ground.

B. Parking bumpers shall meet Florida Department of Transportation standards or be an approved equal.

**32 17 16 Manufactured Traffic-Calming Devices**

A. The Design Professional shall specify the manufactured traffic calming devices as follows:

## 1. Product: Traffic calming devices:

- a. Speed bumps and humps Solid, integrally colored, 96 percent postconsumer or commingled post-consumer and pre-consumer recycled rubber or plastic; UV stabilized. Provide factory-formed or drilled vertical holes for anchoring to substrate.
  - 1) Speed bump: 2 inches high by 10 inches wide by 72 inches with tapered, square, or rounded ends.
  - 2) Speed hump: Modular assembly 4 inches high by 14 feet in overall width with overall length as dimensioned on drawings; and with tapered, square or rounded ends.

## 2. Installation:

- a. Galvanized steel spikes as per manufacturer written recommendation for heavy traffic.
- b. Bed of adhesive for adhesion to pavement with heavy traffic as per manufacturer written recommendation.

**32 17 23 Pavement Markings**

A. General:

1. Applicable Design Standards: All pavement marking shall be in accordance with the latest edition of the "Manual on Uniform Traffic Control Devices (MUTCD)," U.S. Department of Transportation.
2. Type: Exterior Grade Latex Paint shall be used for all pavement markings, except in areas protected from weather or otherwise specified herein where thermoplastic striping is permitted.
3. Thermoplastic Striping: All thermoplastic striping shall be a Florida Department of Transportation approved mix that minimizes the slipperiness of the marking surface.

4. Parking Striping Details: Typical parking striping shall comply with Miami-Dade County.
- B. The Design Professional shall design the pavement markings as follows:
1. Materials:
    - a. Pavement markings paint:
      - 1) Alkyd-resin type as per AASHTO M248
      - 2) Alkyd pavement marking paint as per MPI No. 32.
      - 3) Latex pavement marking paint as per FS TT-P-1952 or MPI No. 97.
    - b. Glass beads.
  2. Installation:
    - a. Specify color and stripe width.
    - b. Pavement to age for 60 days before starting pavement markings.
    - c. Provide a minimum wet film thickness of 0.15 mils.
- C. Roads:
1. Traffic Markings: Six-inch (6") wide painted striping shall be used for traffic markings on all Campus roads, drives, and service drives. Paint shall be applied at a minimum wet film thickness of 15 mils. Materials and application methods for all traffic markings shall be in accordance with FDOT "Standard Specifications for Road and Bridge Construction," latest revision.
  2. Markings for On-Road Parking: To accommodate the possibility of future adjustments to the parking layout, pavement markings for on-road parking shall be made with white latex paint. Typical striping details for parking are shown at the end of this section.
  3. Crosswalks:
    - a. General: Crosswalk placement and design shall be in accordance with the MUTCD. To help ensure the use of marked crosswalks in heavy pedestrian concentration areas, special consideration shall be given to their location relative to construction or proximity of sidewalks, paths, guardrails, retaining walls, or shrubbery as a means for controlling existing pedestrian crossing movements within a defined path (from FDOT's Traffic Engineering Manual).



4. Minimum Configuration at Parking Lot and Service Drive Locations: Marked ladder-style crosswalk in accordance with standard ADA compliant curb cuts at the end points of crosswalk.

D. Parking Garages:

1. Thermoplastic striping shall be used for traffic markings and for designating parking spaces in all Campus parking garages. Material and application shall be in accordance with the Florida D.O.T.'s "Standard Specifications for Road and Bridge Construction", latest revision. Typical striping details for parking are shown at the end of this section.

E. Surface Parking Lots:

1. To accommodate the possibility of future adjustments to the parking layout, pavement markings in surface parking lots should be made with white latex paint.

F. Bike Paths and Lanes:

1. Bicycle Lane Markings: Pavement marking dimensions and placement shall be consistent with Part 9, MUTCD and include lane edge lines, a bike symbol (rather than the optional word "Bike"), the word "Lane", and a directional arrow. MDC requires painted (white latex) bicycle lane markings. Latex paint is preferred due to possible slip hazard. "No Parking" signs (R8-3a in the MUTCD) shall be installed as a subplate to the bicycle lane sign (R3-17 in the MUTCD). The dotted line lane edge marking as indicated in the MUTCD shall be used for all bus stops and locations with heavy right turn motor vehicle volumes.
2. Bicycle Path Markings: Pavement marking dimensions and placement shall be consistent with Part 9, MUTCD. Additional guidance can be found in the FDOT and AASHTO references already cited, along with the Trail Intersection Design Handbook and Designing Trail Termini reference report produced by the Florida Department of Transportation.
3. Curb Inlets, Storm Drains, and Other Potential Hazards: Where hazards to bicyclists cannot be eliminated, the typical obstruction pavement marking is required to make the hazard more visible as depicted in Figure 9C-7 of the MUTCD.

G. ADA Compliance:

1. Refer to the Florida Accessibility Code for Building Construction (Florida Building Code, Chapter 11.)

**32 18 01 Athletic Fields and Hardcourts**

A. General Requirements:

1. Separate high noise generating exterior activity areas from administration, teacher lounges, music and other educational program areas requiring normal or specialized sound control.
2. All playfields areas shall be properly irrigated, sodded and drained.
3. A 10-foot separation, with no drainage structures, vertical obstructions or changes of finish grade elevations, shall be provided around perimeter edge of all playfields, hardcourts, track or any other athletic component.
4. Athletic fields shall be designed and constructed for the referenced program and to meet standard dimensions of the game for which they will be used. Contours are very important since these provide for fast removal of surface water to maintain desirable playing conditions.
5. Provide continuous concrete walkways from appropriate building exits and/or Parking Areas to the Primary Play Area, the Field Equipment areas, the hardcourts, the tennis courts, and athletic field areas including but not limited to the Track, the baseball and softball fields and the multi-purpose playfields.
6. The A/E shall specify that the impact attenuation performance of the Safety Surface shall be documented by a certificate of compliance.
7. Design of the Safety Surfaces shall comply with ADA accessibility requirements.
8. The design of the Safety Surface shall accommodate all playground and play-structure equipment and their foundations.
9. Safety Surfaces shall comply with all the requirements indicated in this Division and MDC Master Spec Guidelines.

## **32 30 00 SITE IMPROVEMENTS**

### **32 30 01 Bicycle Facilities**

#### **A. Design Guide for Bicycle Facilities:**

1. Bicycle facilities should be designed in accord with the "Florida Bicycle Facilities Planning and Design Manual," issued by the Florida Department of Transportation (FDOT) and the "Guide for the Development of Bicycle Facilities" published by the American Association of State Highway Officials (AASHTO).
2. Bicycle parking spaces required as follows:

Total Parking Spaces in lot	Required Number of Bicycle Parking Spaces:
25 to 50	4
51 to 100	8
101 to 500	12
501 to 1000	16
over 1000	four (4) additional spaces for each 500 parking spaces over 1000.

3. All bicycle facilities should be provided with a sign 12" x 18" as follows:



B. Bicycle Racks:

1. The standard parking structure used by the MDC for supporting and securing a bicycle is the black "inverted U" style bicycle rack. This rack is made of 40 gauge-galvanized steel covered with white PVC material. Other



style racks may be acceptable for specific locations with approval to be obtained by the Project Manager prior to installation. Alternate rack styles shall be considered acceptable only if they meet each of the following criteria:

- a. Constructed of durable materials with no moving parts;
- b. Able to accommodate various styles of bicycles and locks (including narrow U-locks);
- c. Able to support the bicycle by the frame;
- d. Enable the bicycle to be secured at multiple points including both wheels and the frame;
- e. Designed with a profile that has no protruding parts, and will not create a trip hazard to pedestrians; and
- f. Design so that the proper method of use is obvious, and that improper parking will not decrease rack capacity.
- g. Surface mounted bicycle racks shall not be allowed.

2. Bicycle parking displaced by construction shall be relocated with a temporary rack.

C. Placement and Arrangement of Bicycle Racks:

1. The "inverted U" rack is designed to secure two bicycles fastened to vertical supports by a "U lock" or cable. Most bicycles are approximately 68 inches in length. When properly secured to the "inverted U" style rack, a back wheel of the bike projects out about 3-4 feet from the vertical support of the rack.
2. Rows of "U" racks should be arranged to allow for ample maneuvering on a concrete pad. The edge of the concrete pad perpendicular to the direction of bike parking is to be at least 6 feet wide to ensure the rear tire of a secured bike does not rest on the ground or lawn and that there is ample walk space behind the bicycles.

D. Other Bicycle Amenities:

1. An effort is to be made to locate bicycle parking as close to the principal entrance to a building as feasible in order to enhance security of the bicycle and the cyclist and also as a means of encouraging bike usage through convenience, efficiency and the provision of superior facilities. When a building is located close to a parking garage and/or open lot, racks may be located at the parking facility closest to the building entrance in lieu of installation near the building entrance. Bike racks shall be located within 200 yards of a building entrance and in proximity to a changing/shower facility.

**32 30 02 Guardrails**

- A. Guardrails shall meet Florida Department of Transportation standards.



**32 30 03 Traffic Signage**

## A. Street Name and Signs:

1. Shall comply with Miami-Dade County Public Works Standards.

## B. Traffic Signs:

2. Traffic signs for placement along MDC roads and drives shall comply with M-DCPW and MUTCD.
3. Traffic signage shall be designed in accordance with the latest edition of the "Manual on Uniform Traffic Control Devices for Streets and Highways," U.S. Department of Transportation.

**32 30 04 Traffic Signals**

- A. Traffic signals shall be designed in accordance with the latest edition of the "Manual on Uniform Traffic Control Devices for Streets and Highways," U.S. Department of Transportation, and in accordance with M-DCPW Standards.

**32 30 05 Vision Triangle**

- A. The vision triangle is a portion of land on the corner of intersecting roads and/or driveways where nothing is permitted to be built, placed, or grown that would limit or obstruct the sight distance of motorist entering or leaving the intersection. The purpose of the vision triangle is to ensure that there is adequate and safe visibility at intersections. The American Association of State Highway and Transportation Officials (AASHTO) Standards (most recent version) shall govern the vision triangle definition. MDC shall prohibit the construction, erection, placement, growth, maintenance or allowance of any building, structure, fence, wall, sign, canopy, vegetation, or obstruction of any kind within the vision triangle that impede views in the vertical plane between two-feet from ground level and eight-feet from the ground level. Diagrams of vision triangle dimensions can be found in the AASHTO Standards and also in the Florida Department of Transportation (FDOT) Roadway and Traffic Design Standards, 2000 Edition, Standards Index 546.

**32 31 00 Fences and Gates**

## A. Fences and Gates

1. MDC fencing shall comply with applicable zoning requirements. An ordinance will have precedence over a design criteria item. Coordinate fencing plan review with appropriate agencies and MDC.
2. Fencing materials and gates, including framing, 9 gage fabric, hardware and ancillary materials, shall be hot

dipped galvanized steel and conform to the appropriate ASTM standards. After installation, metal with the protective coating breached shall be treated with an accepted galvanizing anti-corrosive paint.

3. Lead-based paints or primers are not allowed.
4. Temporary construction chain-link fencing shall be 6 feet or higher and shall be provided with top and bottom rails. Provide a mid-rail when chain-link fencing is 8 feet or higher.
5. For permanent chain-link fencing, provide a top and bottom rail; provide a mid-rail for chain-link fencing 8 feet or higher.
6. Areas designated to receive fencing includes but are not limited to site perimeter, playfields, parking lots, bicycle storage areas, mechanical equipment areas, hazardous storage areas and water retention areas. Permanent fencing shall be provided as follows:
  - a. 6'-0" high chain-link fence at site perimeter.
  - b. 10'-0" high (minimum) chain-link fence at perimeter of baseball and softball fields.
  - c. 10'-0" high chain-link fence around perimeter of tennis courts, with a minimum of two (2) 4'-0" W x 7'-0" H lockable gates remotely located. Note: If the tennis courts are arranged in clusters that are stacked adjacent to each other in the north/south direction, separate each cluster with a 10'-0" high chain link fence containing a minimum of one (1) 4'-0" W x 7'-0" H lockable gate.
7. Gates and Fence Openings.
  - a. Unless otherwise specifically indicated in the MDC Design Standards, provide all fenced-in areas 3'-0" wide (minimum) x full height lockable gates.
  - b. At service yards, provide a 20'-0" clear-opening vehicular double-gate, and two remotely located pedestrian gates 3'-0" wide x fence height.
  - c. All openings through fences shall have gates with locks, except at baffle gates. Provide panic hardware when required by Code.
  - d. To other fenced areas according to program requirements.
  - e. All hinged gates shall swing inward over level ground and without obstructions. Provided a 2-inch maximum ground clearance along the full swing of all gates.
  - f. Consider use of rolling gates at the following locations:
    - 1) Where space for the use of a swing gate is limited.
    - 2) Where adjacent ground elevations, and/or landscaping would interfere with proper and safe operation of a swing gate.
    - 3) Where the use of a swing gate would obstruct pedestrian or vehicular traffic.
    - 4) When rolling gates are specified, they shall not exceed 12 feet in clear opening or 15 feet in total gate length.

- g. Baffled Openings at Chain Link Fencing: Provide “pedestrian-use only” baffled openings along the perimeter fence of playfields located adjacent to residential areas. Provide baffled openings only if the adjacent portion of the facility is secure. Baffled openings shall consist of a 4-foot wide opening located on the perimeter fence, with a 10-foot wide chain-link fence panel of equal height as the adjacent fence, set 3-feet inside the fence line to create two remote access points.

- 8. The use of barbed wire is not allowed.

### 32 31 13 Chain Link Fences and Gates

- A. The Design Professional shall design the chain link fences and gates as follows:

- 1. General requirements:

- a. Wind loading as per ASCE 7 and the Florida Building Code.
- b. Exposure category C.
- c. Fence height to match existing.

- 2. Materials:

- a. Fabric shall be in one-piece heights measured between top and bottom of outer edge of selvage knuckle or twist. Comply with CLFMI Product Manual and with requirements indicated below:

- 1) Fabric Height shall match existing MDC fencing.
- 2) Steel Wire Fabric: Wire with a diameter of 0.148-inch (9-gauge) zinc coated.
- 3) Mesh size: Two (2) inches.
- 4) Selvage: Knuckled edge to be on top, twist on the bottom.
- 5) Fence and gate fabric to be PVC coated class 2b wire (green or black in color) as per ASTM F668. Thickness of coating 0.025 inch.

- b. Posts and rails: Strength requirements shall conform to ASTM F-699, and fence manufacturers written recommendations.

- 1) Pipe shall be straight, true to section, materials and sizes specified.
- 2) Post and rail coatings to comply with the heavy-duty industrial fence requirements in ASTM F668. Zinc coating and PVC coating shall be the same type, thickness and color as indicated for fabric.

