STATE OF MICHIGAN

Department of Technology, Management and Budget

BUILDING DESIGN STANDARDS

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PURPOSE

It is the purpose of these design standards to establish a minimum level of quality in terms of building systems design and material selection for State of Michigan lease, lease-to-own and/or state owned facilities. These design standards have been prepared with the intent to provide quality facilities for the State of Michigan with maximum utility and energy efficiency, requiring a minimum of maintenance and operational expense for the long term.

These standards set minimal design direction for typical office construction components and systems and do not address every possible building component and system that could be encountered. The Lessor and/or the design professional is to refer to the RFP (Request for Proposal) for unique products or systems that are set forth by the requesting State Agency.

Adherence to these standards is mandatory however any equal or improved concepts, methods, or products are encouraged and will be given full consideration. Written approval by DTMB/Design & Construction is required for any deviations or exceptions from these standards. Approval is required prior to the final release of construction documents for bids or construction.

GLOSSARY

ACI	American Concrete Institute
ADA	Americans with Disabilities Act
AHU	Air Handling Unit
AISC	American Institute of Steel Construction, Inc.
ANRI	American National Standards Institute, Inc.
ASHRAE	American Society of Heating, Refrigerating and Air Conditioning Engineers
ASTM	American Society of Testing and Materials
AWG	American Wire Gage
BOCA	Building Officials and Code
CFC	Clorofluorocarbon
F/M	Factory Mutual Research Corporation
GFI	Ground Fault Interuptor
IES	Illuminating Engineering Society
IESNA	Illuminating Engineering Society of North America
LEED	Leadership in Energy and Environmental Design
Lessor/Lessee	The terms Lessor and Lessee are used in a generic fashion in this document. The Lessor may also represent the Contractor or Construction Management firm that is providing a building facility to the State of Michigan. The term Lessee is used as the generic term for the State of Michigan as the end user and/or Owner. Design Professional is the generic title used in this document to describe the Professional Architect or Engineer that is designing the facility being provided.
NEMA	National Electrical Manufactures Association
NFPA	National Fire Protection Association
PCB	Polychlorinated Biphenyl
psig	Pounds per square inch guage
RFP	Request for Proposal
SMACNA	Sheet Metal & Air Conditioning Contractors
STC	Sound Transmission Class
UL	Underwriters Laboratories, Inc.

1.0 – INTRODUCTORY INFORMATION

1.1 General

A. It is the purpose of these standards to set forth the minimum general requirements and standards of quality for the completed facility as well as to clarify points of particular interest to the Lessee.

B. Actual design, construction, and performance of the building, building systems, site and ground utilization, etc. are the responsibility of the Lessor.

C. The Lessor shall obtain the services of an independent architect/engineer to provide the construction documents pursuant to the Lessee's requirements.

D. Construction Documents are to comply with all the latest building codes and local zoning ordinances.

E. The Lessor shall be responsible for presiding over and generating periodic progress meetings, minutes of meetings, and periodic on-site construction inspections to verify the provisions of the drawings and specifications.

F. The Lessor shall submit to the Department of Technology, Management and Budget (DTMB), Facilities Administration, Real Estate Division, and the Property Management Division three (3) sets of complete Construction Documents bearing the seal of a licensed architect or engineer in the State of Michigan, for review and approval prior to permit application and start of construction.

G. These Design Standards and the Lease agreement take precedence over the Construction Documents.

H. The Construction Documents shall be approved by the Lessee before remodeling or new construction is started.

I. Approval of these documents does not waive the Lessor's responsibility to comply with the provisions of the Lease.

J. Construction Documents shall include a complete architectural site plan indicating boundary and/or topographic surveys, demolition, erosion plan, grading, lighting, utilities, building location, sidewalks, parking lot, drives, curbs, fences, signs, landscaping, and other site considerations. Construction Documents are to include all structural, mechanical, electrical and furniture plans and specifications.

K. The Leased premises shall be designed in such a manner as to insure an economical and efficient use of space, adequate natural light, ventilation, circulation patterns and code compliance.

L. Environmental assessments and/or remediation requirements are described in the terms of the Lease.

M. At existing facilities that are renovated and / or occupied all unsafe conditions are to be corrected prior to State of Michigan staff occupying the space. This includes all fire / life safety violations.

1.2 Sustainable Design

A. The Leased premises shall comply with all Governor's, Latest Energy Directives.

B. General Sustainable Design objectives:

1. Design building envelope and building systems to maximize energy efficiency.

2. Utilize Energy Star® performance criteria and when applicable, Energy Star® rated equipment and appliances.

3. Require zero use of CFC-based refrigerants for new systems; complete a comprehensive CFC phase-out conversion when reusing existing systems. Select refrigerants and HVAC&R that minimize emissions.

4. When possible, specify or use products that are extracted, harvested, recovered or manufactured within 500 miles of the project site.

5. When possible, to encourage the use of rapidly renewable materials, specify and or use materials and products that are made of plants that are typically harvested within a ten-year or shorter cycle.

6. Design systems that meet or exceed minimum indoor air quality and ventilation requirements as well as optimizing air change effectiveness in accordance with ASHRAE.

7. Design building envelope and HVAC systems that establish temperature and humidity comfort ranges in accordance with ASHRAE.

8. Design structures to maximize daylight and views to the exterior consistent with the required function of interior building spaces.

C. Lessor and/or Architect/Engineer is to submit a listing and description of credits from the pre-assigned LEED rating system that is to be used to achieve the required Platinum Rating or the designated rating stated in the terms of the Request for Proposal. This material is to be submitted along with the three (3) sets of construction documents to the Department of Technology, Management and Budget (DTMB), Facilities Administration and Real Estate Division for review and approval prior to permit application and start of construction.

During the course of construction the Lessor and/or Architect/Engineer shall be responsible to verify that the approved LEED rating systems are being followed and implemented during the course of construction. This compliance tracking is to be included as part of periodic construction progress meetings, and is to be included as part of the meetings minutes.

2.0 - PROJECT SUMMARY

2.1 Special Requirements

A. The Project RFP and the Terms of the Lease define special requirements such as State supplied and or State installed equipment, materials or furnishings.

B. Permits

1. The Lessor or its representative shall obtain all necessary building, zoning, and other permits as required for the complete construction of the Leased premises.

a. Compliance:

i.) Construction shall be done in strict accordance with approved plans and specifications. The Lessee reserves the right to make periodic inspections of the project to ascertain whether construction and workmanship are as represented by approved construction documents and that the Leased premises is also representative of practices of construction that are reasonable and customary in the industry.

ii.) A Pre-Construction meeting will be called by the Real Estate Division Property Analyst and moderated by an authorized representative of the Facilities Administration prior to the start of any construction work.

C. Testing

1. The Lessor shall pay for all required Code or regulatory testing services.

2. The Lessor shall pay for all environmental assessments.

3. Within ten (10) days after the Pre-Construction Meeting, the Lessor shall submit to the Lessee a copy of a proposed construction schedule.

4. The Progress Schedule shall include the following:

   a. The anticipated date of commencement and completion of the various operations to be performed under the Lease.

   b. The "schedule" shall be predicated on the completion of all the work on or before the date specified.

   c. After being accepted by the Lessee as satisfactory, the schedule shall be strictly adhered to by the Lessor, subject to approved change order(s) to the Lease.

D. Project Meetings:

1. Regularly scheduled construction progress meetings shall be held at the job-site or a mutually agreed upon location between the Lessor and the Lessee.

2. The Lessor shall record and distribute minutes of meetings.

E. Shop Drawings

1. DTMB design & Construction shall provide to the Lessor a list of shop drawings that will require review, comment and approval.

F. Change Order:

1. The Lessor shall submit a detailed breakdown of costs to Lessee through DTMB's Real Estate Division, after review and approval by the Lessor's architect/engineer.

2. The Lessee, through DTMB, Facilities Administration, will review and recommend the adequacy of pricing only to DTMB /Real Estate Division and the Lessee.

3. The Lessee will advise DTMB's Real Estate Division in writing: (1) if it wants the changes made.

4. All change orders shall be issued in writing by the DTMB's Real Estate Division, on a construction change order notice as required by Article III of the Lease. The Lessor will be responsible for the cost of any unauthorized changes.

G. Contract Close Out:

1. The Lessor shall notify the Lessee in writing when the work will be Substantially Complete. The Lessor and Lessee shall conduct at the same time a final construction punch list inspection.

   a. All concerned parties shall attend the Substantial Completion meeting.

   b. All work shall be completed prior to final acceptance by the Lessee.

It is required that the following design concepts be incorporated into the project.

3.0 - SITE PLANNING/DESIGN

3.1 Site Design

A. A site survey is required.

B. Environmental and geotechnical investigations are required and are the responsibility of the Lessor.

C. Minimize site disturbances when determining building, parking, site circulation and utility locations.

D. Maximize the use of native plantings, draught resistant plantings and low maintenance plantings. Irrigation is to be provided in select areas only.

E. Gradients: Turf area – between 3:1 and 1 percent (2 percent desirable), steeper than 3:1 requires ground cover or other erosion control, steeper than 2:1 is not acceptable. Terracing is acceptable if access for lawn equipment is provided.

F. Walkways: ≤ 5 percent, cross slopes ≤ 2 percent, parking areas/entry plazas ≥ 1 percent ≤ 5 percent. Steps are discouraged.