- c. Fittings and accessories: Coating shall be the same as indicated for fence fabric.
  - d. Gates:
    - 1) Swing gates: Comply with ASTM F900.
    - 2) Sliding gates: Comply ASTM F1184.
3. Installation:
- a. The contractor shall examine areas and conditions, with installer present, for compliance with requirements for site clearing, earthwork, pavement work, and other conditions affecting the performance of the work.
  - b. Installation will not begin before final grading is completed.
  - c. Installation will not commence until unsatisfactory conditions have been corrected.
  - d. Installation of the chain-link fencing to comply with ASTM F 567.
  - e. Specify diameters and spacing for drilling or hand-excavation of holes for posts. These holes are to be in firm, undisturbed soil.
  - f. Specify post setting.
  - g. Specify concrete fill:
  - h. Specify terminal posts and line posts: Space line posts uniformly at 10 feet on center maximum. Tension Wire: Install according to ASTM F 567.
  - i. Chain-link fabric shall be applied to outside of enclosing framework. In addition, specify that 2 inches be left between finish grade and bottom selvage unless otherwise indicated. A bottom pipe is required.
  - j. Specify gates according to manufacturer's written instructions, level, plumb, and secure for full opening without interference. Attach hardware using tamper-resistant or concealed means. Specify that ground-set items be in concrete for anchorage. Specify hardware for smooth operation and be lubricated where necessary.
  - k. Design gates to operate smoothly, easily, and quietly, free of binding, warp, excessive deflection, distortion, nonalignment, misplacement, disruption, or malfunction, throughout entire operational range.
  - l. Provide a 6" concrete slab for motor operators, sloped and raised above grade sufficiently to prevent storm water ponding.

### 32 31 19 Decorative Fences and Gates

- A. The Design Professional shall design the decorative fences and gates as follows:
- 1. General requirements:



- a. Wind loading as per ASCE 7 and the Florida Building Code.
  - b. Exposure category C.
  - c. If fencing exists adjacent to proposed fencing or site, proposed fence design, height, and materials to match existing unless otherwise directed by MDC Project Manager. If existing fencing is not present, the MDC Project Manager to advise on general requirements for design, height, and materials. The Design Professional is responsible for preparing final design and submitting signed and sealed structural drawings prepared by a structural engineer licensed in the state of Florida for approval prior to ordering of materials or installation of fence.
  - d. New fencing shall intersect with existing fencing via the use of a column or post. No new fencing shall tie directly into existing fencing material.
  - e. Fencing per program requirement and prior approval from MDC.
2. Materials:
- a. Picket fences: Factory coated aluminum picket fence, materials, finish, color and design similar to of existing MDC picket fences.

### **32 33 00 Site Furnishings**

A. The Design Professional shall design the exterior site furnishings as follows:

1. General requirements:
  - a. At least 50% of the proposed site furnishings for a project shall be accessible to the disabled, if applicable. If only one of a particular furnishing is proposed, it shall be accessible to the disabled.
  - b. All top-opening receptacles shall have a covered opening, via domed lid or bonnet type design to limit rainwater into the bin.
  - c. All receptacles shall be installed with a liner.
  - d. Receptacles shall not be located directly adjacent to benches.
  - e. Bench pads shall have a clear area for adjacent wheelchair parking. Benches, and other site items, shall be setback from the edge of the walkways a minimum of 3'-0".
  - f. Movable seating shall be stackable.
  - g. If umbrellas are provided, they shall be removable, and requires MDC prior approval.
  - h. Removable bollards shall have a locking mechanism.
  - i. Bike racks shall be located to allow a six (6) foot length 'clear zone' for bike parking, centered on rack and in the direction of the rack. This clear zone shall fall outside of walk or building exit and entry areas. Individual racks shall be located no closer than two (2) feet six (6) inches from one another to allow for access between racks.

- j. Bike parking areas shall be lighted.
- 2. Products:
  - a. Site furnishings shall be selected to be in character and of the same quality of the campus's existing furnishings.
  - b. Bike racks shall be selected as those which hold the bike by the frame, making contact at two horizontally separate points, minimum.
- 3. Installation:
  - a. Site furnishings shall be direct burial installation unless hardship from such method is identified to the MDC project manager prior to the installation.
  - b. Utilize tamper-resistant, stainless steel hardware.

## 32 80 00 IRRIGATION

### 32 80 01 GENERAL

- A. Comply with the latest editions of the Florida Building Code, Florida Fire Prevention Code and all other required codes and regulations.
- B. Irrigation for all new construction shall follow the below guidelines.
  - 1. New MDC developments are to be site sustainable. Thus efforts should be made for site sustainable environments ("LEED"-sustainable site points and/or "SITE" certifications/points)

### 32 81 00 Irrigation Components and Guidelines

- A. Provide an electric automatically controlled irrigation system for head to head coverage of planted areas to comply with the best engineering and landscaping practices and equipment manufacturers' recommendations.
- B. The A/E shall design the irrigation systems to have an automated central control station reporting to MDC Facilities Maintenance - Landscaping Staff, via an IP Intra-network.
- C. The irrigation contractor shall request an inspection from the MDC Facilities Maintenance - Landscaping Staff before installation of the irrigation system has been completed. In addition, the A/E shall request Punch List Inspection and/or Final Inspection from MDC Facilities Maintenance - Landscaping Staff. The final operational

tests for the irrigation equipment and all irrigation zones shall be performed by the contractor and witnessed by the A/E and the MDC Facilities Maintenance - Landscaping Staff.

- D. Each new irrigation system will have its own set of construction documents.
- E. A pre-construction meeting should be scheduled including contractor, A/E and ownership.
- F. Irrigation water sources shall be:
  - 1. A new metered system for locations next to walls, plazas, walkways, other building planters, container areas, and landscaped areas that are in close proximity to buildings, courtyards, covered walkways, exterior covered shelters, and other building structures. The domestic water irrigation system shall be provided complete with reduced-pressure backflow preventer and a dedicated water meter.
    - a. Design system shall consider the interior core of campus (such as plazas, walkways, and exterior classrooms) to be irrigated by a city metered system; Exterior open campus spaces (such as streetscapes, playfields and property line buffers zones) to be irrigated by a city metered system.
    - b. If requested by A/E and/or MDC Facilities Maintenance - Landscaping Staff a submeter/flow meter (“McCrometer” with reading “Gallons x 1000”, or approved equal) and vacuum breaker can be provided off water source line.
  - 2. A new pump/well system for all other areas consisting of either a turbine pump or centrifugal split case pump with a 60-gallon minimum pressure tank, depending on the type of area being irrigated. New systems shall not be tied into existing system(s).
    - a. System design shall include a pressure switch interlocked with the controller and pump starter.
    - b. Pressure switch shall have high and low settings for emergency shut down.
    - c. If requested by A/E and/or MDC Facilities Maintenance - Landscaping Staff a flow meter (“McCrometer” with reading “Gallons x 1000”, or approved equal) can be provided.
- G. Where irrigation system exists, project Landscape Architect shall be responsible for indicating on the drawings where the irrigation contractor is to cap, reroute and/or remove any portion of the system in conflict with proposed site modifications. It is the responsibility of the project Landscape Architect and irrigation contractor to ensure that existing system is operational upon the conclusion of all modifications.
- H. The use of reclaimed water for irrigation purposes shall be evaluated by the designer and presented to MDC Campus Administration for consideration.

1. New irrigation lines connected to re-use waterlines shall be “purple” pipe PVC
  2. Existing irrigation lines connected to re-used lines shall have purple sprinkler heads/caps
- I. The irrigation system shall include, but not be limited to:
1. Provide minimum 2” deep sand bed and 2” deep cover over irrigation system.
  2. A two-year warranty for the entire system.
  3. Pop-up spray, pop-up bubbler, or pop-up gear driven rotary spray.
  4. Vehicle-traffic rated pre-cast solenoid valve boxes with lids, constructed of high impact polymer plastic. Top of boxes shall be 17 inches x 11-3/4 inches, and bottom 21 inches x 15-3/4 inches. Valve boxes shall have a green locking lid with the words “IRRIGATION VALVE” integrally molded on it. The top of the valve boxes shall be installed level to the surrounding soil grade.
  5. 14-day electromechanical clock timing device, with primary and valve output surge protection.
  6. Automated Central Control Station shall be Rainbird Model No.IQ- LXM-DTC Satellite Controller or approved equal, with modular design in a single enclosure, complete with automatic timer, zone expansion capabilities and with primary and valve output surge protection.
  7. Zone valves (bronze body) shall be a minimum of 2 inches and a maximum of 3 inches.
  8. Bronze fitted pump with air and heat release valves.
  9. Head to head coverage. Throw pattern shall be shown on plans by way of a thin dashed line to ensure the appropriate coverage is being met.
  10. Watertight electrical connections throughout system.
  11. Schedule 40 risers and mains with PVC Schedule 40 sleeves under pavement, walks, and walls. Main lines at least 18 inches below finish grade.
    - a. Main lines 6 inches or less in diameter shall be Schedule 40 PVC
    - b. Main lines greater than 6 inches in diameter shall be Class 200 with O-ring fittings.
  12. PVC Class 160 lateral irrigation lines with PVC Schedule 40 sleeves under pavement, walks, and walls. Lateral lines at least 1 inch below finish grade.
  13. PVC Schedule 80 double swing joints and threaded fittings. Poly-pipe/Funny pipe are not allowed. Swing joints shall be installed on all spray head pop ups and gear driven rotors.
  14. Reduced pressure back flow preventors for lines connected to the domestic water supply.
  15. All irrigation popup rotor and spray heads shall be flush or within 1/2" below finish grade or per manufacturer's recommendation.
    - a. Rotors pop-up and spray pop-up heads in open sodded spaces require the consideration and implementation of additional protective measures (measure which prevent maintenance equipment and circulation damage). Protective measure include both active and non-active areas:

- 1) “Active” and “Non-active” areas – Steel pop-up risers, and extended deration of flag markers beyond installers contract (or final completion of construction site).
  - 2) Concrete rings are not to be used.
- b. The A/E and the MDC Facilities Maintenance Operations - Landscaping Staff to approve protective measures
  - c. These measures shall be incorporated in areas, including but not exclusive, to open sodded areas and playfields.
16. Shrub risers shall be installed in shrub beds at heights appropriate to over spray all surrounding plants.
17. The irrigation well shall comply with South Florida Water Management District (SFWMD) guidelines and regulations, and with the following requirements:
- a. All suction piping shall be Schedule 40 galvanized steel pipe connected to a steel tee with ANSI flanges.
  - b. Irrigation well design shall meet the following:
    - 1) Pumping capacity shall be 120% the discharge of the largest zone, but never less than 100 gallons.
    - 2) Well draw-down shall not exceed 3 feet during pumping.
    - 3) After installation, the irrigation pump shall be operated for 4 continuous hours, in the presences of the A/E and representatives from MDC Facilities Maintenance - Landscaping Staff, to verify that the requirements noted above have been complied with.
  - c. Well check valve shall be spring-loaded type and shall be provided in accordance with the pump’s manufacturer’s recommendations.
  - d. At existing facilities, when the well-head cannot be located within a secured chain-link area, a concrete enclosure with lockable galvanized steel lid shall be provided to protect the well.
  - e. Provide a hose-tap on the suction side of the well piping to facilitate priming of the pump.
  - f. Minimum depth of well shall be as per SFWMD regulations
  - g. The A/E and/or MDC Facilities Maintenance - Landscaping Staff, may request a project specific specialty add-on, “de-rust chemical tank”. This “de-rust chemical tank” add-on may be implemented to the well system to prevent rust staining on nearby hardscapes and structures.
18. Domestic water hose bibb in pump room.
19. Hose bibb connection at pump piping suitable for priming connection.
20. UV resistant PVC risers painted black.
21. Metallic detection tape (2-inch-wide) buried between 4 to 6 inches below finish grade at PVC main and lateral lines.

- J. Provide a fully automatic electromechanical electric timer system for station control.
- K. Specify the contractor to maintain and operate the system until final completion, to assure proper operation and irrigation all landscape and grass areas.
- L. Provide necessary irrigation system, design data, and calculations regarding volumes and pressures to deliver 100 percent head-to-head coverage of landscaped areas.
- M. Provide a loop main system where possible.
  - 1. Provide a 1" diameter industrial strength brass quick-coupling valve adjacent to each baseball and softball dugout for the manual watering of the clay infield areas. Each quick-coupling valve shall have a locking cover and be located within a 12-inch diameter traffic-rated valve box w/cover, located adjacent to each dugout and away from the playing areas. Quick-coupling valve shall be Rainbird Model 33DRC or approved equal.
- N. Provide quick coupler keys with swivel hose reels to allow hand watering of adjacent plants during establishment period.
- O. Provide rain sensor to automatic system to ensure on-site water conservation.
- P. Irrigation design shall include provisions for relocatable buildings (portables maintenance facilities, classrooms, etc.), future addition and expansion.
- Q. Locate pumps and controllers in lockable pump room, mechanical room, or other custodial controlled space within the facility for security.
- R. Provide an electrical riser diagram showing the electrical components, interlock, etc., for well systems.
- S. Provide a riser diagram showing pump, pressure tank, and piping arrangement of the well pumping system.
- T. Provide an 8" x 10" clear laminated photocopy, inside controller box door, of the irrigation plan with color coded circuits noted in sequence equal to automatic operation.
  - 1. Operation card shall define timing for each zone.
- U. All portions of the underground irrigation piping system shall be pressure tested at 100 psi for 1 hour.

- V. Notify MDC Project Manager upon completion and installation of all underground piping prior to backfill of trenches for site inspection. A minimum of 48 hours is required for notification of inspection.
- W. At substantial completion and final punchout Facilities Maintenance - Landscaping Staff training will be required.
  - 1. Training shall take place with each site's maintenance supervisor and staff (for each site/project)
  - 2. Substantial completion training will familiarize Facilities Maintenance - Landscaping Staff to the system an allow time for routine usage.
  - 3. Final punchout training will allow Facilities Maintenance - Landscaping Staff to address questions, comments, concerns, and controller setting configurations.

### 32 82 00 Irrigation Pumps (And Well Stations)

- A. When providing irrigation for any playfield or athletic field area at an existing facility, the A/E shall investigate with MDC Facilities Maintenance - Landscaping Staff, to determine if an existing usable pump station is on site. This will avoid duplication of wells and pump stations. If there is no usable pump station on site, then one of the MDC specified pump stations as manufactured from Hoover Pumping Systems, Pompano Beach, Florida or approved equal, shall be provided. The size and type of the pump station will be determined by the size of the area to be irrigated.
- B. Irrigation pump system shall consist of a bronze fitted centrifugal closed-couple case pump with a 15-gallon minimum pressure tank, and equipped with the following:
  - 1. Pressure/flow switches interlocked with the controller and pump starter. Pressure switch shall have high and low settings for emergency shutdown.
  - 2. Pump over-heating sensors VFD (Variable Frequency Drive) shall be install prior to operation
- C. The size of the irrigation pump and the number of circuits/zones shall provide a minimum of 1.5 inches of water per week in three irrigation cycles. For sites 5 acres or less, the irrigation cycle shall be 4 hours per day. For sites greater than 5 acres, the irrigation cycle shall be 8 hours per day.
- D. Pumps and control panel shall be located within a secured chain-link enclosure with lockable gate, as indicated under the "Fences and Gates" section of this Division.
- E. Provide an electrical riser diagram for the entire well system showing the electrical components, interlock, etc.
- F. Well system suction line from well to pump and discharge pipe from pump to 10 feet outside building wall shall be

schedule 40 galvanized steel pipe.

- G Pump irrigation well after drilling for 4 hours in the presence of a Building Code inspector.
1. Pumping capacity shall be twice the discharge of the largest zone, but never less than 300 GMP.
  2. Well draw down during pumping shall not exceed 3 feet

### **32 84 00 Planting Irrigation**

- A Irrigation system for grassed areas shall be operational, inspected, and accepted (by MDC maintenance) before planting of grass in any form.
- B Provide separate zones and applicable heads to correspond to irrigation requirements of various landscape areas.
- C Zone xeriscape areas independently from other areas.
- D Irrigation zones serving landscape areas shall be separate from irrigation zones serving athletic fields.
- E Athletic fields shall have separate irrigation zones for watering the infield clay areas utilizing stainless steel Falcon 6504 rotors, or approved equal.
1. Rotor heads shall be place on a separate zone then other irrigation head-types. (typical for all planting areas)

### **32 84 13 Drip Irrigation**

- A. All irrigation systems are encouraged to incorporate the latest technology available for water conservation. (Bubblers and drip systems should be studied by A/E)

## **32 90 00 PLANTING**

### **32 01 00 GENERAL**

- A. Comply with the latest editions of the Florida Building Code, Florida Fire Prevention Code and all other required codes and regulations.
- B. Planting for all new construction shall follow the below guidelines.



1. New MDC developments are to be site sustainable. Thus, efforts should be made for site-sustainable environments (“LEED”-sustainable site points and/or “SITE” certifications/points)

### 32 91 00 Planting Preparation and Guidelines

The following topics are included in “PLANTING” section:

- A. General requirements.
  - B. Code compliancy.
  - C. Disposition and mitigation existing trees.
  - D. Tree protection
  - E. Energy conservation, environmental concerns and planting related work
  - F. Landscape related work
  - G. General planting requirements
  - H. Specific planting requirements
  - I. Additional suggestions
- A. General Requirements.
    1. The design professional shall design the landscape to enhance the character of the campus, which is that of a visually pleasing, consistent lush landscape that response to human and environmental needs, while being responsive to architectural and landscaping precedent and simplified maintenance with an emphasis on drought tolerance and vegetation. Landscape design shall abide by the Campus Master Plan and current design guidelines.
    2. An A/E team for new facilities or other projects with large or specialized site components must employ a Florida Registered Landscape Architect secured for full design, coordination and construction documentation services through construction administration and completion of project.
    3. Develop a comprehensive landscape design providing students protection from the sun and promoting energy conservation. Emphasize the main entrance and front facades and coordinate with architectural, civil,

- mechanical, and electrical work throughout the construction process.
4. Landscaping shall not impede means of egress at doors, windows and other paths of egress, or block lighting pattern.
- B. Comply with applicable federal, state, and local codes.
1. Landscape design shall comply with all applicable agencies and ordinances, including MDC Design Standards, and program requirements.
  2. Landscape design shall incorporate the latest design requirements of:
    - a. The Florida Building Code, Latest Edition (FBC).
    - b. American National Standards Institute (ANSI).
    - c. American Society for Testing and Materials (ASTM).
    - d. Florida Department of Education (DOE).
    - e. Florida Department of Environmental Resources Management (DERM).
    - f. National Arborist Association (NAA).
    - g. Miami-Dade County Landscape Ordinance (Chapter 18-A), when applicable.
    - h. State Requirement for Educational Facilities (SREF)
    - i. South Florida Water Management District (SFWMD)
- C. Disposition and Mitigation of Existing Trees.
1. Provide Preserve, if feasible, existing trees on acquired sites or sites considered for purchase.
    - a. Appropriate protection and bracing of trees at all times. The intent of this policy shall be followed from preliminary design through construction administration.
    - b. See DERM regulations for Tree Canopy Replacement. (and Design Criteria Planting Guidelines)
    - c. Existing trees shall be evaluated to decide feasibility and desirability of retainage or relocation.
      - 1) Before completing construction documents, participate in a preliminary walk-through for tree relocations and removals to comply with the appropriate agencies.
  2. Provide appropriate plans and specifications for tree protection disposition and/or mitigation.
  3. Retain existing trees whenever possible, pending the follow exceptions.
    - a. Whenever possible incorporate the removal of exiting exotic/prohibited species listing, as per category I or II by FLEPPC; the systematic program for the removal of Invasive non-native plants.
    - b. Tree in poor condition, deemed a hazard by LA or Certified Arborist.

4. Provide tree surveys/disposition plans to include.
  - a. Scientific and common tree names.
  - b. Tree height.
  - c. Canopy spread.
  - d. Grade elevation at base (if needed for tree preservation)
  - e. Trunk diameter at diameter breast height (DBH) or 4'6" above existing grade.
  - f. Condition of tree.
  - g. Recommendation for retainage, relocation, or removals.

#### D. Tree Protection

1. In construction documents, provide methods and scheduling for effective tree and plant protection during construction. Provide all appropriate details and notes on plan(s). This information should be cross-referenced in the written specifications.
2. Provide appropriate protective fencing, boxing, root pruning, construction and seasonal hurricane pruning, mulching, irrigation, fertilization, and aeration to comply with:
  - a. ANSI Z133.1 "Safety Requirements for Pruning, Trimming, Repairing, Maintaining and Removing Trees and for Cutting Brush".
  - b. NAA - REF.1 "Pruning Standards for Shade Trees".
  - c. NAA - REF.2 "Standard for Fertilizing Shade and Ornamental Trees".
3. Provide 6-inch mulch layer over root zones of existing trees but 12" away from trunk to remain during construction. Remove after construction activities are completed and before cleanup.
4. Thoroughly aerate the soil, according to accepted horticultural practice, around the base and within the dripline of protected trees before cleanup at project completion.
5. Existing oaks or pines shall not have adjacent cuts or fill greater than 6 inches without special accepted, artificial drainage structures to provide oxygen exchange for root systems.
6. Provide tree protection during construction through substantial completion.
7. The designer shall indicate the protection for all existing planting to remain or to be relocated
8. Necessary corrective or aesthetic pruning shall be included in scope of work and directed by the landscape architect or certified tree arborist, in accordance with Local, State, and ANSI Z133.1 "Safety Requirements for Pruning, Trimming, Repairing, Maintaining, and Removing Trees, and for Cutting Brush" requirements.
9. All existing trees that are scheduled to be relocated or removed must be carefully scrutinized for any wildlife nesting (including but not exclusive birds, bats, owls) PRIOR to the commencement of such relocation or removal.

10. If wildlife (including but not exclusive birds, bats, owls) are found they are to be protected as per Landscape Architect's recommendation and/or the National Arborist Association guidelines.
  11. All existing trees in a construction site must be relocated or replaced in kind at the direction A/E and MDC-Facilities Management/Campus Administration.
- E. Energy conservation, environmental concerns, planting related work
1. MDC project are to be site sustainable; A/E is to review "LEED" and "SITE" certifications programming with MDC-Facilities Management/Campus Administration.
  2. Xeriscaping is highly encouraged for water conservation when landscaping new and existing sites and as defined as a landscaping method that maximizes the conservation of water by the use of site appropriate plants and an efficient watering system and includes planning and design, appropriate choice of plants, soil analysis which may include the use of solid waste compost, efficient irrigation, practical use of turf, appropriate use of mulches, and proper maintenance.
  3. Where feasible, reduce lawn areas by increasing xeriscaping with native plants.
  4. Include low maintenance and water-conserving native Florida trees and shrubs in new plantings; And/or acclimated to South Florida and low maintenance.
  5. The areas of new work on the site shall be cleared of invasive, poisonous and toxic plants and none shall be planted.
  6. A systematic program for the removal of invasive non-native plants in the areas of new work, including Punk tree (*Melaleuca Quinquenervia*), Brazilian Pepper (*Schinus Terebinthifolius*), Australian Pine (*Casuarina-equisetifolia*), and Cat claw Mimosa (*Mimosa Pigra*) shall be implemented and none shall be planted, as required by law.
- F. Landscape related work
1. Landscape areas with trees, shrubs, grass, ground cover, and hedges. Loose sand, gravel, wood chips, or pavement shall not be used as landscape materials. Decretive aggregates, specialty surfaces and/or binned aggregates proposed require A/E and MDC-Facilities Management/Campus Administration approvals.
  2. Minimum of 4 mature existing or new trees per acre shall be provided. Trees may be grouped and need not be located within each acre.
    - a. Mature existing trees are defined as having an approximate trunk diameter of 6 inches, measured 4'-6" from the ground, and a minimum drip-line diameter of 15 feet.
    - b. New trees are defined as having an approximate trunk diameter of 1-1/2" to 2", measured at 4'-6" from the ground.
    - c. Trees with a drip-line less than 15 feet may be grouped together to equal the required drip-line.
    - d. Trees to be preserved on a site shall be protected from construction or vehicle damage by erecting substantial barriers at the tree drip-line.
    - e. Credit shall be given for existing healthy, disease-free, non-construction-damaged trees and root

systems as follows:

<u>DRIP-LINE DIAMETER</u>	<u>TRUNK DIAMETER</u>	<u>NUMBER OF CREDITS</u>
90'+	35"+	7
60' - 89'	30" - 34"	6
50' - 59'	25" - 29"	5
40' - 49'	20" - 24"	4
30' - 39'	15" - 19"	3
20' - 29'	10" - 14"	2
5' - 19'	2" - 9"	1

3. Paved parking area landscaping should be as follows:
  - a. A minimum of 5 percent of the required paved vehicular use areas shall be landscaped and should be devoted to xeriscape landscaping.
  - b. Twenty percent of the landscaping shall be adjacent to the buildings served.
  - c. The remainder of the landscaping should consist of planter islands, traffic divider median strips, and perimeter landscape strips.
  - d. Place landscaped islands at each end of every parking row and, when possible, a maximum of 10 parking spaces apart.
  - e. Sub-soil below all planting areas shall be de-compacted so that drainage is not impeded.
4. Provide planted buffers and screening such as hedges, fences, walls, earth berms, or other landscaping between MCD-owned sites and incompatible adjacent land uses, such as a factory.
5. Building area landscaping shall be as follows:
  - a. A minimum of 10 percent of the building’s ground level floor plan gross square footage shall be devoted to plantings of shrubs, flowers and ground covers, not including sod.
6. Trees and landscaped areas shall be designed and installed so as not to create blind spots around the perimeter of buildings and not provide access to the roof.
  - a. Trees shall be planted no closer than the mature height of the tree from buildings.
  - b. Courtyards less than 30 feet in width shall not be landscaped with large trees or palms. In these areas, shrubs, small canopy trees and palms should be considered.



7. Road intersection visibility, on or off site, shall be achieved by providing a clear sight line at intersections. No object, earth berm, or vegetation, other than grass or low ground cover, shall be permitted in the right-of-way area measuring fifty (50) feet from the edge of the two roads.
- G. General planting requirements
1. Planting categories include trees, shrubs, and groundcover.
    - a. Provide 3 min. planting types for each category.
    - b. Each plant type shall not be less than 10 percent of each category.
    - c. Provide tree and landscaping quantities.
    - d. Provide low maintenance varieties of plants.
  2. Plant materials with thorns, stickers, projectiles, fruit, berries, nuts, aggressive root systems, or are poisonous are not encouraged.
    - a. Black Olive Trees are not to be used within 30' of structures or hardscape surfaces, preventing standing and discoloration.
  3. Select trees for locations based on ultimate size of tree, and ease of maintenance and replacement. Large trees are not appropriate for small interior courtyards.
    - a. Royal palms and other palms trees that produce large falling fronds shall not be used in designated sitting and other student gathering areas or in proximity to park spaces
  4. Specify single or multiple tree trunks to achieve consistent plantings. Do not mix trunk types (unless mixing is required for design intent, as defined in documentation) and do not leave decision to contractor.
  5. Intention to match trees for size, multiple trunks, or other visual criteria shall be noted in construction documents. Provide such specification in planting legend.
  6. Specify landscaped and sodded areas to be completed at least 1 month before final completion.
  7. Specify contractor to maintain plantings until final completion, or until required by the warranty period, which ever on is more stringent. See Irrigation, this division, for additional requirements.
  8. Comply with quarantine requirements of white fringed beetles and fire ants.
  9. Specify that the contractor shall replace at no additional cost to MDC:
    - a. Sodded areas in unsightly or damaged condition for 90 days after substantial completion.
    - b. Warranty trees and shrubs for a period of two years after date of final acceptance against defects including death and unsatisfactory growth, except for defects resulting from neglect by Owner, abuse or

damage by others, or unusual phenomena or incidents which are beyond Landscape Installer's control.

10. Project landscape architect shall approve landscaping and materials before planting.
11. Provide clear sight line zones for vehicular drives, entrances, and at potential areas of pedestrian and vehicular conflict.

#### H. Specific planting requirements

1. Provide tree canopy shade to reduce sun exposure or heat gain at:
  - a. Drop-off, waiting, or congregating areas.
  - b. The building perimeter especially the east, west, and south orientations.
  - c. A/C units to increase unit efficiency.
  - d. Paved areas of service yards, parking areas, and hardcourts (palm or low maintenance trees only).
  - e. Areas set aside for outdoor instructional or recreational space activities.
  - f. Courtyards
  - g. Perimeter areas of athletic fields for shading of spectators
2. Parking Lots.
  - a. Locate trees to avoid conflict with parking lot lighting.
  - b. Avoid planting strips between sidewalk edges and fences to minimize maintenance difficulties.
  - c. Island ground cover shall be solid sod (or other xeriscape planting)
  - d. Provide xeriscape landscaping areas equal to 5 percent min. of paved parking lot area.
  - e. Verify landscaping requirements of the applicable municipality for additional items, if enforceable.
3. Entry Plaza at Building Front.
  - a. Root barriers implementation required
  - b. Design an entry plaza with 1,000 square feet minimum of landscaped area to include:
    - 1) Shade trees at waiting and congregating areas.
    - 2) Planters accommodating proposed root balls and future growth.
4. Remaining building front excluding playfields and playgrounds shall include:
  - a. Canopy trees to provide shade.
  - b. Solid sod at remaining areas.