G. Provide slip resistant finishes at exterior concrete surfaces subject to foot traffic.

H. Parking lot drives shall not be crowned. Provide areas for piling of snow.

I. Lessor/Design Professional is to contact local utility companies regarding systems capacities, rates, rebates etc.

J. Locate all utility lines behind curbs and in unpaved areas if possible. Do not locate water lines under foundations, streets, drives, parking areas or other inaccessible areas.

K. Fire hydrants are to be placed less than 300 feet from all points of the building façade, within 5 feet of fire truck access road and within 100 feet of the building siamese connection.

L. Locate sanitary sewer lines in unpaved areas, at least 10 feet from potable water lines.

M. Provide manholes at all intersections, changes in pipe size and changes in gradient.

N. Manhole spacing: pipe < 18”: 300 feet and pipe ≥ 18”: 400 feet.

O. Provide cleanouts at service lines 5 feet from building and at all bends where manholes are not used.

P. Provide separate storm system even if connected to a dual service main.

Q. Use a minimum 10 year storm frequency for design of parking lots. Use piped gravity flow system (no open ditches).

R. Parking lot lighting, landscape lighting, site amenities and site signage are to compliment each other.

S. Flag poles are to be provided with simplified access.

T. Provide concrete filled pipe bollards at exterior locations subject to damage, i.e. dumpster pads, electrical transformers, mechanical devices.

U. Provide reinforced concrete slab at dumpster locations, 15-foot long x width of garbage vehicle. Provide screen wall with lockable gate and pipe bumpers at dumpster pad per local ordinance requirements.

3.2 Site Circulation

A. Service drives are to be accessed from site circulation drives, screened as much as possible, separate from parking access and be of one way design.

B. Provide 10 space bike rack no less than 25’ from entry and visible from entry.

C. Provide the following as a minimum at parking lots: stall size 9’ x 20’, use 90° parking where possible, at least 10 percent of parking lot area is to be dedicated for plant islands, provide curbs around perimeter of parking lot and lot islands, maximum combined gradient = 5 percent. The use of pre-cast concrete curbs are discouraged, however if they must be used, anchor to paved surface.

D. Provide handicapped parking and signage per building code requirements.

4.0 - BUILDING PLANNING/DESIGN

4.1 General Building Planning

A. Field verify existing construction conditions and configurations. Do not assume that existing building framing and construction is plumb and square. Structural elements of all existing facilities shall be inspected and verified for size and loading capacity.

B. Structural bay sizing is to be commensurate with building configuration, architectural expression, seismic zone, structural framing material and cost. Typical bay size with no parking in the structure: 24’ x 32’ or 20’ x 40’. Buildings with parking in the structure; 30’ x 30’.

C. Diagonal structural bracing is not to be located at private office areas at exterior perimeter walls.

D. Utilize a raised access floor system for HVAC, electrical and communications systems to facilitate change management in new building construction and where practical at existing buildings.

E. Stack all electrical closets, communications/data closets and toilets vertically.

F. Use fixed windows in environmentally controlled buildings. If operable windows are utilized they must be lockable and must be washable on both sides from the building interior.

G. Do not locate fresh-air intakes adjacent to vehicle drop-off areas, parking areas, truck docks or emergency generators.

H. Aluminum windows must be thermally broken.

I. Use double or triple pane glazing according to climate conditions and to meet LEED requirements. Reflective glazing may be used if glare is not at issue.

J. Provide positive drainage at exterior window sills. Interior window sills that are to be constructed of durable water and moisture resistant materials. Gypsum board window sills are not acceptable.

K. Roofs shall be sloped to prohibit snow and ice slide off onto entry doors. Use cold roof design in heavy snow areas to prevent snow and ice build-up.

L. Flat or level roofs are not permitted.

M. Provide fall protection as required by MIOSHA. Integrate all protection into the design of the facility.

N. Caulking is not to be the primary method of preventing water intrusion.

O. Freight elevators are required for buildings over 2 stories and are to be separate and remote from passenger elevators. Ceiling height should be a minimum of 12’ and must be of sufficient capacity to transport building replacement mechanical equipment.

P. The total number of passenger elevators provided is to be coordinated and approved by the Lessee.

4.2 Space Planning: Security Design

A. Controlled access is required to the entire building and to each individual floor. The card access management system is to match existing State of Michigan access system. The access system is to be capable of tracking the issuing and revocation of access cards along with generating reports of all access into the building. Provide these readers at all building entrances, loading docks, and interior suite entrance doors.

B. Central data base computer is to connect all access locations, equipped for stand-alone operation upon power failure, programmed for automatic locking/unlocking of building doors.

4.3 Space Planning: Office Areas

A. Avoid locating private offices along building perimeter wall and window locations. Dedicate building perimeter locations for circulation space.

B. Coordinate interior wall partitions with window mullion locations.

C. Doors to conference rooms, private offices and break rooms are to have an adjacent side light. Provide standard 3’ x 7’ doors. Doors should swing against a wall whenever possible.

D. In office areas, stagger office/conference room doors so that they are not directly across from each other, especially in a corridor.

E. Coordinate electrical outlet locations with furniture panels.

4.4 Space Planning: Entrances, Vestibules and Lobbies

A. For small buildings and at office suites provide one entrance for staff/visitors/public. For large buildings provide one entrance for staff /visitors/public and an additional entrance for employees only.

B. For large buildings divide major lobbies into secure/non-secure areas with provisions for card access turnstiles.

C. Provide a vestibule with recessed floor mat at main entry area.

D. Power operated sliding doors are preferred to power operated swing doors. Provide push plate and motion sensors (no mat activation).

E. Provide overhangs at all public and employee entrances to reduce snow accumulation and protect occupants.

F. Exterior entrance doors are to be anodized aluminum, stainless steel or heavy duty laminated glass.

G. Unglazed exterior frames and doors are to be galvanized hollow metal welded frames with insulated doors.

H. Provide for a security desk at main lobby. Systems furniture may be used as a security desk. Provide adequate power, phone, data and security equipment provisions.

I. Provide directional graphics, directories and agency emblems.

4.5 Space Planning: Loading Docks

A. Locate loading docks separate from main entrance and locate convenient to freight elevator and to food service area.

B. Provide hydraulic dock leveler, dock bumpers, dock lock, dock seals and edge guards.

C. Loading dock doors are to be insulated overhead coiling type, with push button controls. Provide an adjacent man door to the dock door.

D. Provide a separate area for trash compactor.

E. Locate trash rooms adjacent to dock area and provide space for paper, glass and metal recyclable containers.

4.6 Space Planning: Support Spaces

A. As a minimum provide one men's and one women's toilet room per floor. Some building programs may require separate employee and separate public toilet rooms. Provide one men's and one women's toilet room adjacent to a cafeteria or food service area.

B. Vertically stack toilet rooms along with janitor's closets. Provide a floor mounted mop basin at janitor's closet.

C. Mechanical Equipment Rooms: Ceiling height to be a minimum 12', control noise transmission to adjacent spaces.

   Refer to Mechanical Design Requirements for additional descriptions.

D. Locate toilet rooms, janitor closets, electrical and telecom closets central to the building.

E. Switchgear and electrical rooms located in basement areas must have provisions for removing water. (Provide a back-up electrical power source).

F. Locate and centralize all mechanical equipment in a penthouse as much as possible. Avoid scattering miscellaneous condensing units, exhaust fans and equipment on the roof. Locate equipment behind a screen wall and integrate into the building design. Provide roof walkway pads compatible to the roofing system to roof top equipment.

G. Locate vertical shafts adjacent to core areas with no offsets allowing for maintenance accessibility and additions for future utilities.

H. Allow for vending areas, break rooms and lactation rooms.

5.0 - STRUCTURAL COMPONENTS

5.1 Structural Design

A. Live loads: Use 100 pounds per square foot for entire office floors. Limit floor deflection to L/360.

B. Verify with Lessee special floor loading requirements for computer room loads, special equipment loads and storage loads. Design 1 bay per floor for high density storage systems.

C. Design spaces with greater than office type loading according to the greater of the actual load or code live loading.

D. Do not reduce live load for horizontal framing members/columns or load bearing walls supporting top floor or roof.

E. Design Procedures:

1. Load Resistance Factor Design (LRFD): Use for small or large building structures.

2. Allowable Stress Design (ASD): Use for small building structures only.

F. Progressive Collapse:

1. Building is not to be subject to progressive collapse as defined by the building code.

2. Beam or slab failure shall not affect system below or in adjacent bays.

3. Column failure shall affect only the bays supported by that column

G. Drift:

1. Lateral deflection of building under lateral load is to be limited to wind and earthquake requirements. Wind induced motion and sway must also be limited.

2. Transient vibration induced by passing traffic or foot fall is to be minimized.

H. Corrosion Protection: Steel exposed to elements is to have a protective coating. For small isolated steel elements use either hot dipped galvanized zinc coating or coal tar epoxy. For larger exposed steel elements use a 2-coat system: Coat 1: organic zinc rich urethane or epoxy primer shop applied over blast cleaned surfaces. Coat 2: field applied finish coat.

For concrete in parking structures use either corrosion inhibiting additives and cathodic protection or epoxy coated reinforcing bars and surface sealers.

I. Attachments of non-structural elements: exterior cladding.

1. Provide connections and joints that provide movement between stories.

2. Connections to have sufficient ductility and rotation capacity to preclude brittle failure in connection welds or concrete fractures.