5. Courtyards.
  - a. Root barriers implementation required
  - b. Planters or planted areas shall be at least 25 percent of the total courtyard square footage
    - 1) Locate shade trees at potential gathering areas and to reduce heat island effect. Locate trees in large containment areas for future root development.
    - 2) Raised planter seat walls shall be between 18 and 20 inches.
    - 3) Curbed planter edges shall not be lower than 6 inches.
    - 4) Potted planting on hardscape condition require additional drainage considerations, preventing runoff and surface staining
6. Building rear and sides excluding playfields shall include the following from main building to perimeter sidewalks or to 50 feet away.
  - a. Trees and/or palms.
  - b. 10 percent of area with shrubs. min.
  - c. 5 percent of area with ground cover. min.
  - d. Solid sod at remaining area.
7. Sodded Areas.
  - a. Provide solid sodding of St. Augustine 'Palmetto' for right-of-ways and all other areas not occupied by structures, roadways, walkways, other plantings and sod, or parking lots.
  - b. Provide Certified Bermuda solid rolled sod at football fields, soccer fields, softball fields, baseball fields and other athletic field. It shall also be specified around other athletic specialty areas such as track-and-field and between athletic field areas so that it is continuous within the athletic fields' footprint. All sodded fields shall be designed so that there are physical barriers between the Bermuda sod and other types of sods and ground covers to prevent migration.
    - 1) Bermuda spp. shall be 'Tifway 419', 'Tifway II' or 'Celebration'. Only 1 spp. selection shall be used per project site.
  - c. Solid sodding of Bahia shall be in areas where grass maintenance may be a major concern, or not irrigation is a proposed.
  - d. Seeding and sprigging are not allowed.
  - e. Seeding and sprigging are not allowed, except when authorized by MDC.



8. Design landscaping to enhance security. Plants of appropriate maintained or mature size will be selected to assure visibility and prevent obstruction of lighting and signage. Follow CPTED-Crime Prevention Through Environmental Design guidelines.
  9. Plant material is to be maintained away from equipment to meet equipment access requirements.
  10. Provide planting buffers such as, hedging, shrubs and/or small trees around above ground utilities areas (BFP, Back of house spaces, and/or Storage spaces).
  11. Art Installations Areas.
    - a. Art installations require a designated and/or specialty installation zone approved by MDC Facilities Maintenance - Landscaping Staff.
    - b. Exterior art installations are to have an 8' mulch bed radius around installation; Unless Artist or Landscape Architect requests a specialty installation condition.
- I. Additional planting requirements
1. Root barriers, shall be provided for all large canopy trees planted in parking lot islands and/or located adjacent to walkways/hardscape surfaces (8' feet or less). Root barriers shall extend from the surface to a depth of 30 inches.
  2. Weed barriers shall be used in high manicured spaces, Barrier use to be approved by A/E and MDC-Facilities Management/Campus Administration.
  3. The landscape design shall provide design grades, coordinated lighting layouts, plazas, walks, drives, service areas, fencing, playfields, site furnishings, planting plans, irrigation plans and considerations for future expansion provisions.
  4. Landscaping shall not impede the means of egress at emergency rescue egress windows and any other paths of egress.
  5. Specially conservation, environmental, educational or horticultural areas must be design to meet campus masterplan's programming, specially area to be approved by A/E and MDC-Facilities Management/Campus Administration.
  6. Planting microclimates shall be studied and enhanced, to complement existing watershed patterns and/or unique environments.

### 32 91 13 Soil Preparation

- A. Construction debris shall not be buried or left on site during or after construction to affect soil conditions next to proposed construction, or new or preserved
- B. The A/E shall decide the location and the number of percolation and soil tests to be performed at each project. The geotechnical engineer performing the percolation tests will be contracted by MDC on projects for which the

A/E is commissioned by the MDC Campus Administration, and by the Design Builder on all Design Build projects. Site design shall be based on test results combined with finish grades, paved areas and building footprint.

- C. The A/E shall monitor surface and subsurface soils before and after fill operations to confirm that percolation and compaction levels satisfy playfields and proposed planting requirements.
- D. All building sites shall receive termite soil treatment for an area at least five feet outside the structural footprint.
- E. Tree rooting growth and/or growth promoting measures are encouraged.
  - 1. Silva Cells, Structural Soils, or A/E and MDC-Facilities Management/Campus Administration approved equals.

#### **32 91 13.16 Mulch**

- A. Specify Melaleuca mulch when available and avoid mulched containing arsenic or dyes.

#### **32 19 13.19 Planting Soil Mixing**

- A. Topsoil mix, sod, and other landscaping materials shall be certified by suppliers for compliance with specified requirements.
  - 1. Topsoil and planting soil shall be initially tested and tested immediately before application.

#### **32 91 16 Planting Soil Stabilization**

- A. Sod the bottom and side slopes of the retention basin or swale to reduce erosion.
- B. Staging/construction areas shall be aerated prior to final planting installations, promoting plant growth and reducing possible die back.

#### **32 91 19 Landscape Grading**

- A. The landscape design shall provide design grades in coordination with the civil engineers proposed surface and underground site drainage system relevant to proposed locations for relocated trees, planting plans (to include existing tree location plan), and irrigation plans.
- B. Provide positive drainage away from all buildings, interior/exterior patios and walks.

C. The use of berm and mounds is to be limited.

#### **32 92 00 Turf and Grasses (Sod)**

- A. Sodded area should be easily accessible for mowing
- B. Provide a minimum of 2 inches of approved topsoil at all areas to be sodded.
- C. Artificial turf for play and other specially campus facilities/amenities spaces must be approved by A/E and MDC-Facilities Management/Campus Administration.
- D. All true sod (not artificial) installations shall be sod strip, not seeded installations
- E. All sod area shall be top dressed and rolled after installation; Thus, ensuring a level sodded surface, no tripping hazards.

#### **32 93 00 Plants**

- A. List of Plant Material to be approved by A/E and MDC-Facilities Management/Campus Administration.
- B. Refer to - Planting Guidelines at the end of this Division for suggested plant list and landscape details
  - 1. Tree Canopy Replacement – Planting Guidelines
  - 2. Recommended Plant List – Planting Guidelines
  - 3. Prohibited Plant List – Planting Guidelines
  - 4. Landscape Design Details – Planting Guidelines

#### **32 96 00 Transplanting**

- A. Include tree relocation instructions on plans and in specifications. These instructions shall include notes and details on the plans. All information on the plan should be cross-referenced in the written specifications. Hand digging, tree spade, boxing, or other relocation methods shall comply with:
  - 1. ANSI Z60.1 "American Standards for Nursery Stock".
  - 2. NAA REF.1. "Transplanting of Trees and Shrubs in the Southeastern U.S."
  - 3. DOA "Codes and Standards for Nursery Plants Parts I & II."
  - 4. Miami-Dade County Landscape Ordinance (Chapter 18-A), when applicable.
  - 5. Florida Department of Environmental Resource Management (DERM)

6. Certified Arborist (of Record)

## PLANTING GUIDELINES

### 32 93 00 B GENERAL

- A. The MDC Facilities Maintenance - Landscaping Staff finds it necessary to establish and provide standard recommendation for plantings; Recommendation which provide/promote a diverse, environmentally sound, functional and aesthetically pleasing framework from which the professional design team can establish as a baseline to begin planting work.
- B. Information concerning planting details, professional design requirements, planting protection during construction and other typical planting data is defined in the MDC Design Standards 32 90 00 PLANTING Section.
- C. These standards are applicable to repairs, restorations, and new construction projects. These standards will apply uniformly to all general contractors commissioned by MDC.

### 32 93 00 B.1 Tree Replacement Notes and Guidelines

- A. Duties and Powers; The duties, functions, powers and responsibilities identified in these standards shall include the following:
  1. MDC hereby authorizes the MDC Facilities Maintenance – Landscaping Staff – Campus Superintendent to implement these standards. Authority for administering these standards including, but is not limited to:
    - a. Making and adopting administrative rules in order to manage these standards.
    - b. Controlling the removal of trees on MDC campuses to preserve all existing trees (native and desirable non-native species).
    - c. Supervising the replacement of trees no longer viable due to “Acts of God”.
    - d. Providing for the continued maintenance, care, and record-keeping of all trees on MDC Campuses.
    - e. Granting design variances from these standards on case-by-case basis, only where it is affirmatively established by credited factual data and would not be contrary to the intent of these standards.
    - f. Initiating legal and/or disciplinary action against individual or organizations that willfully, wantonly or negligently destroy MCD Campus trees.

B. Approvals for Tree Removals and Relocations:

1. No person or organization shall remove or relocated any MDC campus trees without the express written approval of the MDC Facilities Maintenance – Landscaping Staff. Exceptions being, trees planted as student activities intended for sale, education and//or horticultural charity programs.
2. Approval may be granted by MDC Facilities Maintenance – Landscaping Staff to remove certain species of trees which are considered a nuisance without requiring replacement.
3. Approval may be granted by the by MDC Facilities Maintenance – Landscaping Staff to relocate any MDC campus tree. Such approval shall take into consideration historic value, the ability of the tree to remain viable after relocation, and other data deemed pertinent.
4. A certified arborist shall provide specifications for all “specimen” tree/palms relocations. Specification shall be provided to the A/E and contractor prior to construction.

C. Violations

1. Each viable tree that is removed without approval of the MDC Facilities Maintenance – Landscaping Staff and/or DERM regulations shall constitute a separate violation of these standards and shall be replaced according to these standards. Trees removed by an act of God shall not constitute a violation, however their replacement shall be in accordance with these standards.

**32 93 00 B.2 Recommended Plant List**

**SHADE TREES**

Botanical Name	Common Name	Specification	Caliper
1. Bursera simaruba	Gumbo Limbo	18'-20', FG., STD.	4"-5"
2. Coccoloba uvifera	Seagrape	14'-16', FG., STD.	2.5"-3"
3. Chrysophyllum oliviforme	Satin Leaf	12'-14', FG., STD.	2.5"-3"
4. Quercus virginiana	Live Oak	18'-20', FG., STD.	4"-5"
5. Swietenia mahagona	Mahogany	18'-20', FG., STD.	4"-5"
6. Lysiloma latisilqua	Wild Tamarind	18'-20', FG., STD.	4"-5"
7. Pinus Elliott	Slash pine	12'-14', FG., STD.	2.5"-3"
8. Taxodium distchum	Bald Cypress	12'-14', FG., STD.	2.5"-3"

**FLOWER TREES**

Botanical Name	Common Name	Specification	Caliper
1. Bulnesia arborea	Verawood	14'-16', FG., STD.	2.5"-3"
2. Cassia fistula	Golden Shower	14'-16', FG., STD.	2.5"-3"
3. Cassia bakeriana	Pink Shower	12'-14', FG., STD.	2.5"-3"
4. Cordia sebestena	Orange Geiger	12'-14', FG., STD.	2.5"-3"



5.	<i>Delonix regia</i>	Royal Poinciana	18'-20', FG., STD.	4"-5"
6.	<i>Lagerstroemia indica</i>	Crepemyrtle	12'-14', FG., STD.	2.5"-3"
7.	<i>Peltophorum pterocarpum</i>	Yellow Poinciana	14'-16', FG., STD.	2.5"-3"
8.	<i>Tabebuila Heterophylla</i>	Pink Trumpet	14'-16', FG., STD.	2.5"-3"

**PALM TREES**

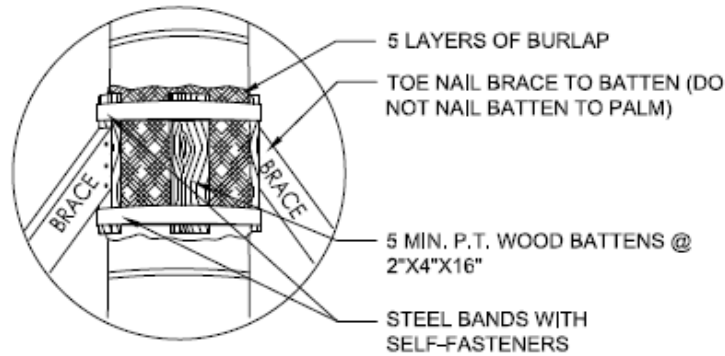
Botanical Name	Common Name	Specification	Caliper
1. <i>Archontophoenix alexander</i>	Alexander Palm	14'-16', FG., GW.	10"
2. <i>Bismarkia nobilis 'Silver'</i>	Silver Bismark Palm	14'-16', FG., GW.	12"
3. <i>Phoenix dactylifera 'Medjool'</i>	Medjool Date Palm	20'-22', FG., OA.	10"
4. <i>Roystonea elata</i>	Florida Royal Palm	14'-16', FG., GW.	12"
5. <i>Sabal palmetto</i>	Sabal Palm	12'-14', FG., OA.	10"
6. <i>Thrinax radiata</i>	Thatch Palm	12'-14', FG., OA.	6"
7. <i>Veitchia merrillii</i>	Christmas Palm	12'-14', FG., OA.	6"
8. <i>Veitchia montgomeryana</i>	Montgomery Palm	12'-14', FG., OA.	6"

**32 93 00 B.3 Prohibited Planting List Species**  
 (See “Miami-Dade County Prohibited Plant Species List” for additional examples)

Botanical Name	Common Name
1. <i>Acacia auriculiformis</i>	Earleaf acacia
2. <i>Adenantha pavonina</i>	Red sandalwood
3. <i>Albizia lebeck</i>	Woman's tongue
4. <i>Ardisia elliptica</i>	Shoebuttan ardisia
5. <i>Bischofia javanica</i>	Bischofia
6. <i>Casuarina spp.</i>	Australian Pine
7. <i>Catharanthus roseus</i>	Madagascar Periwinkle
8. <i>Cestrum diurnum</i>	Day jasmine
9. <i>Colubrina asiatica</i>	Lather leaf
10. <i>Cuaniopsis anacardiopsis</i>	Carrotwood
11. <i>Dalbergia sissoo</i>	Indian dalbergia
12. <i>Eugenia uniflora</i>	Surinam cherry
13. <i>Epipermunum pinnatum aureum</i>	Pothos
14. <i>Ficus altissima</i>	Banyan tree
15. <i>Ficus elastic</i>	Indian rubber tree
16. <i>Ficus microcarpa</i>	Laurel
17. <i>Kalanchoe pinnata</i>	Life plant
18. <i>Melaleuca quinquenervia</i>	Melaleuca
19. <i>Merremia tuberosa</i>	Wood rose
20. <i>Schinus terebinthifolius</i>	Brazilian pepper



32 93 00 B.4 Typical Landscape Details



NOTE:  
 SECURE BATTENS WITH 2-3/4" HI  
 CARBON STEEL BANDS TO HOLD  
 BATTENS IN PLACE DURING  
 PLANTING PROCESS, DO NOT NAIL  
 BATTENS TO PALM. HEIGHT OF  
 BATTENS SHALL BE LOCATED IN  
 RELATION TO THE HEIGHT OF THE  
 PALM FOR ADEQUATE BRACING.  
 PAINT ALL EXPOSED WOOD  
 SURFACES WITH COLOR SPECIFIED  
 BY LANDSCAPE ARCHITECT