3. Concrete inserts are to be attached to or hooked around reinforcing steel.

4. Positively anchor window frames to resist lateral loads.

5. Provide clearance and flexible mountings at window frames to permit thermal movement.

J. Attachments of non-structural elements: partitions.

1. Non-structural, rigid partitions adequately supported so as to not to become load bearing.

2. Masonry walls are to be isolated from floor above by a gap and restrained by either an intermittent or continuous steel angle on both sides at top of wall or steel straps extending in the wall grout.

3. Metal stud partitions do not require in-plane lateral isolation from structure if the design story drift ratio multiplied by 3(R/8) is less than 0.0025.

4. Top of stud in full height walls is to be separated from the track. Use deflection tracks.

5. Building expansion is to be carried through crossing partitions.

6.0 - BUILDING ENVELOPE COMPONENTS

6.1 Masonry

A. Face Brick: grade "SW", severe weather type, special shapes as required by building configuration.

B. Concrete Masonry Units: Hollow load-bearing concrete masonry units, normal weight.

C. Masonry Accessories: horizontal and vertical joint reinforcement, ties, straps and weeps to meet design parameters.

6.2 Metals

A. ASTM grade for structural steel shapes, plates and bars as determined to meet project conditions and design parameters.

B. Shop prime all exposed steel surfaces except where fire proofing is provided.

C. All steel decking must be galvanized or be provided with a rust prohibitive coating, shop applied.

6.3 Wood

A. Dimensional lumber for light framing: stud, No. 2 or standard grade.

B. Dimensional lumber for structural framing: select structural, No. 1 grade.

6.4 Roof

A. Roof shingles: Fiberglass or asphalt, dimensional or 3-tab self sealing. Must have a minimum manufacturer's warranty of 25 years standard pro-rated, U.L. class "A" and wind resistant. Provide roof felts of 15#, non-perforated or better, ice and water dams at all valleys and eaves (3' minimum width), metal or aluminum drip edges.

B. Built-up and Single-Ply Roof Systems: Provide either a 4-ply built-up hot applied or single ply membrane roof system depending upon design parameters. The selected roof system must have a 20-year full system warranty which is to include insulation, fasteners, flashings, and roof systems accessories. Roof system manufacturer is to provide a roof inspection and roof report, with copies, to both the Lessor and Lessee at project completion. Single-ply roof membrane may be either reinforced or non-reinforced and have the equivalent in performance of a 60-mil non-reinforced membrane. A white reflective membrane system is preferred. Roof insulation is to comply with the Michigan Energy Code and be installed in 2 layers, joints staggered.

C. Metal roof panels: Manufactured roof panels comprised of polyisocyanurate insulations sandwiched between 24-gage aluminum coated sheet steel with a Kynar 500 finish. Provide continuous snow fencing to prohibit snow slide-off on all sloped metal roof applications. Manufacturer is to provide a 20-year full systems warranty.

D. Roof specialties: Provide factory assembled/fabricated roof components compatible to roof systems manufacturer's warranty. Field fabricated roof specialties are not permitted.

E. Manufacturer's roof systems and accessories submittals are to be reviewed and approved by DTMB prior to product procurement, to assure compliance with Item B above.

6.5 Sectional Doors

A. Galvanized sheet steel with polyurethane insulation bonded to facing sheets with manufacturer's standard finish paint. Provide weather stripping.

B. Provide torsion spring lift mechanism on cross head shaft with braided steel cables.

C. NEMA Type 1 electric operated motor, side mounted on cross head shaft, adjustable safety friction clutch, gear driven limit switch , magnetic cross line reversing starter, mounting brackets and hardware.

D. Surface mounted control station is to be a standard three button open-close-stop type; separate controls for each electric door operator.

6.6 Aluminum Entrances, Store Fronts and Windows

A. Aluminum Entrances: Provide as minimum design standard Series 14000 Glazed System as manufactured by Tubelite Inc., Reed City Michigan. Other manufacturers' may be substituted provided they meet or exceed the selected standard.

B. Aluminum framing members are to be thermally broken with either clear anodized or electronically deposited color. Doors are to have as a minimum, medium stiles and rails. Framing members are to be configured to accept insulated glazed units.

6.7 Glazed Aluminum Curtain Walls

A. Glazed aluminum curtain wall systems components include extruded aluminum framing, thermally broken with internal reinforcement, insulated spandrel panels, trim, filler units and gaskets. Glass units are to be low "E" insulated either tinted or reflective. Anchor clips and accessories are to be aluminum, nonmagnetic stainless steel or galvanized steel.

B. Aluminum finish is to be fluropolymer, Kynar 500, 2-coat for exterior applications and fluropolymer, Kynar 500, 2-coat or baked enamel for interior applications.

C. Glazed aluminum curtain wall systems design as well as manufacturer's submittals are to be reviewed and approved by DTMB Design & construction prior to product procurement, to assure compliance with Item A above.

6.8 Structural Sealant Glazed Curtain Walls

A. Structural sealant glazed curtain wall systems components include extruded aluminum framing, thermally broken, with internal reinforcement, insulated spandrel panels, trim, filler units and gaskets. Glass units are to be low "E" insulated either tinted or reflective. Anchor clips and accessories are to be aluminum, nonmagnetic stainless steel or galvanized steel. Structural sealant must meet systems manufacturer's specifications.

B. Aluminum finish is to be fluoropolymer, Kynar 500, 2-coat for exterior applications and fluropolymer, Kynar 500, 2-coat or baked enamel for interior applications.

C. Glazed aluminum curtain wall systems design as well as manufacturer's submittals are to be reviewed and approved by DTMB Design & Construction prior to product procurement, to assure compliance with Item A above.

6.9 Metal Wall Panels

A. Factory assembled manufactured wall panel insulated with isocyanurate foam-core, double tongue and groove joinery with factory applied air and vapor sealing with a minimum "R" value of 15. 26-gage minimum face and backer sheet steel with Kynar 500 finishing consisting of 1-color coat and 1-primer coat (both faces).

6.10 Glazing

A. Exterior sealed insulated glass units: 1-inch thick, Class A, low "E" glass.
Storefront: 1-inch thick insulated unit low "E" glass to match window units.
Mirrors: ¼-inch plate glass with silvering and protective coating.
Doors: Tempered or wire glass.
Security glazing; Laminated glass.
Bullet resistant glass: Level 3 per UL 752.
When required by user agency.

6.11 Site Furnishings

A. Site furnishings consisting of benches, trash receptacles, bike racks and picnic tables if required will be noted in the request for proposal. In general, site furnishings are to be from the same manufacture and are to match or be complimentary to each other in terms of style, material and color. It is encouraged that site furnishings are manufactured from recycled materials where possible.

7.0 - INTERIOR COMPONENTS & FINISHES

7.1 Gypsum Plastering

A. Portland cement plaster consisting of 3 coats over metal lath and/or 3 coats over concrete masonry units, float finish.

7.2 Gypsum Board and Non-Structural Framing

A. Metal framing members: 22-gage minimum, corrosion resistant steel, 3-5/8", channel type at 16-inches on center. Verify gage size with actual span and loading conditions. Provide pre-manufactured deflection track at full height wall construction extending to either a floor or roof deck.

B. Wood framing members: nominal, grade 2, 2" x 4" at 16-inches on center.

C. Gypsum board: As a standard, 5/8-inch typical thickness, screw attached. Provide 5/8-inch cementitious board at ceramic tile finish surfaces susceptible to water contact. Provide 5/8-inch water resistant gypsum board at areas subject to high humidity/moisture exposure or to water damage.

D. Installation standards:

Gypsum board shall be installed and finished per United States Gypsum Co. levels of gypsum board finishing as follows:

Level 1 finish: when above finished ceilings and concealed from view.
Level 2 finish: as a substrate for tile.
Level 3 finish: when scheduled to receive a heavy or medium textured finish.
Level 4 finish: in offices and other areas that receive lower public traffic and visibility.
Level 5 finish: for all walls and ceilings to receive a painted finish, lightly textured finish and/or wall coverings. Use in corridors and other high public traffic areas.

E. Trim and accessories: Use metal trim. Provide fire treated wood or 20-gage metal wall reinforcement for toilet room accessories, wall mounted mechanical and electrical equipment, wall mounted cabinets, and other miscellaneous wall supported accessory items.

7.3 Applied Fireproofing

A. Provide high density cementitious, cement-fiber or mineral fiber formulations complying to the Michigan Building Code, local fire marshal directives and U.L. requirements. Applied fireproofing component materials are to be from one manufacturer. Surfaces are to be cleaned and prepared per manufacturers recommendations. Repair and patch fireproofing material at areas subject to damage from pipe hangers, and equipment installation.

7.4 Fire and Smoke Resistive Joint Systems

A. Fire and smoke resistive joint systems includes through-penetration firestopping of fire-rated construction. Components are to be from one manufacturer complying with the Michigan Building Code, local fire marshal directives and U.L. requirements. The selected system must conform to the construction type, type of material penetrating a surface, and the type of space in which the penetration is located.

7.5 Joint Sealants

A. Provide either silicone or polysulfide elastomeric joint sealants at gaps between dissimilar materials, offsets, areas of expansions movement, areas of water and air penetration and where visual appearance is critical. Maximum joint size is ¼-inch.

7.6 Doors and Openings

A. Interior doors at offices, conference rooms, stairwells and other heavily used locations are to have a glass side light as a minimum. Use standard height and width doors where ever possible to avoid custom fabrication. Doors are to swing against a wall whenever possible. Vertical rod panic devices are not permitted.

B. Hollow metal steel doors are to be flush with composite construction Grade II, heavy-duty, 18-gage cold-rolled, 1-3/4-inches thick at interior locations and Grade III, extra-heavy duty, 16 gage galvanized steel 1-3/4-inches thick at exterior locations.

C. Steel frames must be welded type 16 gage steel at interior locations and welded type 16 gage galvanized steel at exterior locations. All door frames are to have door silencers and plaster guards.

D. Flush wood doors at interior locations are to be premium grade, 5 or 7-ply construction, rift-cut red oak faces with either a field or factory applied finish.

E. Access doors are to be fabricated with 16 gage steel frames with 14 gage steel doors, primed with a cylinder lock.

F. Overhead coiling doors are to be galvanized steel, with manufacturer's standard paint finish At exterior locations provide insulated polyurethane cores with jamb and sill weather stripping. Lift mechanism shall be torsion spring on cross head shaft with steel lift cables. Doors shall be electronically operated with standard three button open-close-stop type controls. Each door is to have separated controls.

G. Automatic sliding entrance doors and frames are to be aluminum with a finish of fluropolymer, Kynar 500 2-coat or fluropolymer etched and clear anodized or electronically deposited color. Doors are to have medium stiles and rails. At exterior locations provide insulated glass, door sweeps, perimeter seals and barrier free aluminum thresholds. Door operator shall be electromechanical and activated either by motion sensor or by paddle type push button.

H. Automatic door operators are to be ADA compliant, electronically operated, surface mounted with weather tight aluminum housing. Operator is to be provided with an adjustable time delay. Provide 6-inch diameter push plate for activation.

I. Door hardware: For buildings owned or operated by the State of Michigan furnish and install door hardware to comply with the latest edition of the State of Michigan Security and Emergency Management Standards. State of Michigan will provide these specifications upon request. For all other conditions comply with the following:

    1. Quality level: Heavy duty commercial.

    2. Locksets and latchsets: Cylindrical type, heavy duty lever handle (no door knobs).

    3. Keying: Owner's (agency) requirements for keying and key control systems with master and grand master keying.

    4. Hinges and butts: Full-mortise type with non-removable pins at exterior doors.

5. Closers, door control: High frequency, ADA compliant.

6. Exist devices: Similar in performance to IR-VonDuprin, 990 Series.

7. Push/pull units: Through-bolted type.

8. Door stops: Wall mounted.

9. Weatherstripping: At all exterior hollow metal and aluminum doors provide perimeter door seals, door sweeps and barrier free aluminum thresholds.

10. Card operated opening devices may be required. Lessor's existing card operated system may be used if approved by the Lessee (agency).

7.7 Tile

A. All toilet room wall surfaces are to have glazed ceramic tile extending a minimum of 4'-0" above finish floor, thinset with colored latex-cement grout. Tile is to be plain faced with cushion edges, ¼-inch thickness.

B. All toilet room floors are to have unglazed ceramic tile with integral coved base, thin-set with colored latex-cement gout and 2-coats of sealer. Tile to be porcelain, factory-mounted, flat, with abrasive admixture, ¼-inch thickness with patterned face and cushion edges.

C. Quarry tile floors are to be installed using thin-set latex cement with colored grout coated with 2 coats of sealer.

7.8 Acoustical Panel Ceilings

A. Ceiling panels are to be mineral base panels, wet formed, standard fissured, white, with square lay-in edge profile. Size to be either 2' x 2' x ¾-inch or 2' x 4' x ¾-inch. Minimum panel size at walls are to be no smaller than 6-inches.

B. Ceiling suspension systems are to be equal to Prelude XL, 15/16-inch, exposed Tee system, white, direct hung double-web heavy duty as manufactured by Armstrong Contract Interiors. Provide all necessary attachment devices, hold-down clips, wall angle and hangers per manufacturer's recommendations. Do not hang suspension system off of pipe, conduit or ductwork.

7.9 Resilient Flooring

A. Resilient tile flooring to be vinyl composition tile, Composition I, non-asbestos formulated, Class 2. 12-inch x 12-inch x 1/8-inch thick.

B. Vinyl wall base shall be 4-inches in height x 1/8-inch thick. Provide cove base at vinyl composition tile locations and straight base at carpet locations. Provide vinyl or rubber treads at all stair treads locations. Provide vinyl edge strips at terminations.

7.10 Access Flooring

A. Access flooring panels shall be lightweight concrete filled zinc-coated steel pans with a rigid bolted pedestal understructure secured to the concrete floor. Minimum design load for access flooring system shall be 1250 lbs. minimum with a minimum uniform load of 400 lbs./s.f. Facing material shall be carpet in office areas and plastic laminate in data rooms. Provide all ramps, steps, aluminum guard rail accessories.

B. At Office areas provide flush electrical/telephone/data outlet boxes with hinged cover and with adjustable air supply dampers. At data room locations all cutouts for data cable are to be grommeted with nylon brush closures. Provide perforated tiles for air supply.

7.11 Carpet

A. The State of Michigan has awarded the supply and installation of the specified carpet to a single manufacturer and installer through a predetermined bidding process. It is to be clarified in the RFP if the carpet described within this specification, referred to as "standard carpet", is to be supplied and installed per this predetermined pricing or if it may be supplied and installed by other manufactures and installers.

1. Any upgraded carpeting noted on the finish schedule and or the building program statement are not included as part of this predetermined bidding process.
2. All costs for the supply and installation of carpeting is to be included as part of the contract.

B. Carpet Materials Manufacturer/Subcontractor:

1. Carpet Manufacturer: Tandus, C & A
2. Primary Contact: Elyse Bertling, Account Executive

Tandus US, LLC
3272 West Haverford
Franklin, MI 48025
Email: ebertling@tandus.com
Cell: 248-346-8733
Fax: 866-708-9375
Voice Mail: 800-241-4902, Ext 1461

C. Installation & Secondary Contact: Chris Ruehle State Contract Coordinator &

Project Manager
Lansing Tile & Mosiac, Inc.
2210 Appolo Drive
Lansing MI 48906
Email: Chris.Ruehle@lansingtile.com
Tel: 517-321-5307
Fax: 517-321-5461

C. Carpet Product Description (Office Standard Field Carpet)

1. Manufacturer: Tandus, C & A, “Runaway II”, #03164
   24” x 24”
2. Construction: Level Loop
3. Fiber content: Antron Legacy® Nylon
4. Dye Method: 50% Solution Dyed/50% Yarn Dyed
5. Pile Height Average: 0.117 inch, 3.0 mm
6. Machine Gauge: 1/13 (50.4 rows/cm)
7. Stiches Per Inch: 8.3 (32.7pu/10 cm)
8. Face Weight: 18 oz/sq yd, 610.2 g/sq m

1.4 Carpet Product Description - Office Standard Field

A. Manufacturer: Tandus, C & A, “Color Spectrum”, #03343
B. Construction: Level Loop
C. Fiber Content: DuPont Antron® Legacy Nylon
D. Dye Method: 60% Solution Dyed/40% Yarn Dyed
F. Pile Height Average: 0.117 in. (3.0mm)
E. Machine Gauge: 1/13 (50.4/10 cm)
G. Stitches per Inch: 8.5, 33.5 pu/10cm
H. Face Weight: 18 oz/sq yd, 610.2 g/sq m

1.5 Carpet Product Description - Office Substitute Carpet

A. Manufacturer: Tandus, C & A, “Field Day”, #03377
B. Construction: Level Loop
C. Fiber Content: TDX Nylon
D. Dye Method: 80% Solution Dyed/20% Yarn Dyed
E. Pile Height Average: 0.117 in. (3.0mm)
F. Machine Gauge: 1/13 (50.4 rows/10 cm)

G. Stitches per Inch: 10.0 39.4 pu/10cm

H. Face Weight: 18 oz/sq yd, 610.2 g/sq m

1.6 Carpet Product Description - Office Solid Carpet

A. Manufacturer: Tandus, C & A, “Plexus Accents II”, #05112

B. Construction: Symtex®

C. Fiber Content: DuPont Antron® Legacy Nylon

D. Dye Method: Piece Dye

E. Pile Height Average: 0.218 in. (5.5mm)

F. Machine Gauge: 1/10 (39.4/10 cm)

G. Stitches per Inch: 11.0, 43.3 pu/10cm

H. Face Weight: 32 oz/sq yd, 1084.8 g/sq m

1.7 Carpet Product Description - High Traffic Field Carpet

1. Manufacturer: Tandus, C & A, “Sheffield”, #01932
   24” x 24”
2. Construction: Stratatec® Patterned Loop
3. Fiber content: Antron Nylon
4. Dye Method: 50% Solution Dyed/50% Yarn Dyed
5. Pile Height Average: 0.187” (4.7 mm)
6. Machine Gauge: 5/64 (50.4 rows/10cm)
7. Stiches Per Inch: 9.7 (38.2 pu/10 cm)
8. Face Weight: 22 oz/sq yd, 745.8 g/sq m

1.8 Carpet Product Description – Walk-off Carpet

A. Manufacturer: Tandus, C & A, “Abrasive Action”, #02578

B. Construction: Accuweave® Patterned Loop

C. Fiber Content: TDX Nylon

D. Dye Method: 100% Solution Dyed

E. Pile Height Average: 0.187 in. (4.7mm) C.

F. Machine Gauge: 1/12 (47.2 rows/10 cm)

G. Stitches per Inch: 8.0, 31.5 pu/10cm

H. Face Weight: 24 oz/sq yd, 813.6 g/sq m

2.0 RECYCLED CONTENT

A. Product must contain a minimum of 44% recycled content by weight. This percentage is calculated by dividing the weight of recycled content in one square yard of finished carpet by the total weight of one square yard of finished product and multiplying by 100. [(Recycle Content Weight) **/** (Total Product Weight) x 100].