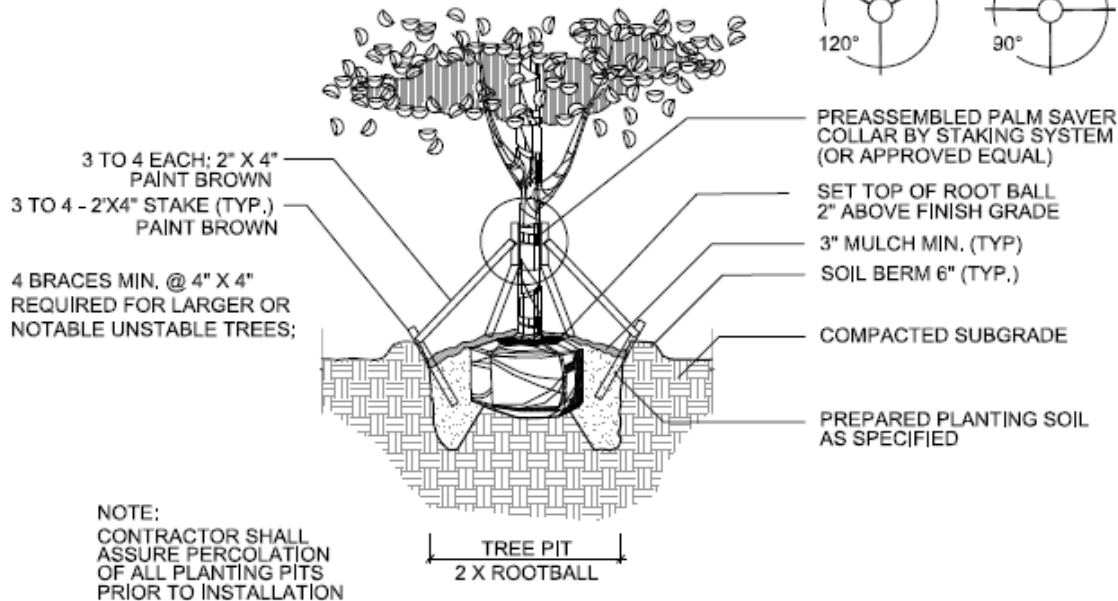
○ SECURED BATTEN AND BURLAP DETAIL  
 Scale: NTS

SK-32.01



ARBOR TIE  
(STAKING COMPONENTS  
MANUFACTURE BY STAKING  
SYSTEMS INC. OR APPROVED EQUAL)

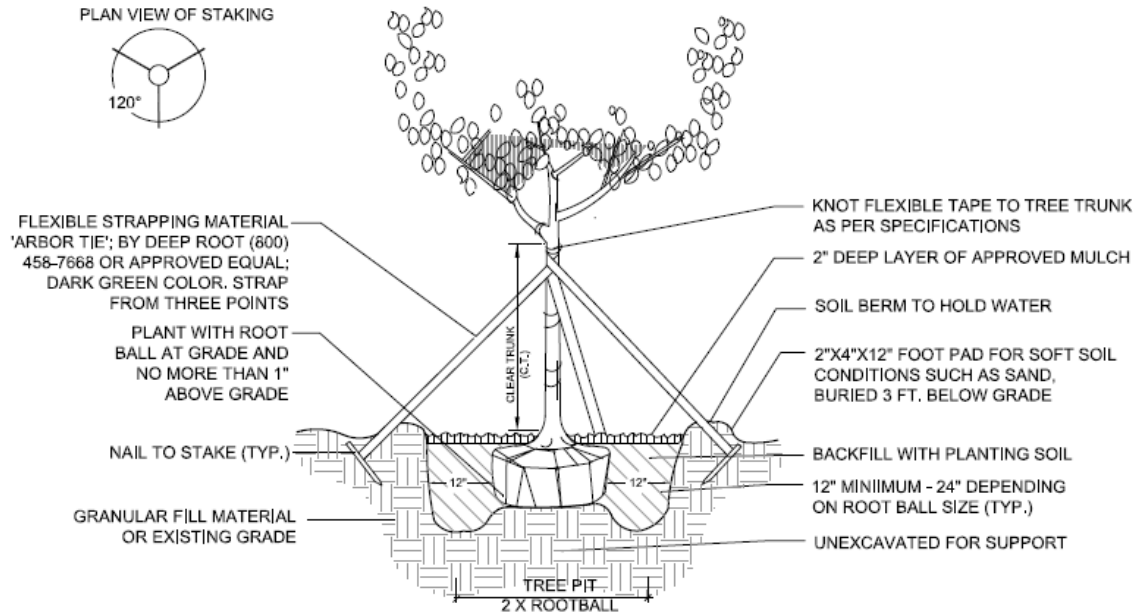
PLAN VIEW OF STAKING



 SPECIMEN TREE PLANTING DETAIL (PLANT BEDS ONLY)  
Scale: NTS

SK-32.02

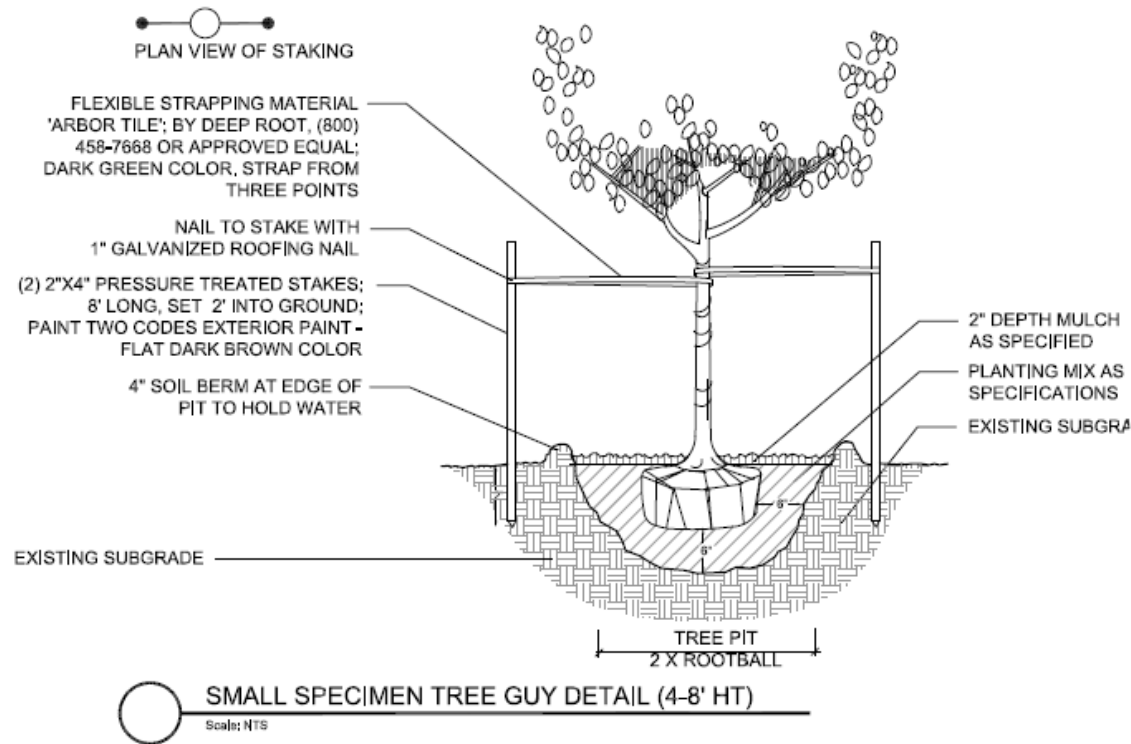




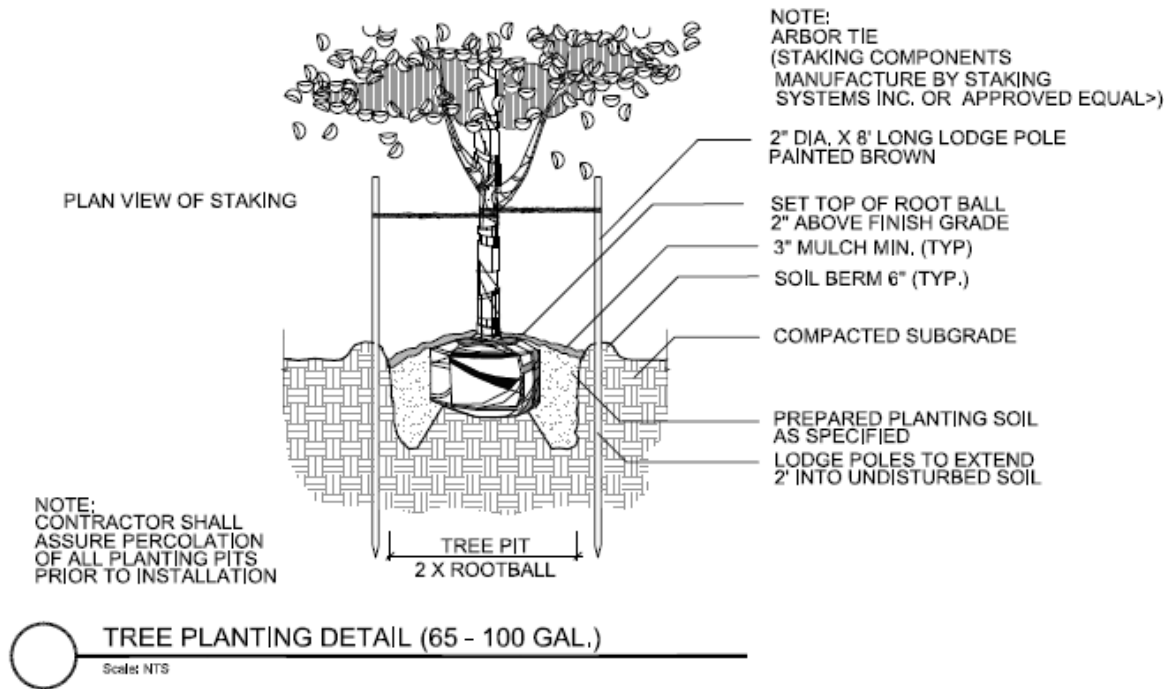
MEDIUM SPECIMEN TREE GUY DETAIL (8-10' HT)  
Scale: NTS

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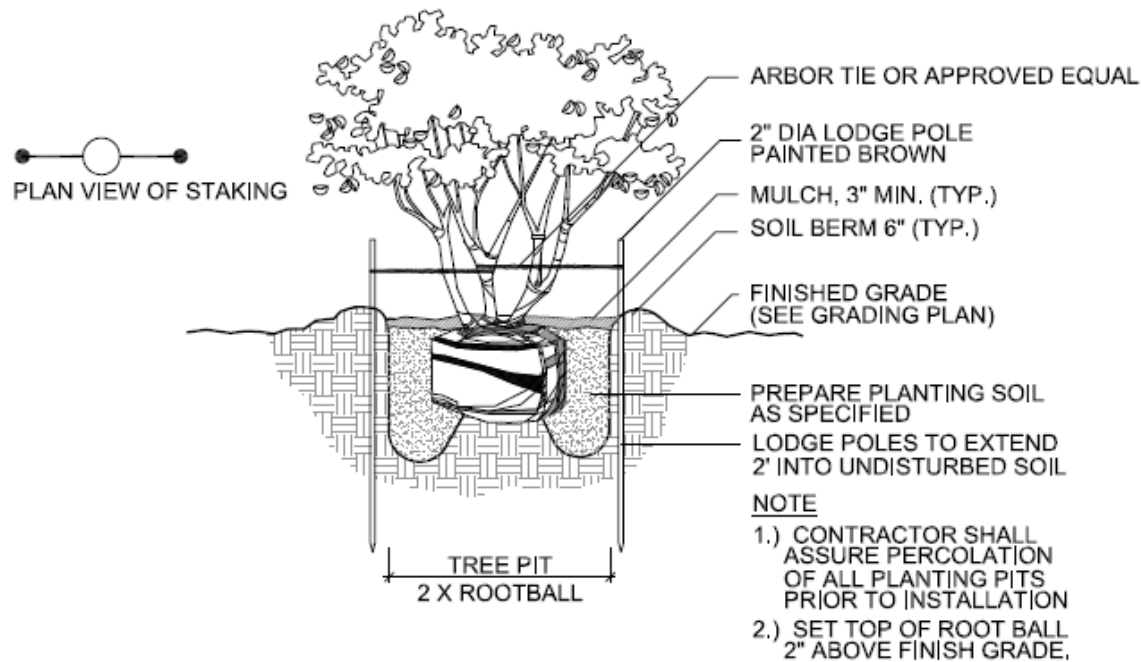




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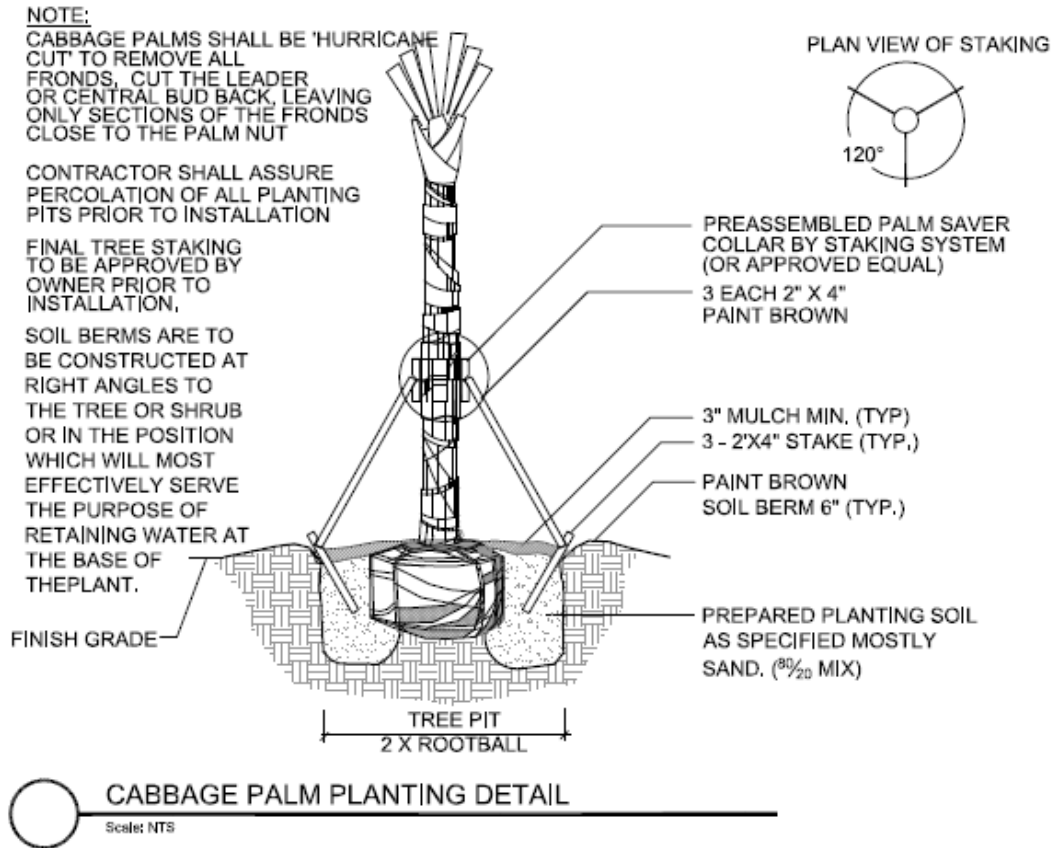