B. Product must contain 10% post-consumer recycled content by weight from recycled post-consumer carpet. This ensures that carpet is diverted from landfills for the production of the product and that virgin resource use in the product is reduced.

C. Recycled content must be certified by a neutral, independent, third party organization such as Scientific Certification Systems. Product must carry product label certifying overall recycled content (including post-industrial and post-consumer content). Report percentage of post-industrial and post-consumer recycled content as a percentage of total product weight.

D. Product must be available inclusive of 100% recycled content secondary backing.

1. Recycled content and post-consumer content must not be subject to availability. Post-industrial and post-consumer recycled content of product installed must be the same as those required by Project requirements.
2. Also, Recycled content must be expressed as an exact percentage or a range. Statements such as "*up to* 60%" recycled content are not acceptable.
3. Manufacturer must fully comply with FTC Part 260 "Guides for the Use of Environmental Marketing Claims," with respect to advertising, labeling, product inserts, catalogs and sales presentations of all its flooring products submitted and sold.

2.1 PRODUCT RECYCLABILITY

A. Product must meet FTC Guides for recyclability and must be one hundred percent (100%) closed-loop recyclable back into flooring. A manufacturer cannot claim that a product or <u>any portion of a product</u> that is incinerated is recyclable, even if incineration is used to produce heat and power (i.e. waste-to-energy) per FTC Guides 16 CFR section 260.7 (d) example 3.

B. Recyclability of product installed must be the same as those required by Project requirements.

2.2 RECYCLING PROGRAM

A. Manufacturer must have a collection and recovery system for product and a fully established, currently operational recycling program at time of bid per FTC Guides Section 260.7 (d).

1. Manufacturer must be able to reclaim and recycle 100% of installed carpet. Like materials as installed must be 100% recycled.
2. Manufacturer must have written guarantee that 100% of the recovered vinyl backed carpet will be recycled and that no portion of the product will be landfilled or incinerated (including waste-to-energy).

2.3 PRODUCT WARRANTY

A. Warranty to be sole source responsibility of the Manufacturer. Second source warranties and warranties that involve parties other than the carpet manufacturer are unacceptable.

B. If the product fails to perform as warranted when properly installed and maintained, the affected area will be repaired or replaced at the discretion of the Manufacturer.

C. Chair pads are not required, but are recommended for optimum textural performance. Absent the use of chair pads, more intensive maintenance will be required for areas in direct contact with chair caster traffic, and some degree of appearance change is to be expected.

D. Warranty shall be for a specifically defined period of fifteen years. "Lifetime" warranties are not acceptable.

E. The fifteen-year warranty shall specifically warrant against:
    1. Excessive Surface Wear: More than 15% loss of pile fiber weight
    2. Excessive Static Electricity: More than 3.0 kV per AATCC 134
    3. Resiliency Loss of the Backing: More than 10% loss of backing resiliency
    4. Delamination
    5. Edge Ravel
    6. Zippering

F. Tuft Bind warranty in lieu of edge ravel and zippering is not acceptable.

2.4 FIBER

A. Nylon Fiber: Bulked Continuous Filament (BCF) Nylon in a loop pile construction <*InVista Antron Lumena InVista Antron Legacy*

B. For yarn containing recycled content, report post-consumer and post-industrial recycled content of the pile face yarn based on total yarn weight i.e. [(Recycle Content in Pile Face Yarn) **/** (Total Weight of Pile Face Yarn) x 100]

C. Fiber to contain carbon-core filament for permanent static control. Topical treatments are not acceptable.

D. Durable stain inhibitor should be applied to the fiber during product manufacturing to resist fiber staining and soiling.
    1. Initial: Minimum 400 ppm Fluorine per CRI TM-102
    2. After two hot water extractions per AATCC 171: Minimum 260 ppm Fluorine per CRI TM-102

2.5 BACKING CHARACTERISTICS

A. Primary Backing: Synthetic Non-Woven.

B.Secondary Backing: ER3 100% Recycled Content

1. Density (ASTM D-1667): Min. 65 lbs/cu ft +/- 5%
2. Standard Size: 18" x 18"; 24" x 24"; or 36" x 36"
3. Recycled Content: 100% Recycled Content Secondary Backing
4. Fiberglass Reinforced
5. Face yarn fully fused to secondary backing system that will not delaminate.
6. Delamination: No delamination per ASTM D3936

Product must not contain pesticides (US EPA Registered Antimicrobials). Installation adhesives are exempt from this section.

2.6 PERFORMANCE CHARACTERISTICS

A. Test reports for the following performance assurance testing to be submitted upon request. Submitted results shall represent average results for production goods of the referenced style. Requirements listed below must be met by all products.

1. Flooring Radiant Panel
   ASTM E-648 / NFPA 253: Class 1 (CRF: 0.45 watts/sq cm or greater)

2. Federal Flammability
   CPSC FF 1-70: Passes

3. Smoke Density
   ASTM E-662 / NFPA 258: $\leq$ 450 Flaming Mode

4. Electrostatic Propensity
   AATCC 134 (Step & Scuff): 3.0 kV or less

5. Static Coefficient of Friction
   ASTM C-1028: Passes ADA Requirements for Accessible Routes (minimum 0.60)

6. Delamination of Secondary Backing of Pile Floor Coverings
   ASTM D-3936: No Delamination

7. Lightfastness
   AATCC 16E: $\geq$ 4 @ 100 hours

8. Vetterman Drum
   ASTM D-5417: Minimum 3 @ 22,000 cycles

9. Dimensional Stability
   Aachen / ISO 2551: Maximum Change =/- 0.149%

10. Other
    As specified in 2.05, 2.06 and 2.07 of this document

Refer to Resilient Flooring and Accessories Items, for wall base and transitions description.

7.12 Wall Covering

A. Provide Type II medium duty in offices and areas not subject to high abuse. Provide Type III heavy-duty wall covering in high abuse areas such as corridors, toilet rooms and break rooms.

7.13 Painting

A. Use only first-line commercial products for all coating systems similar to Sherwin-Williams, Benjamin-Moore, Pratt & Lambert or PPG.

B. At exterior locations provide as follows:

1. Concrete and stucco: 2-coats of exterior polyvinyl emulsion.

2. Concrete masonry units: 1-coat of latex block filler, 2-coats of exterior acrylic.

3. Ferrous metal: 1-coat of synthetic rust-inhibiting primer, 2-coats of full-gloss alkyd enamel.

4. Zinc-coated metal: 1-coat of galvanized metal primer, 2-coats of full-gloss alkyd enamel.

C. At interior locations provide the following:

1. Concrete: 2-coats of latex-based interior flat paint.

2. Concrete masonry units: 1-coat of high-performance latex block filler, 1-coat of interior enamel undercoat and 1-coat of interior semi-gloss.

3. Gypsum drywall ceilings: 1-coat latex-based interior primer, 1-coat of latex-based interior flat paint.

4. Gypsum drywall walls: 1-coat interior latex-based primer, 2-coats of interior semi-gloss odorless alkyd enamel.

5. Gypsum drywall to receive wall covering: 1-coat of interior latex-based primer.

6. Woodwork and hardboard: 1-coat of interior enamel undercoat, 2-coats of alkyd gloss enamel.

7. Stained woodwork: 1-coat oil-type interior wood stain, 1-coat of shellac. 1-application of paste wood filler, 2-coats of oil rubbing varnish.

8. Ferrous metal: 1-coat synthetic rust-inhibitive primer, 1-coat of interior enamel undercoat, 1-coat of exterior alkyd gloss enamel.

9. Zinc coated metal: 1-coat of galvanized metal primer, 1-coat of interior enamel undercoat and 1-coat exterior alkyd enamel.

D. General Requirements:

1. All exposed piping, conduit mechanical and electrical components in finish areas are to be either field painted or pre-painted by the manufacturer.

2. Provide odorless paint when painting in areas occupied by personnel regardless if painting operations are conducted during or after business hours.

7.14 Visual Display Surfaces

A. Marker boards are to be porcelain enamel faced for liquid-type markers with core material and backing with an aluminum tray.

7.15 Directories

A. Internally illuminated with reveal type frame with clear glass.

7.16 Signage

A. Panel sign for toilet rooms and stairwell locations are to be unframed, plastic with raised lettering in compliance with ADA and building code requirements.

7.17 Exterior Post, Panel and Pylon Signage

A. Exterior post, panel and pylon signage shall be addressed in the RFP.

7.18 Telephone Specialties

A. Telephone specialties and enclosures shall be addressed in the RFP.

7.19 Toilet Compartments

A. At public use toilet room locations, toilet compartments, urinal screen and privacy panels are to be fabricated from High Density Polyethylene (HDPE). Toilet compartments are to be ceiling hung with security over-ride latching devices. Urinal screens are to be wall hung and

miscellaneous partitions are to be wall hung or floor supported. All fasteners and hardware are to be tamperproof.

B. At employee toilet room locations, toilet compartments, urinal/screens and privacy panels are to be fabricated of painted steel. Toilet partitions are to be ceiling hung. Urinal screen are to be wall hung. Miscellaneous partitions are to be wall hung or floor supported. All fasteners and hardware are to be tamperproof.