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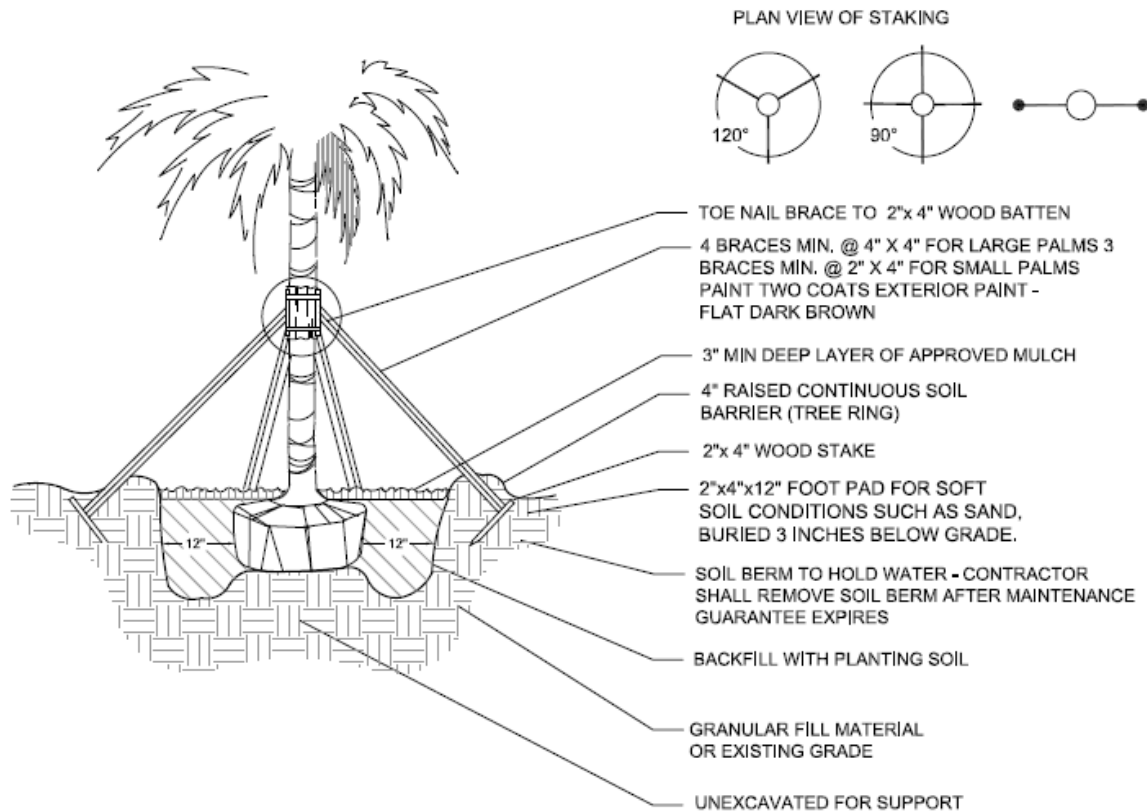



 MULTI-TRUNK TREE PLANTING DETAIL  
Scale: NTS

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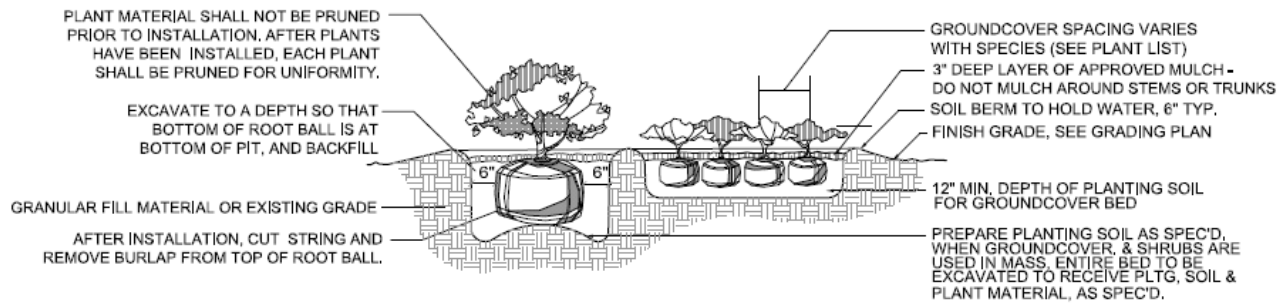


SK-32.07



 SPECIMEN PALM PLANTING DETAIL  
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SK-32.08

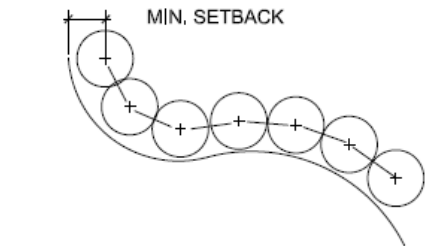
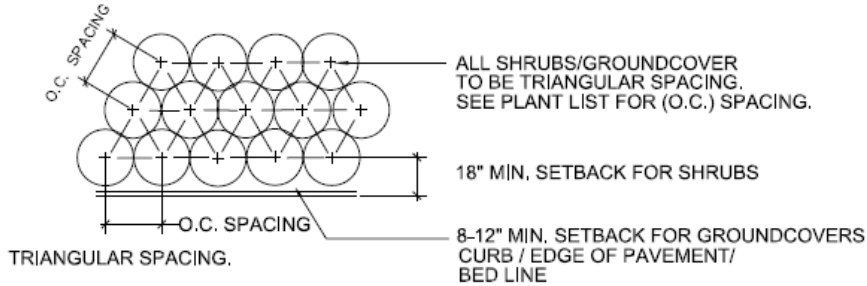
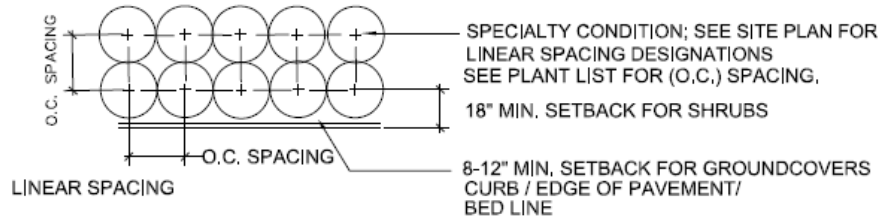


NOTE:  
CONTRACTOR SHALL ASSURE PERCOLATION OF ALL PLANTING PITS / BEDS PRIOR TO INSTALLATION

○ SHRUB AND GROUNDCOVER PLANTING DETAIL  
Scale: NTS

SK-32.09





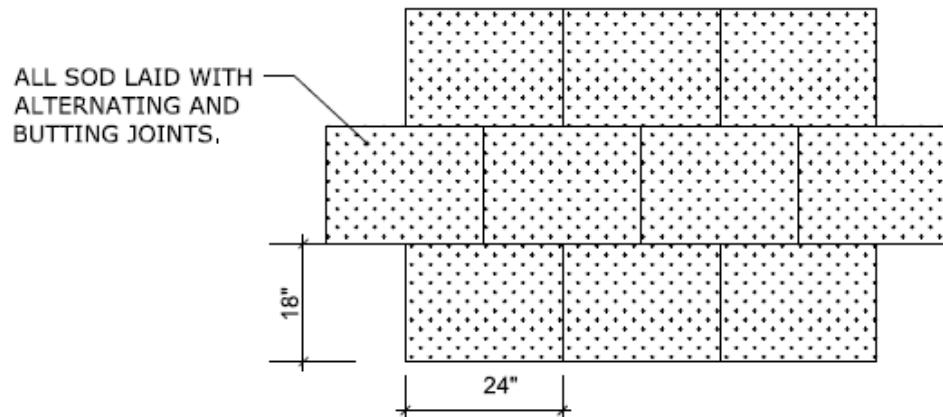
NOTE:  
THE PERIMETER OF ALL CURVED PLANTING BEDS SHALL BE PLANTED WITH A ROW OF SHRUBS AS SHOWN IN THE PLANS AND AT THE SPACING SHOWN IN THE PLANT LIST. INTERIOR PORTIONS OF EACH BED SHALL BE PLANTED AT APPROPRIATE SPACING ACCORDING TO THIS PLANT SPACING DETAIL.

○ PLANT SPACING DETAIL  
Scale: NTS

SK-32.10







- NOTE:
- SOD TO BE TOP DRESSED AND ROLLED
  - 2"-3" IN OF TOP SOIL TO FINE GRADING AND LAY SOD

○ SOD DETAIL  
Scale: NTS

**SK-32.11**

**NOTE:** This division of the design criteria shall be included as part of Project Manual in the Construction and Contract Documents.

**END OF DIVISION**



**33 00 00 UTILITIES**

**33 01 00 GENERAL**

- A. If project is within Miami-Dade Water and Sewer Department (WASD) service area the following procedures shall be followed.
  - 1. A/E Coordination with MDC Facilities Management Department’s Project Manager:
    - a. The A/E shall schedule a meeting with the Fire Department having jurisdiction, to determine the requirements for fire hydrants. If a fire hydrant is required, a water main extension may be required.
    - b. If it is determined that a water main extension is required, the A/E shall contact MDC Project Manager immediately.
    - c. The A/E shall provide the MDC a copy of the Fire Department stamped approved site plan. MDC will determine if the Fire Department requirements comply with Florida Statutes Section 1013.51 (1)(b).
    - d. MDC will schedule a meeting with the WASD and negotiate the points of connection for water.
    - e. If required, MDC will formally request a WASD Service Agreement from the utility company having jurisdiction. WASD requires the following documents:
      - 1) One (1) Signed and Sealed Boundary Surveys with Legal Description and Location Map.
      - 2) Property Legal Description typed on 8-1/2" x 11" sheet.
      - 3) One (1) copy of the site plan and/or tentative plat showing layout of buildings and roads.
      - 4) Proof of any existing or previously connected structure, and the type or usage/ occupancy of said structure.
      - 5) Sewer Capacity Certification Letter (Sewer Allocation) provided by the A/E.
      - 6) Preliminary site plan showing proposed water scope of work (8½" x 11", 8½" x 14" or 11" x 17" sheet) provided by the A/E.
      - 7) Fire Department stamped approved drawing provided by the A/E.
    - f. The A/E shall submit the aforementioned documents to MDC who will then prepare the required Service Agreement package and submit to WASD for processing
  - 2. The A/E shall submit to WASD the required engineering documents for the Dry Run review approximately 3 weeks after the Service Agreement has been requested.

**DIVISION 33**

**UTILITIES**

**This section contains the following:**

- 33 01 00 GENERAL**
- 33 05 09.43 Wet Taps
- 33 05 61 Concrete Manholes
- 33 05 61.1 Sanitary Sewerage Manholes and Structures
- 33 05 61.2 Stormwater Manholes and Structures
- 33 05 97 Identification and Signage for Utilities
- 33 08 10 Commissioning of Water Utilities
- 33 08 30 Commissioning of Sanitary Sewerage Utilities
- 33 08 40 Commissioning of Stormwater Utilities

*(Continues)*



3. The A/E shall submit all water and sewer (WASD and RER) permit applications to MDC for their review. Following their review, the MDC Project Manager will sign the application, which will then be returned to the A/E for further processing.
4. Specify that the Contractor shall request a pre-construction meeting with WASD Service Desk or Inspection Section to review procedures before commencing work.
5. Specify that the Contractor, after the completion of all required testing, submittal of WASD As-Built for approval (including approval of the legal description and sketches for any new water or sewer easements), securing the WASD Final Inspection, Department of Health (DOH) HRS Letter of Release, RER Letter of Release and any other approval or certifications required by applicable agencies, WASD New Business Division, will prepare a Conveyance Package. This package shall include the following documents:
  - a. Waiver and Release of Lien.
  - b. Warranty Letter or Maintenance Bond.
  - c. Cost Breakdown, Water and Sewer.
  - d. Legal Description and Sketch (Contractor shall provide two (2) originals to MDC).
  - e. Bill of Sale.
  - f. Grant of Easement.

NOTE: The General Contractor/Offsite Contractor shall execute all the aforementioned documents and provide two (2) originals of each to MDC, with the exception of the Bill of Sale and Grant of Easement, prior to the installation of the permanent water meter.

6. The General Contractor/Offsite Contractor shall submit the Backflow Certifications and HRS Letter of Release to MDC, who will then request the installation of the permanent water meter.

B. Water Distribution System.

1. Public right-of-way improvements shall comply with DOH, WASD, and other utilities with site jurisdictions, for approvals, permits, and other specific requirements:
2. On-site Improvements:
  - a. Extend water lines on site to provide domestic water, emergency water, and fire service complying with DOH and fire department requirements.
  - b. Design connections to existing lines and provide locations for required meters according to governing agency or utility requirements.
  - c. Provide supply line with reduced pressure backflow preventer and separate water meter for irrigation tie-in to the domestic water supply.
  - d. On-site water lines to be dedicated to the county shall comply with WASD requirements.

<b>33 10 00</b>	<b>WATER UTILITIES</b>
33 14 00	Potable Water Systems
33 14 19.1	Backflow Prevention
33 14 19.2	Hydrants
33 19 00	Metering
<b>33 30 00</b>	<b>SANITARY SEWERAGE</b>
33 31 00	Sanitary Sewerage Piping
33 32 00	Sanitary Sewerage Equipment
<b>33 40 00</b>	<b>STORMWATER UTILITIES</b>
33 42 00	Stormwater Conveyance
<b>33 50 00</b>	<b>GAS SERVICE</b>
<b>33 60 00</b>	<b>HOT/CHILLED WATER</b>
<b>33 70 00</b>	<b>SITE ELECTRICAL</b>

3. Provide alternate or temporary water and sewer lines as required to existing facilities to avoid service interruption.
4. Underground exterior domestic water lines shall be:
  - a. PVC with mechanical joints with elastomeric seal for 4-inch diameter lines and larger.
  - b. PVC with socket welded joints for 3-inch diameter lines or less.
  - c. Determine proper PVC type for intended use from Florida Building Code.
  - d. Burial depth:
    - 1) Plumbing lines 2-1/2 inch in diameter or less shall be buried a minimum of 24 inches.
    - 2) Plumbing lines 3 inch in diameter or larger shall be buried a minimum of 36 inches.
  - e. Install lines with 6 inches of clean sand below and at sides of pipe and with a minimum of 12 inches of clean sand backfill over pipe.
  - f. PVC supply line velocities shall not exceed 5 fps.
  - g. PVC lines shall have 2-inch-wide metallic detection tape buried between 4 and 6 inches below finish grade.
5. Post indicator valves shall be required at emergency lines, including building fire lines. Locate valves near property lines. Additional valving shall not be provided except as allowed by National Fire Prevention Association (NFPA).

C. Hydrants and Siamese Connections.

1. Locate a drafting hydrant or fire hydrant within 8 feet of a fire lane and next to the main entrance of the campus.
2. A Siamese connection shall be within 50 feet of a hydrant, either mounted on a wall without adjacent window exposure or freestanding on a concrete pad or slab.
3. A Siamese connection shall be visible from fire lanes and readily accessible to firefighting crews by being clear of obstructions or landscaping.
4. When Siamese connections require concrete bollards to provide protection from vehicular traffic, the bollards shall be 3 feet high and shall be 4 feet clear of hydrants.

**33 05 09.43 Wet Taps**

See section 33 60 00 for information specific to heating hot water and chilled water line wet taps.

- A. General: Wet tapping may be performed on potable, fire, irrigation, and sanitary sewer force mains. All wet tapping shall be coordinated with MDC Operations Engineering.
- B. Contractor's Equipment: Tapping or drilling machine shall have the following features:
1. Automatic feed indicator to show the exact position of the drill at all times.
  2. Automatic over-travel protection to prevent the cutter from going through the back side of the main.
  3. Automatic disengagement protection.
  4. Shell cutters shall be 1/2" undersized.
- C. Materials:
1. Tapping Sleeves for potable, fire, and irrigation.
    - a. When tapping ductile or cast iron mains (12" and above), use one of the following:
      - 1) Fusion epoxy coated steel with stainless steel nuts and bolts; or
      - 2) Mechanical joint sleeve; or
      - 3) Stainless Steel Full Circle Tapping Sleeve: Romac SST with ductile flange, JCM 432 or mechanical joint sleeve with a test plug is acceptable.
    - b. When tapping asbestos-cement or PVC pipe (of any size), or iron pipe (12" and smaller), use only a Stainless Steel Full Circle Tapping Sleeve, with 304 Stainless Steel lugs, bolts, nuts and washers. The distance between bolts should not exceed 3".
    - c. All sleeves used in wet tapping must have a test plug for pressure testing.
- D. Execution:
1. After installing the sleeve, and prior to drilling, the Contractor shall pressure test the installed material, using chlorinated water.
  2. If thrust blocks are needed, they shall not be installed until after the tap has been made. Pipe shall be wrapped with a Visqueen liner before cement is poured so concrete does not adhere to pipe.
  3. Do not backfill until inspected by MDC.

### 33 05 61.1 Sanitary Sewerage Manholes and Structures

- A. General:

1. All manholes and underground utility structures shall either be constructed with precast concrete units or reinforced cast-in-place concrete.
2. All manhole openings shall be installed so as to minimize surface water intrusion through the lid.
  - a) In grassed areas, the opening shall be 3" above surrounding grade with a continuous gradual slope down from the opening; maximum slope is 1" per foot.
  - b) In paved areas, the opening shall be 1" above the surrounding grade with a continuous gradual slope down from the opening; maximum slope is 1/3" per foot.

B. Structural Requirements:

1. Manholes and underground utility structures shall be designed by an engineer registered in the State of Florida based on ASTM C857 Standard Practice for Minimum Structural Design Loading for Underground Precast Concrete Utility Structures with A-16 (AASHTO HS20) wheel loads. An additional load case consisting of A-12 (AASHTO HS15) wheel loads with 1/3 of the ASTM C857 impact and with Live Load Spacing of 32 inches rather than 4 feet shown in ASTM C857 Figure 1 shall also be considered.
2. As an alternate, precast, and reinforced cast-in-place, concrete manholes and underground utility structures with top slabs not longer than 48 inches maximum inside dimension conforming to the 2008 Florida Department of Transportation Design Standards Index No. 200 and Index No. 201 may be utilized without design by an engineer registered in the state of Florida.
3. Joints between precast units shall be made using "Ram-Nek" sealant.

C. Sanitary Sewer Manholes:

1. Entrance Neck: 24" maximum length.
2. Waterproofing: Manhole exterior shall be coated with bituminous material to prevent infiltration.
3. Interior Construction: Smooth channels shall be made at the manhole invert to convey sewage through manholes. These channels may be made using either sewer line pipe that has had the top half of the pipe removed, or grout that has been shaped and formed. The space between the half-pipe, or grout channel, and the manhole walls shall be filled with grout that is shaped to promote drainage back into the channel. The use of brick is allowed in constructing this grout shelf, but is not allowed elsewhere in manhole construction.
4. Ladder: No integral ladder is to be installed.
5. Manhole Spacing: Maximum spacing between sanitary sewer manholes shall be 350 feet.
6. Drop Manholes: Specify "drop" manhole if inlet invert is more than 2' above manhole invert. Drops for drop manholes shall drop on the outside of the manhole. Pour the outside pipe in concrete. Drop pipes inside of manhole are not permitted.
7. Covers: Provide 24" minimum diameter lids permanently marked "SANITARY."
8. All sanitary sewer manholes shall be furnished with an infiltration insert. Manhole inserts shall be furnished

and installed in all new sanitary sewer manholes and all manholes to be rehabilitated as part of the Project. Infiltration insert body shall be manufactured of High-Density Polyethylene meeting the requirements of American Society for Testing and Materials Standard D1248-84 (Reapproved 1989), A Polyethylene Plastics Molding and Extrusion Materials, Type III, Class A, Category 5 or stainless steel, or as required by Utility Authority.

### 33 05 61.2 Stormwater Manholes and Structures

#### A. General:

1. All manholes and underground utility structures shall either be constructed with precast concrete units or reinforced cast-in-place concrete.
2. All manhole openings shall be installed so as to minimize surface water intrusion through the lid.
  - a) In grassed areas, the opening shall be 3" above surrounding grade with a continuous gradual slope down from the opening; maximum slope is 1" per foot.
  - b) In paved areas, the opening shall be 1" above the surrounding grade with a continuous gradual slope down from the opening; maximum slope is 1/3" per foot.

#### B. Structural Requirements:

1. Manholes and underground utility structures shall be designed by an engineer registered in the State of Florida based on ASTM C857 Standard Practice for Minimum Structural Design Loading for Underground Precast Concrete Utility Structures with A-16 (AASHTO HS20) wheel loads. An additional load case consisting of A-12 (AASHTO HS15) wheel loads with 1/3 of the ASTM C857 impact and with Live Load Spacing of 32 inches rather than 4 feet shown in ASTM C857 Figure 1 shall also be considered.
2. As an alternate, precast, and reinforced cast-in-place, concrete manholes and underground utility structures with top slabs not longer than 48 inches maximum inside dimension conforming to the 2008 Florida Department of Transportation Design Standards Index No. 200 and Index No. 201 may be utilized without design by an engineer registered in the state of Florida.
3. Joints between precast units shall be made using "Ram-Nek" sealant.

#### C. Storm Drainage Manholes & Structures:

##### 1. Manholes:

- a) Entrance Neck: 24" maximum length.
- b) Ladder: No integral ladder is to be installed.

- c) Manhole Spacing: Maximum spacing between storm sewer manholes shall be 350 feet.
  - d) Covers: Provide 24" minimum diameter lids permanently marked "STORM."
2. Inlets and Curb Inlets: Storm sewerage inlets shall conform to Florida Department of Transportation Design Standards, shall satisfy AASHTO HS-20 loading, and shall be suitable for bicycle traffic. Grates that allow bicycle tires to “drop in” or “get stuck” are not considered safe.
- a) Grates typically approved elsewhere may not be considered bicycle-safe and may require modification prior to installation.
  - b) Build up bottoms of catch basins to pipe inverts to create a natural flushing action during storm events.
  - c) Do not locate curb inlets on the radius of curves such as on the corners at intersections.

### 33 05 97 Identification and Signage for Utilities

- A. Warning Tape: All underground piping and utilities shall have non-detectable warning tape that conforms to the following requirements to identify the specific system buried below. Warning tape shall meet OSHA regulation 1926-956 (C) (I). Tape shall be 6" wide with black lettering imprinted on a color-coded background that conforms to APWA color code specifications. Tape shall be installed between 18" to 30" above the top of the pipe and a minimum of 6" below grade.
- B. Tracer Wire: All non-metallic pipes installed underground (except pipe containing electric wires and traceable communication lines) and all piping installed 6 feet or more below grade shall have a tracer wire installed along the length of the pipe. The tracer wire shall be taped to the pipe and not allowed to “float freely” within the backfill. The tracer wire shall be continuous without splicing from access point to access point along the length of the pipe. The tracer wire shall be accessible at all structures (valve boxes, meter pits, manholes, pull boxes, lift stations) along the length of the pipe. The tracer wire shall have an access point at the beginning and ending points of the pipe run with no distance between access points to exceed 400 feet within the pipe run. The tracer wire shall have a color-coded jacket as follows:
- 1. Potable Water – Blue
  - 2. Reclaimed Water – Purple
  - 3. Sanitary Sewer – Green
  - 4. Storm Sewer & Drain Lines – Green



UTILITY	COLOR
PROPOSED EXCAVATION	WHITE
ELECTRIC POWER LINES, CABLES, CONDUIT AND LIGHTING CABLES	RED
POTABLE WATER	BLUE
STEAM, CONDENSATE, GAS OR OIL COMPRESSED AIR	YELLOW
TELECOMMUNICATIONS, ALARM OR SIGNAL LINES, CABLES OR CONDUIT	ORANGE
TEMPORARY SURVEY MARKINGS	PINK
SEWER AND STORM DRAINS	GREEN
CHILLED WATER, RECLAIMED WATER, IRRIGATION AND SLURRY LINES	PURPLE
OTHER	LIGHT BLUE

Tracer wire for piping less than 12” diameter shall be a #12 AWG and for piping greater than 12” diameter or 6 feet or more below grade shall be a #10 AWG and HS-CCS high-strength copper clad steel conductor (HS-CCS), insulated with a 30 mil, high-density, high molecular weight polyethylene (HDPE) insulation, rated for direct burial use at 30 volts. HS-CCS conductor must be 21% conductivity for locating purposes, Break load 380# minimum. HDPE insulation shall be RoHS compliant and utilize virgin grade material. Insulation color shall meet the APWA color code standard for identification of buried utilities. Tracer wire shall be Copperhead™ HS-CCS HDPE 30 mil insulation or pre-approved equal and made in the USA. Any disturbance of this tape requires replacement after work is completed.

**33 08 10 Commissioning of Water Utilities**

- A. General: All piping for water distribution systems shall be cleaned and tested.
- B. Specify thorough flushing, and cleaning with a "Polly Pig" where necessary. Sterilization and pressure testing procedures shall be explicitly specified and shall comply with the appropriate AWWA standard and State of Florida Health Standards.
- C. Water samples shall be tested at a Miami-Dade County Public Health Unit, Environmental Health Division in Miami. Currently a fee is charged for this test. Test results are to be forwarded to the MDC Project Manager and MDC before service is turned on. A representative from MDC must be present during the water sampling – no exceptions.



- D. Commissioning of water utilities shall be accordance with Miami-Dade County Water and Sewer Department's Standard Specifications.

### **33 08 30 Commissioning of Sanitary Sewerage Utilities**

- A. All newly installed sanitary sewer piping shall be television inspected and recorded. The TV inspection recording shall provide a clear picture with audio. The picture shall contain the number of linear feet from the center of the manhole. The recording shall be turned over to MDC at Substantial Completion in DVD or MPEG format.
- B. All drain and gravity sewer line segments or sections shall be separately and individually lamped and tested for infiltration and exfiltration, unless otherwise allowed by the Engineer. A line "segment" or "section" shall be defined as a run of pipe between a manhole and the next manhole either up or down stream of that manhole.
- C. Commissioning of sanitary sewerage utilities shall be accordance with Miami-Dade County Water and Sewer Department's Standard Specifications.

### **33 08 40 Commissioning of Stormwater Utilities**

- A. All newly installed stormwater piping shall be television inspected and recorded. The TV inspection recording shall provide a clear picture with audio. The picture shall contain the number of linear feet from the center of the manhole. The recording shall be turned over to MDC at Substantial Completion in DVD or MPEG format.

## **33 10 00 WATER UTILITIES**

### **33 14 00 Potable Water Systems**

- A. Underground piping 4" and larger shall be C900 PVC or cement lined, bituminous sealed ductile iron.
1. Push-on joint pipe should be minimum thickness Class 51, and flanged joint pipe should be minimum thickness Class 53.
  2. Use flanged joint type pipe when piping is exposed, and when buried pipe joints are located beneath structures. Welded joints are not permitted.
  3. Ductile iron pipe installed in a corrosive area shall be wrapped in a plastic approved for underground applications.
- B. Pipe size under 4" shall be Schedule 80 PVC. Design shall include a reaction block schedule, if applicable.

- C. Flanges: Flanges should conform to American Standard B16.1, latest revision. Specify full-faced type rubber gaskets, 1/16" thick, for all flanged joints.
- D. Minimum Depth of Burial: The minimum depth of burial for potable water piping shall be 30" to the top of the pipe.
- E. Sleeves Under Roadways and Sidewalks: All buried lines under roadways and sidewalks shall be installed in a pipe sleeve that is a minimum of two pipe sizes larger than the line itself. Pipe sleeves shall be ductile iron pipe (DIP) and shall extend a minimum of 5' beyond both sides of the roadway and a minimum of 1' beyond both sides of the sidewalk.
- F. Pressure Testing: All potable water systems shall be tested at 150 psi for a minimum of two hours. If test fails, corrections shall be made to the system and the test repeated to confirm correction of deficiencies. All testing shall be performed to ASTM Standards and witnessed by MDC.
- G. Valve Boxes: Valve boxes shall be cast iron. Surround with concrete pad, with chamfered edges. Pad shall be 18" x 18" x 8" with 6" x 6" #10 gage welded wire mesh. Lid should be marked "WATER." Boxes and lid material shall be AASHTO H-16 rated.
- H. Thrust Restraints: Absent the use of mechanical connections on fittings at changes in direction, properly sized concrete thrust blocks shall be installed. To facilitate ease in the future removal of thrust blocks, the affected piping shall be wrapped in 6 mil polyethylene film (Visqueen) prior to pouring the thrust block.

### 33 14 19.1 Backflow Prevention

The following requirements relating to backflow prevention devices apply to MDC's potable water, fire water, and irrigation systems regardless of whether the system served is described in these Standards or where the backflow prevention device is physically located (indoors or outdoors).

- A. General:
  - 1. Provision Requirement: To reduce the risk for contaminants being introduced into the potable water system, backflow prevention devices are required on all potable water system service laterals, regardless of whether the lateral is used for fire water, potable water, or irrigation. Projects for new buildings and renovations shall provide and install backflow preventers (BFP's) on all such laterals, and elsewhere if required by the below-mentioned applicable design guidelines.
  - 2. Design Guidelines: Pipe, fittings, and devices shall comply with American Water Works Association Manual M-14, Miami-Dade County Regional Utilities' Manual of Cross Connection Control, and Florida Department of

Environmental Protection requirements (62-555.360 Florida Statutes).