7.20 Toilet and Bath Accessories

A. All toilet accessories are to be ADA compliant.

B. Toilet tissue dispensers: dual dispensers, stainless steel.

C. Combination towel dispenser/waste receptacle units: stainless steel, fully recessed, large capacity dispenser and waste.

D. Grab bars: 1-1/2-inch round stainless steel.

E. Sanitary napkin disposal units: stainless steel, one per stall.

F. Feminine napkin dispenser: stainless steel, fully recessed type allowing coin or free operation; one per women's toilet room.

G. Soap dispenser: deck mounted with 7-inch spout. One per lavatory fixture.

H. Mop and broom holders: two per janitor closet.

I. Seat cover dispenser: at public toilet rooms only, one per water closet fixture.

J. Mirrors and frames: Full width mirrors are to meet ADA requirements. Mirror glass is to be ¼-inch thick with polished stainless steel frame.

K. Infant changing station.

7.21 Operable Partitions

A. Manually operated, folding panel partition system, ceiling suspended with overhead track. Panels are to be vinyl faced and side stacked with STC rating of 50 as a minimum. Provide all necessary steel support framing. Verify existing structural framing capacity with operable partition loads.

7.22 Fire Extinguishers and Cabinets

A. Fire extinguisher are to multipurpose dry chemical type sized and rated for project requirements. Provide flush mounted in recessed wall cabinets in public, office and work areas and provide surfaced mounted on metal brackets at warehouse and storage areas. Cabinets are to be recessed type, trimless type with aluminum baked enamel finish. Doors are to have glass panels with flush type opening device.

7.23 Projection Screens

A. Projection screens are to be electrically operated, recessed mounted in the ceiling. Viewing surface is to be matte white and edge treatment is to be without black masking boarders.

7.24 Window Treatment

A. Provide commercial grade vertical prefinished aluminum blinds at all exterior windows. Slats are to be 3-½ inch wide and white in color. Channel track is to be aluminum. Provide chain for blade rotation and polyester chord for side draw.

7.25 Casework

A. All casework for break rooms, conference rooms and work areas are to be plastic laminate on particle board with frameless construction and full overlay doors. Provide adjustable shelving and wire pulls.

B. At all areas other than toilet rooms, countertops are to be plastic laminate on particle board substrate with rolled front profile and square edge backsplash.

C. At public use toilet rooms all counter and lavatory surfaces are to be fabricated from High Density Polyethylene (HDPE).

D. Plastic laminate counters and lavatory surfaces are permitted at employee toilet room locations.

7.26 Entrance Floor Grilles

A. At all public and employee exterior entrances provide recessed entrance floor grilles. Floor grilles and frames are to be extruded aluminum. Floor grilles are to have top-surfaced tread rails with nylon carpet inserts.

8.0 - SPECIAL CONSTRUCTION

8.1 Elevators

A. For typical 2- stop application provide a hole-less hydraulic passenger elevator system, 2,500 pound capacity minimum with a finish clear cab size of not less than 6’-8” x 4’-3” with a minimum ceiling height of 7’-11”. Cab speed shall not be less the 80 feet per minute.

B. For facilities requiring more than 2 stops, a larger elevator platform size, speed and weight capacity will be required. Refer to RFP for requirements.

C. Elevator cabs are to have plastic laminate side walls, protective bumpers and skid-resistant vinyl composition tile floor surface. Furnish removable protective pads.

D. The need and description for a freight elevator is to be noted in the RFP. But as a minimum a freight elevator shall be Class A, hydraulically operated, with a minimum of 2500 pound loading capacity. Minimum clear cab size shall be 5’-4” x 7’-0”.

E. Elevator shaft way as well as elevator components are to be designed, manufactured and installed to comply with the latest edition of the State of Michigan Elevator Code as well as meet ADA requirements.

Table A1 Architectural Door, Room and Finish Standards Schedule

	Tenant Separation Walls	Toilet Room	Conference Room	Enclosed Office	Open Office Area	Break Room	Perimeter Walls	Elec/Mech Room	Janitor Closets	Computer/ Communication Rooms
Wall Type	W1	W2	W4	W4	W5	W4	W6	W3	W3	W3
Door Type	D1	D2	D4	D4	D3	D4	D2	D2	D2	D2
Door Hardware	H1/ H2	H6	H3	H3	H3	H3	H5	H3	H3	H3
Floor Type	F1	F3	F1/ F2	F1/ F2	F1	F3	-	F5	F3	F3
Ceiling Type	C1	C2	C1	C1	C1	C1	-	C3	C1	C1

Wall Types Legend	
Designation	Wall Construction Description
W-1	3-5/8” metal studs at 16” o.c. with 5/8” gyp bd each face with acoustical insulation. Extend from finish floor to underside of floor or roof deck. Provide deflection track and seal tight to deck above.
W-2	3-5/8” metal studs at 16” o.c. with acoustical insulation, 5/8” gyp bd on one face with 5/8” moisture resistant gyp bd and ceramic tile to 4’ a.f.f opposite face. Extend wall to roof or floor deck above. Provide deflection track above.
W-3	3-5/8” metal studs at 16” o.c. with 5/8” gyp bd on one face with 5/8” gyp bd each face with acoustical insulation. Extend to roof or floor deck above. Provide deflection track above.
W-4	3-5/8” metal studs at 16” o.c. with 5/8” gyp bd each face with acoustical insulation. Clip to ceiling grid and provide 2’ acoustical insulation at both sides of partition.
W-5	3-5/8” metal studs at 16” o.c. with 5/8” gyp bd each face. Clip to underside of ceiling.
W-6	1-5/8” metal furring with 5/8” gyp bd with rigid insulation. Extend 1’ above ceiling.

C – Ceiling material type
D – Door type
F – Floor material type
H – Door hardware type

W –Wall construction type

Table A1 Architectural Door, Room and Finish Standards Schedule … continued

Provide the following type of hollow metal doors and frames at the given applications.

Offices, Conference Rooms, Toilet Rooms: Standard Duty*.
Mechanical Rooms, Electrical Rooms, Service Rooms: Heavy Duty*
Service Entrance Doors at building exterior: Extra Heavy Duty*
* Refer to Steel Door Institute criteria for description.

1.	Door Type Legend
D-1	Aluminum storefront medium stile with side light
D-2	Hollow metal frame and hollow metal door
D-3	Hollow metal frame and hollow metal door/ side light or narrow light glazing
D-3	Hollow metal frame and wood door
D-4	Hollow metal frame and wood door/ side light or narrow light glazing
2.	Hardware Legend
H-1	Panic bars, closer, lock, hinges, weatherstrip
H-2	Aluminum push/pulls, closer, hinges, floor bumpers
H-3	Mortise passage set, hinges, wall bumper
H-3	Mortise lock set, hinges, wall bumper
H-5	Mortise lock set, hinges, closer, wall bumper
H-6	Push /pulls, closer, hinges, wall bumper
3.	Floor Legend
F-1	State standard carpet with base (See specification and program statement for description)
F-2	Carpet upgrade with base (See program statement for description)
F-3	Vinyl composition tile with base
F-3	Ceramic floor tile with sanitary coved base
F-5	No floor finish, provide anti-dusting sealer only
4.	Ceiling Legend
C-1	Metal suspension system with acoustical lay-in ceiling
C-2	½” gypsum board on metal suspension system, painted
C-3	Open, no ceiling, no paint

9.0 - MECHANICAL

9.1 Mechanical/HVAC/Plumbing Summary

A. It is the intention of this standard to meet or exceed all State of Michigan and Local vicinity code and regulation requirements for the mechanical systems in all State of Michigan Leased, Owned, or State Operated Facilities.

B. Some of the requirements of this Standard exceed Code requirements.

C. Coordinate additional amenities and requirements with the Building Program as defined in the "RFP" or project statement.

D. Designers to review latest editions of State of Michigan Governor's energy directives, American Society of Heating, Refrigeration and Air Conditioning Engineers (ASHRAE) standards 15, 55, 62, and advise the State where more current standard editions have more stringent requirements than current code requirements.

9.2 Existing Mechanical / HVAC Conditions

A. Labeling of existing piping/ductwork – When an existing facility/building is being utilized, all existing piping which is re-used shall be labeled. The existing piping and ductwork including connections and diffusers shall be thoroughly inspected for size, condition, and suitability for re-use.

B. Remediation of Hazardous Materials – If an existing facility/building is utilized testing and/or inspection - investigation shall determine if any hazardous material exist in the facility. If it is determined that remediation is required then a plan must be implemented rendering the facility free of hazards. This includes but is not limited to Asbestos, Lead, and PCB's.

C. Abandonment of existing HVAC/piping system components – When existing facility/ buildings are being utilized all existing HVAC components, piping and devices no longer being used shall be completely removed and not abandon in place.

D. All openings in existing walls, floors, and shafts shall be properly firestopped after the removal of old HVAC components and piping.

9.3 Site Design/Planning

A. Gas Service Entrance – Gas piping entering the building must be protected from accidental damage by vehicles, foundation settlement or vibration. Where practical, the entrance should be above grade and provided with a self-tightening swing joint prior to entering the building.

9.4 Building Design/Planning

A. General Requirements

1. Energy savings should be a primary component and part of the selection of HVAC equipment. Building design to comply with both the mandatory and prescriptive provisions of latest ASHRAE standards as listed in LEED-NC 2.2 Reference Guide. Proposed building performance rating compared to baseline building performance rating per ASHRAE standards (without amendments) by building simulation method is to be 14% higher on new buildings and 7% higher on exiting buildings.

2. Design systems that require zero use of CFC-based refrigerants for new systems; complete a comprehensive CFC phase-out conversion when reusing existing systems.

3. Design HVAC and Refrigeration systems with refrigerants with no or very little ozone depleting potential. Projects shall comply with current LEED guide lines and standards.

4. Establish temperature and humidity comfort ranges and design the building envelope and HVAC system to maintain the comfort ranges (See Table M1) in accordance with ASHRAE.

5. Require an assessment of building thermal comfort within a period of 8 to 12 months after occupancy. Based on the assessment, a corrective action plan is to be developed if Table M1 requirements are not maintained. This plan shall include measurement of relevant environmental variables in problem areas in accordance with ASHRAE.

6. Duct sizing and velocities shall be designed to minimize air noise.

7. Kitchen or other exhaust hoods shall meet NFPA regulations and local health department requirements.

8. For lease facilities 15,000 square feet and above, provide a building automation system to monitor and control lighting, ventilation, heating and air conditioning systems.

9. Lessor shall provide the latest technology and technology integration for building automation systems.

10. Fire alarm and security system must function as stand-alone systems with an interface to the building automation system.

11. Vertical zoning: The ceiling space shall be layered with the plumbing and sprinkler piping zone near the underside of the structure, the HVAC duct zone in the middle and the lighting zone immediately above the ceiling system. Sufficient space must be provided to accommodate future lighting relocations and changes without the need for moving HVAC or other components.

12. Valves are to be located in accessible ceiling and wall areas where possible. Provide access panels in gypsum board ceilings and wall locations. Coordinate with furniture plans.

13. Mechanical systems are to be designed with future expansion in mind. Provide valves, controls etc. at locations where future equipment tie-ins would be likely and where systems isolation seems prudent.

14. Allow for adequate space for anticipated future equipment in mechanical equipment rooms, penthouses and above ceiling areas.

15. Allow adequate space for maintenance access to coils, pumps, filters etc.

16. HVAC equipment shall not be placed in ceiling spaces above computer rooms, server rooms, electrical rooms, telephone rooms etc.

17. All Mechanical rooms and Kitchens shall have floor drains.

B. Fire Protection Systems

1. Fire protection and / or Fire Detection – Alarm Systems shall be provided in all State of Michigan Leased facilities.

2. Fire protection systems are to conform to NFPA, state and local codes.

3. Sprinkler piping shall be schedule 40, schedule 10, or copper.

4. Concealed type sprinkler heads shall be used in all occupied areas.

C. Plumbing Systems

1. Sewage ejectors are only to be used where gravity drainage is not possible.

2. Dishwashers shall have dedicated booster heat units that meet all code requirements.

3. Booster pumps for domestic water service are to be provided when required to maintain system design pressures.

4. Recirculation piping is to be provided for all domestic hot water systems.

5. Plumbing fixtures are to be commercial grade and based upon American Standard or Kohler.

6. Low-flow water closets, urinals, faucets for sinks and lavatories are required for all locations. The use of waterless urinals must be approved by the State of Michigan during the schematic design phase of a project.

7. Fixtures designated for use by the handicapped must comply with the requirements of Federal Standard 795; Uniform Federal Accessibility Standards and the requirements of the Title III Standards for the ADA.

8. Drinking fountains are to supply 55°F water, from standard packaged electric water coolers.

9. Gas piping is not to be piped through confined spaces such as trenches or ventilated spaces.

10. All spaces containing gas-fire equipment, such as boiler, chillers and generators are to be mechanically ventilated.

11. Vertical shafts carrying gas piping are to be ventilated at top and bottom of shaft-way.

12. Avoid water-filled plumbing on outside wall, above ornamental ceilings or in unheated areas.

13. Provide isolation valves at all pieces of equipment for maintenance and service.

14. Each restroom fixture is to have water shut off for both hot and cold water.

15. Each restroom facility is to have separate water shut-off.

16. Locate valves where they can be reached for service in hallways and public spaces where possible.

17. Label all valves in plumbing systems. Provide a listing of the labels at project close out.

18. If a well is required, the well is to be tested and documentation provided for water flow, water quality, chemical content and performance. The test results must be submitted for approval and acceptance. Non-performing wells will be rejected.

19. Sanitary and Storm system piping shall be separated and discharged per code and local regulations.

D. Pumping Systems

1. Pumps used in closed loop hydronic piping are to be designed to operate to the left of the peak efficiency point on their curves (high head, less flow) to compensate for variances in pressure drop between calculated and actual valves without causing pump overloading.

2. Do not use pumps with steep curves due to limiting of system flow rates.

3. Packaged variable flow pumping may be used however pumps and their controls are to be supplied by the same manufacturer.

4. Pumps are to operate at no less then 75% efficiency for their performance curve.

5. If minimum flows are required, use separate, constant flow primary water pumps and variable flow secondary systems.

6. Primary/secondary systems are recommended.

E. Piping Systems

1. Provide cathodic protection or other means of preventing pipe corrosion.

2. Isolation valves, shut off valves, by-pass circuits and unions are to be provided as necessary for piping at equipment to facilitate equipment repair and replacement. Equipment requiring isolation includes boilers, chillers, pumps, coils, terminal units and heat exchangers.

3. Valves are to be provided for zones off vertical risers.

4. Valves and other operable fittings must be tagged. Valve tag schedule to be provided as part of project closeout documentation. Properly identify all valves and locations.

5. Copper piping shall be used on all Domestic and Hydronic Piping systems.

F. HVAC Systems

1. HVAC air distribution requires the establishment of minimum Indoor Air Quality (IAQ) performance to enhance indoor air quality in building by complying with minimum requirements of ASHRAE.

2. AHU: provide properly installed condensate drains to prevent build-up of condensate in drain pans.

3. All closed loop heating and cooling systems shall be treated with a corrosion inhibitor.

4. For HVAC piping systems, provide isolation valves at all pieces of equipment and coils for maintenance and service. Locate the valves where they can be reached for service.

5. HVAC piping insulation shall be installed on all piping, valves, terminal units and all section. Do not leave un-insulated gaps between components that can cause condensation.

6. Location of temperature sensors and thermostats shall be coordinated with furniture, equipment and window locations.

7. Kitchen hood design must meet NFPA regulations as well as all local health department requirements.

8. Air filters are to be changed at the time of occupancy.

9. Provide acoustical sound boots at ceiling return air grilles at offices, meeting rooms and conference rooms if walls do not extend to the roof/floor deck above or if a separate return air duct system is not provided.

10. Air handlers are to be equipped with variable frequency drives to control fan motor speed.

G. Vibration and Acoustical Isolation

1. Isolate all moving equipment in the building under dynamic loading.

2. Use flexible connections for piping/ductwork terminations.

3. All wall/floor openings for ducts and piping are to be sealed except at shafts dedicated to gas piping which must be ventilated.

4. Reduce fan vibrations immediately outside of all mechanical room walls by acoustically coating or wrapping the duct.

5. Provide spring and rubber isolators for piping 2-inches and larger hung below noise sensitive spaces.

H. Layout of Mechanical Spaces/Documentation

1. Mechanical rooms are to be laid out with clear aisles and access to all equipment.

2. Chillers are to be placed to permit pulling of unit tubes. Clearance = tube length + 2’-0”.

3. Air handling units are to have a minimum of 3’-0” on all sides. Clearance for coil/filter sides = length of coil + 2’-0”.

4. Lighting is to be laid out so as not to interfere with equipment.

5. Housekeeping pads are to be 3-inches wider than the mounted equipment on all sides.

9.5 Building Mechanical Specialties

The following items should be discussed during the early stages of a project and become part of the RFP and / or Lease documents.

A. Electrical Generators – fuel systems, capacity and system components being supplied with backup emergency generator shall be clearly defined and specified in the Lease or Specification requirements.

B. Elevators – if required shall meet all Code requirements. No building HVAC or plumbing system piping shall be allowed in the elevator shaft or machine. If HVAC or piping is specifically required for the elevator system the design and installation shall be coordinated with the elevator manufacture.

C. Computer Data Centers Server Rooms – Any special HVAC equipment required for any Computer Data Centers or Server Rooms shall be clearly specified in the RFP.

D. Incinerators – are not allowed.

E. Dock Levelers – the electrical contractor shall coordinate.

F. Fire Extinguishing Systems – shall meet all building codes and NFPA regulations.

G. Building HVAC Control Systems –shall be clearly specified in the terms and condition of the Contract.

H. Water Softeners – if required, shall be clearly specified in the terms and condition of the Contract.

I. Drinking Fountains – Reference the Mechanical/Plumbing section of this standard for the minimum requirements.

TABLE M1 – General Office Mechanical Space requirements

Mechanical Minimum Design Requirements for General Office Space		
Code Reference	HVAC Systems –	Michigan Uniform Energy Code - latest edition Michigan Mechanical Code – latest edition
	Ductwork -	Shall be constructed per SMACNA – latest edition.
	Plumbing -	Michigan Plumbing Code – latest edition
Temperature	73°F ± 4°F	
Humidity	30-50%	
Ventilation	Office Space: 20 cfm per person or 0.2 cfm / sq. ft. (whichever is greater) Break Room: 30 cfm per person Waiting Area: 15 cfm per person Kitchen/Toilet/Janitor's Closest: 10 air changes per hour and 100% exhaust	
Air Conditioning	Equipment: 3 watts / sq. ft. Lighting: 2 watts / sq. ft.	
Ductwork	Supply and Return air shall be ducted (except at raised floor systems). No return air plenums will be accepted. Duct insulation shall be external wrap only; no internally lined duct will be accepted. Flex duct allowed within 10 of ceiling diffusers.	
Miscellaneous	Provide a minimum of 1 electric water cooler and drinking fountain combination unit located adjacent to restrooms.	