3. Quality Assurance: All pipe, fittings, and devices shall be approved by the Foundation for Cross-Connection Control and Hydraulic Research (FCCC & HR).
  4. Required Type of Device: Use reduced pressure type backflow preventers only, except in cases where an air gap is deemed necessary. Backflow Preventer Assembly shall conform to the AWWA “Recommended Practice for Backflow Prevention and Cross-Connection Control” M-14”. All Double Check Valve Assemblies (DCVA) shall be testable. Flow detection meter assembly is not required.
  5. Location of Device:
    - a. BFP's should be located indoor, concealed, or landscaped so as not to be visually obtrusive; location shall be coordinated with the MDC Project Manager.
    - b. BFP's shall be located above grade in an area not prone to flooding.
  6. Test Cocks: All BFP's shall have test cocks.
  7. Acceptable Manufacturer: AMES, Watts, Febco, Wilkins.
- B. Special Requirements by Application:

Special requirements for fire protection, potable water, irrigation system and health hazard applications are given below.

1. Fire Water System: A single-double check valve is acceptable. If possible, install BFP's for the fire water system indoors.
2. Chiller and Cooling System: make-up water for chillers and cooling systems shall be provided with a single-double check valve BFP's.
3. Potable Water System:

Two BFP's, installed in parallel, are to be installed on all potable water system laterals to buildings. The size of each of these two BFP's can be reduced from the size required when using a single BFP, provided the two are identical in size and the combined cross-sectional area of the two BFP's equals, or exceeds, the cross-sectional area of the single BFP.

  - a. MDC requires dual BFP's because the buildings cannot be without water during testing and repairs of BFP's (bypasses are not acceptable).
  - b. Laboratory areas within buildings: All laboratory areas within buildings shall be isolated by BFP's located such that they are easily accessible for maintenance.
4. Irrigation System:

- a. Reclaimed Water As Source: If reclaimed water is used as a source for irrigation water, a reduced pressure backflow preventer is not required to protect the reclaimed water system.
  - b. Groundwater/Reclaimed Water As Sources: Wells serving irrigation systems also fed by reclaimed water shall be protected by a reduced pressure backflow preventer.
  - c. Potable Water/Reclaimed Water As Sources: Where potable water serves irrigation systems also fed by reclaimed water, the potable water system shall be protected by an air gap rather than a reduced pressure backflow preventer.
5. Health Hazard Applications: Reduced Pressure Devices for Health Hazard Applications shall have removable insulated valve protection device (i.e. "Hot Box") insulation jackets and an air gap drain.
- C. Execution:
1. Method of installation shall be designed to minimize flow restriction.
  2. Service Clearances: To facilitate servicing BFP's, the bottom of the BFP shall be located between 12" and 36" above the ground. The side with the test cocks shall be 24" from the nearest fixed wall or obstruction, and all other sides shall be 12" from the nearest fixed wall or obstruction.
  3. Water Drainage: Provide appropriate means for collection of water from backflow prevention devices if located within the building.
- D. Certification: All backflow preventers shall be tested, certified, and tagged following the installation and prior to Substantial Completion.

### 33 14 19.2 Hydrants

- A. General:
1. All hydrants shall be a dry-barrel, breakaway type with 5 1/4-inch seats, meeting AWWA C502 standards for dry-barrel hydrants.
  2. Hydrants shall have two 2 1/2-inch nozzle connections and one 4-inch nozzle connection. The nozzle section of the hydrant shall be able to rotate 360° during field installation.
  3. The rated water working pressure for all hydrants shall be 200 psi and tested to 400 psi by an independent laboratory testing agency.
  4. The main valve closure shall be compression type. The hydrant will be breakaway type so main valve will remain closed if hydrant is damaged by a vehicle.
  5. The main valve opening shall not be less than 5 1/4 inches. The internal working parts shall be removable through the top of the hydrant. The seat and subseat shall be made of bronze.
  6. The drainage system of the hydrant shall be activated by the main stem and shut-off by direct compression

closure.

7. A gate valve shall be installed in the line feeding the hydrant, as close as possible to the hydrant.
  8. Hydrant must have a 6" inlet pipe connection.
  9. Hydrant shall not have a tamperproof cover.
- B. Installation Height: Centerline of pumper nozzle shall be a minimum of 18" and a maximum of 22" above grade.
- C. Acceptable Manufacturers: American Darling, Kennedy Valve, Clow Valve and in accordance with Fire Department having jurisdiction.
- D. Clearances: No obstructions within a 6' radius; and no building within 10'.
- E. Operation:
1. Unless properly metered by MDC, Contractors shall not operate fire hydrants for the purpose of using water on construction.
  2. Contractors shall not operate fire hydrants without proper fire hydrant tools. The use of pipe wrenches, monkey wrenches, or any other device not made for fire hydrant use is prohibited.

### **33 19 00 Metering**

- A. Water meters shall comply with water utility standards and requirements of the water utility providing services.

### **33 30 00 SANITARY SEWERAGE**

- A. If project is within Miami-Dade Water and Sewer Department (WASD) service area the following procedures shall be followed.
1. A/E Coordination with MDC Facilities Management Department's Project Manager:
    - a. MDC will schedule a meeting with the WASD and negotiate the points of connection for sewer.
    - b. If required, MDC will formally request a WASD Service Agreement from the utility company having jurisdiction. WASD requires the following documents:
      - 1) One (1) Signed and Sealed Boundary Surveys with Legal Description and Location Map.
      - 2) Property Legal Description typed on 8-1/2" x 11" sheet.
      - 3) One (1) copy of the site plan and/or tentative plat showing layout of buildings and roads.

- 4) Proof of any existing or previously connected structure, and the type or usage/ occupancy of said structure.
  - 5) Sewer Capacity Certification Letter (Sewer Allocation) provided by the A/E.
  - 6) Preliminary site plan showing proposed water and sewer scope of work (8½" x 11", 8½" x 14" or 11" x 17" sheet) provided by the A/E.
  - 7) Fire Department stamped approved drawing provided by the A/E. The A/E shall submit the aforementioned documents to MDC who will then prepare the required Service Agreement package and submit to WASD for processing
2. The A/E shall submit to WASD the required engineering documents for the Dry Run review approximately 3 weeks after the Service Agreement has been requested.
  3. The A/E shall submit all sewer (WASD and RER) permit applications to MDC for their review. Following their review, the MDC Project Manager will sign the application, which will then be returned to the A/E for further processing.
  4. Specify that the Contractor shall request a pre-construction meeting with WASD Service Desk or Inspection Section to review procedures before commencing work.
  5. Specify that the Contractor, after the completion of all required testing, submittal of WASD As-Built for approval (including approval of the legal description and sketches for any new water or sewer easements), securing the WASD Final Inspection, Department of Health (DOH) HRS Letter of Release, RER Letter of Release and any other approval or certifications required by applicable agencies, WASD New Business Division, will prepare a Conveyance Package. This package shall include the following documents:
    - a. Waiver and Release of Lien.
    - b. Warranty Letter or Maintenance Bond.
    - c. Cost Breakdown, Water and Sewer.
    - d. Legal Description and Sketch (Contractor shall provide two (2) originals to MDC.
    - e. Bill of Sale.
    - f. Grant of Easement.
  6. In addition, prior to occupying the new facility, the Engineer of Record shall obtain the required RER 100% Certificate of Completion for the newly installed sewer infrastructure.
- B. Sanitary Sewer System.
1. Public right-of-way and on-site improvements require WASD and RER approval before MDC acceptance.
  2. Connect the building sewer system to a public sanitary sewer system or a RER approved disposal system.
  3. Underground exterior sanitary lines shall be as follows:

- a. PVC with mechanical joints with elastomeric seal for lines 4 inch diameter and larger.
  - b. PVC with socket welded joints for lines 3 inch diameter or less.
  - c. Determine proper PVC type for intended use from FBC- Plumbing, Chapter 7 with their respective governing ASTM or other standards.
  - d. Burial depth:
    - 1) Sanitary lines that are 2-1/2 inch diameter or less shall be buried a minimum of 24 inches.
    - 2) Sanitary lines that are 3 inch diameter or more shall be buried a minimum of 36 inches.
  - e. Install lines with 6 inches of clean sand below and at sides of pipe and with a minimum of 12 inches of clean sand backfill over pipe.
  - f. PVC lines shall have 2 inch wide metallic detection tape buried between 4 to 6 inches below finish grade.
4. Provide exterior sanitary sewer lines with manholes at every change of line or grade and at intervals not exceeding 300 feet.
- a. Piping connecting manholes shall be 8 inch diameter or greater, have at least a 0.4 percent slope, and a sewage velocity of at least 2 feet per second.
  - b. Provide traffic type cast iron rings and round covers at manholes.
  - c. Manholes shall be according to M-DCPW.
  - d. Manholes shall have inlet and outlet inverts noted and with a 0.1" change of elevation.
5. Calculations and design of lift stations require MDC acceptance.
6. See Division 22 00 00 "Plumbing" for acid resistant piping requirements.
- C. Waste Disposal System.
1. See Division 22 13 00 "Facility Sanitary Sewerage" for grease interceptor locations, sizes, and other requirements.
  2. Comply with and size grease interceptors according to DOH requirements.
- D. Dumpster Pads.
1. French drains or collection tanks shall not be used for dumpster pad drainage.

### 33 31 00 Sanitary Sewerage Piping

- A. Gravity Collection System Piping: PVC piping shall be in accordance with ASTM 3034D standards and SDR ratio



applicable to the depth of burial as recommended by the manufacturer. Cement lined ductile iron class 50 is acceptable for special conditions.

- B. Sanitary Force Main Piping: If PVC piping is used for the force main then the piping shall be DR-25, as a minimum, with mechanical joint fittings. PVC piping used for sanitary force mains will need to have a 14-1-MDC gauge insulated wire attached to the pipe. The insulated wire shall be continuous through valve boxes. Pipe should be green in color or have a yellow stripe painted on top.
- C. The use of vitrified clay pipe is unacceptable.
- D. Cleanouts: Cleanouts shall be provided at grade. Cleanout caps shall be made of brass. Surround cleanouts with concrete pad with chamfered edges. Pad shall be 18" x 18" x 6" with #10-gauge welded wire mesh.
- E. Valve Boxes: Valve boxes shall be cast iron. Surround with concrete pad with chamfered edges. Pad shall be 18" x 18" x 8" with 6" x 6" #10 gauge welded wire mesh. Lid shall be marked "SANITARY." Boxes and lid material shall be AASHTO H-16 rated.

### **33 32 00 Sanitary Sewerage Equipment**

- A. General: Lift stations shall comply with Division 22 13 00 "Facility Sanitary Sewerage."

### **33 40 00 STORMWATER UTILITIES**

- A. Storm-water Management.
  - 1. Public right-of-way improvements shall comply with M-DCPW for approvals, permits, and other specific requirements.
  - 2. On-site improvements shall comply with:
    - a. RER
    - b. South Florida Water Management District.
    - c. M-DCPW.
    - d. Or other Agencies having jurisdiction.
  - 3. Storm-water management shall follow the requirements of the Department of Transportation (DOT) Drainage Manual, Volume 2A, and the requirements of the local comprehensive plan.

- a. Pipe capacity shall be determined by the Manning Formula and partially full flowing pipes shall have a flow velocity of at least 2 feet per second.
  - b. Parking lot drainage shall have a storm recurrence frequency of 5 years, with positive drainage at paving, and with the storm drainage system water level not exceeding the pavement surface elevation.
4. The A/E shall decide the location and number of percolation tests to be performed on each project. Site drainage design shall be based on test results combined with finish grades, paved areas and building footprints.
  5. Request criteria regarding soil corrosion effects from geotechnical engineer to decide piping life cycle cost analysis.
  6. Landscaped areas not directly drained by a system of pipes, trenches or catch basins shall be sloped to a properly drained area to prevent ponding water.
  7. Provide adequate drainage structures to control runoff from parking lots and other paved areas.
  8. Courtyards, partially or completely surrounded by buildings, shall drain away from buildings.
  9. Centerline of exfiltration trenches shall be at least 15 feet from building foundations.
  10. Storm drainage runoff shall be directed away from buildings and shall not cross sidewalks or covered walkways to get to drainage inlets.
  11. Catch basins shall not be located in or within 10 feet of field play areas.
  12. Provide catch basin covers with hinges.
  13. Storm systems shall be designed to minimize standing water in the pipes and structures so as to not breed mosquitoes.

### **33 42 00 Stormwater Conveyance**

- A. Schedule 40 PVC piping shall be used for storm sewer piping up to 10 inches. Black corrugated HDPE piping shall be used for storm sewer piping above 10 inches. Where circumstances warrant, double walled HDPE (lined corrugated) pipe can be used. RCP and other types of successfully field-tested piping are acceptable alternates if FDOT- approved.
- B. The use of corrugated metal pipe or vitrified clay pipe is not acceptable.
- C. Cleanouts: Cleanouts shall be provided at grade. Cleanout caps shall be made of brass. Surround cleanouts with concrete pad with chamfered edges. Pad shall be 18" x 18" x 6" with #10-gauge welded wire mesh.

### **33 50 00 GAS SERVICE**

- A. Where gas services are required for laboratory, food preparation, and hot water needs, the A/E is to consult with

the franchised gas service supplier. A/E is to advise MDC and show the proposed gas service lines on the Civil Site Plans to ensure coordination with other site improvements and prevention of conflict. The associated work is to be indicated as provided by others on the plans.

### 33 60 00 HOT/CHILLED WATER

- A. See Division 23, HVAC for specific requirements regarding piping, valves, fittings, manhole materials, and placement. Show all site related mechanical improvements on the Civil Site Plans for proper coordination with other utilities and resolution of conflicts.

### 33 70 00 SITE ELECTRICAL

- A. See Division 26, Electrical for specific requirements regarding conduits, cabling, manholes, site lighting, transformers and switching materials, placement, and meters. Show all site related electrical improvements on the Civil Site Plans for proper coordination and resolution of conflicts.
1. Develop installation specifications for all utility systems satisfying manufacturer's recommendations and other related Division 2, Sitework requirements. Coordinate with the MDC Project Manager prior to design for project requirements, utility source, and medium voltage distribution design and specifications.
  2. Specify that dry trench conditions are to be maintained to facilitate effective installations by well pointing where needed.
  3. The A/E is to make sure that any new or modified system is not put into service until the agency approval/clearance letter has been received.

**NOTE: This division of the design criteria shall be included as part of Project Manual in the Construction and Contract Documents.**

**END OF DIVISION**

## Design Criteria – Edit Request Form

<b>Name:</b>	
<b>Department:</b>	
<b>Email:</b>	
<b>Date:</b>	

This request is to:

- Modify a section of the document
- Replace a section of the document
- Delete a section of the document
- Add a new section to the document

**Division:**

**Chapter:**

Please supply a brief description of why you would like to present changes to the document:

Please indicate the urgency of this request:

- High
- Moderate
- Low

Please submit all requests to [documentcontrol@mdc.edu](mailto:documentcontrol@mdc.edu) for review.

**END OF FORM**

## DESIGN CRITERIA - EDIT REQUEST

EDIT REQUEST FORM