Standard Piping Material	Use	Comments
ASTM Schedule 40	Chilled water up to 12-inch diameter. Condenser water up to 12-inch diameter.	150 psi fittings. Standard weight pipe over 12-inch diameter. 150% of working pressure
	Hot water	Test to 300 psig.
	Natural gas	Weld and test to 300 psig
ASTM schedule 80	Steam over 15 psig	Test to 500 psig, 150% of working pressure
Copper tubing	Chilled water, Condenser water	Builder option. Use type K below ground and type L above ground.
	Domestic water	Lead free solder connections
	Refrigeration	Type ACR
Cast Iron	Sanitary, waste and vent	
PVC	Storm	Below grade only

10.0 - ELECTRICAL STANDARDS

10.1 Electrical Standards Summary

A. It is the intention of this standard to meet or exceed all State of Michigan and Local vicinity code and regulation requirements for the electrical systems in all SOM Leased, Owned, or State Operated Facilities.

B. Some of the requirements of this standard exceed code requirements.

10.2 Existing Electrical Conditions

A. Labeling of existing circuits – When existing facility/buildings are being utilized all existing circuits which are re-used shall be labeled. The existing circuits including wiring, connections, and disconnects, shall be thoroughly inspected for size, condition, and suitability for re-use.

B. Remediation of Hazardous Materials – If an existing facility/building is utilized testing and / or inspection - investigation shall determine if any hazardous material exist in the electrical system components. If it is determined that remediation is required then a plan must be implemented rendering the facility free of hazards. This includes but is not limited to Asbestos, Lead, and PCB's.

C. Abandonment of existing electric system components – When existing facility buildings are being utilized all existing wiring, conduit, devices no longer being used shall be completely removed and not abandon in place. All existing power supply wiring or cabling shall be completely removed back to supply distribution panel and circuits breakers relabeled as "Spare" or with the new circuit title.

D. All openings in existing walls, floors, and shafts shall be properly firestopped after the removal of old conduit and wiring.

10.3 Electrical Site Design/Planning

A. Spare conduits shall be provided at all primary, secondary, and Panelboard feeders for future use.

B. Electrical metering locations and metering sockets must be acceptable to the local utility company.

C. New transformers shall be free of any hazardous materials (PCB's, asbestos, etc.), and dry type transformers are preferred.

D. Exterior lighting design and layout shall meet the latest requirements of the SOM energy directives and LEED standards established for the project.

E. All underground conduit and duct banks shall be water tight and sloped to manholes or junction boxes with a sump.

F. All underground conduit/wiring shall be buried with a marker/tracing wire and a plastic warning tape approximately one foot above the conduit/wire.

G. Lightning protection shall be provided for all buildings and associated structures per NFPA and any other code requirements.

10.4 Building Design/Planning

A. Planning shall include locations of copier, microwaves, coffee machines, and vending machines. Provide as a minimum a separate 20-amp circuit for each device.

B. Provide as a minimum 20-amp dedicated circuits with isolated grounds to all copy machines.

C. Provide as a minimum isolated ground 20-amp circuits with surge protected receptacles for all main computer hub network equipment and audio-visual equipment.

D. Provide a minimum of a twenty-five (25%) percent spare capacity above maximum demand for future growth of the electrical system.

E. Dedicated isolated-grounded circuits are not required for computer receptacles.

F. Provide a minimum of one (1) 120-volt duplex receptacle in all building entrance vestibules.

G. All electrical panels, control panels, and disconnect panels shall be lockable and within the building all be keyed alike. (Lock hasps are acceptable).

H. Firestopping – Provide U.L. listed Firestopping assemblies for all openings and sleeves through floors and firewalls. Sleeves provided for telephone, data sound or other communications cables shall be firestopped after the respective contractor has finished their work.

I. Whenever possible, below grade electrical, telephone, and data cabling are to be installed in concrete encased duct banks. Telephone and data are to be separated from electrical power with independent conduit systems.

J. All telecommunications cabling shall be kept in trays and/or conduit separate from primary or secondary power cabling.

K. Provide adequate lighting including emergency lighting to service all equipment in mechanical rooms. (Prefer fluorescent lighting). Provide GFI service outlets for supplemental lighting in mechanical spaces. Provide GFI outlets within six (6) feet of Control Panels.

L. Lighting controls used in public areas are to comply with ANSI/ASHRAE/IESNA regulations.

M. Lighting fixtures shall be located where practical, so scaffolding is not required for bulb replacement.

N. Lighting in all occupied rooms will be controlled by a wall switch located at all points of entry into the space. If an occupied room is equipped with an automatic sensor, a wall switch is suggested but not required.

O. All conference rooms shall have motion sensor light controllers and manual override switching capability.

P. All electrical system components and devices shall be independently supported from the building structural framing members and supported per manufacture's recommendations.

Q. Provide concrete housekeeping pads for all floor mounted electrical equipment. Pads are to be a minimum height of 3 ½ inches and extend a minimum of 6 inches beyond the perimeter of each piece of equipment.

R. All building electrical systems wiring smaller that AWG # 10 shall be copper.

S. All electrical home run circuits or main feeders shall be solid tubular (Non-flexible) type conduit.

T. All receptacles and switches shall be a minimum of specification grade quality.

U. Emergency circuit receptacles, switches, or devises shall have color RED bodies.

V. Planning shall take into consideration the Lessee's Phone and Data systems, security system components including; cameras, card access systems, door monitoring systems, and any other components included in the security system.

W. If a Fire Alarm system is required place annunciation panels in a location coordinated with the Lessee. If a connection to the local fire department is required it shall be included.

X. If surface mounted raceway is required and non-exposed conduit is not feasible then painted "Wiremold" is required.

10.5 Building Electrical Specialties

The following items should be discussed during the early stages of a project and become part of the RFP and / or Lease documents.

A. Electrical Generators – capacity and system components being supplied with backup emergency power shall be clearly defined and specified in the lease or specification requirements.

B. Elevators – if required shall meet all Code requirements including the ADA Barrier Free requirements. All elevators shall be equipped a battery backup device that allows for exit of any persons trapped in elevator when building or local power is lost.

C. Computer data centers server rooms.

D. Incinerators – are not allowed.

E. Dock Levelers – if required shall be clearly specified in the terms and condition of the Contract.

F. Fire Extinguishing Systems – shall meet all building codes and NFPA regulations.

G. Water Softeners – if required shall be clearly specified in the terms and condition of the Contract.

H. Drinking Fountains – Reference the Mechanical / Plumbing section of this standard for the minimum requirements.

11.0 – ADDITIONAL OWNER REQUIREMENTS

11.1 General Introductory Information

A. It is the purpose of this section to set forth the minimum additional requirements when a building will be purchased and /or operated by the State of Michigan.

11.2 Contract Close Out

A. The Lessor (Contractor) shall notify the Lessee when the work will be Substantially Complete and ready for inspection and preparation of a list of minor replacement, correction, and adjustment and touch-up items.

1. All concerned parties shall attend the Substantial Completion inspection.

The Lessor shall complete all work required by the date set for final acceptance by the Lessee.

B. At the time of Substantial Completion the Lessor/contractor shall provide the following:

1. Certification of Fire Alarm System and Sprinkler System (Vendor Certifications).

2. Permit certification including all applicable permits. This may include but it is not limited to general building permit, mechanical permit, HVAC permit, electrical permit, site work permit, or any other miscellaneous permits.

3. Certificate of Occupancy from the applicable permitting agency.

4. Fire Marshall, Fire Department or agency fire inspection final approval.

5. Heating, ventilation, cooling balance report and equipment start up reports.

6. Water test and balance reports. Including anti-bacteriology reports.

7. Keys – submit any and all keys required to operate the facility, to the DMB or the operating agency. (An agency sign off is required for transmitted keys.) All remaining specified keys required by the project specifications must be submitted prior to final project close out. (Including but not limited to: fire extinguisher cabinets, fire alarm panels, access doors, cabinets or case work, electrical panels, HVAC control panels or security systems.)

8. Agency training to be completed to the extent required to properly operate the new facility. An agency sign-off is required.

9. O & M Manuals – a minimum of at least 3 copies of all O & M manuals must be submitted at the time of Substantial Completion.

10. Special Tools and Equipment – any special tools, spare parts, accessories, or equipment required to operate the facility must be turned over to the DMB or operating agency before substantial completion. An agency sign-off is required.

C. At Project Close-Out provide the following:

1. Guarantee and Statement.

2. Extended guarantees as specified. (including be not limited to the roof warranties including flashing and sheet metal work, windows, including glass seal and manufacture warranties, doors, equipment Warranties which extend beyond the normal contract

guarantees and including any service agreements for elevators, air conditioning units, kitchen equipment, computer systems, or other special equipment).

3. Submit bond/surety company release for final payment.

4. Submit AS-BUILTS as specified.

5. Turn Over Items – submit balance of the specified copies that where not submitted previously.

6. Keys – submit balance of specified copies that where not submitted previously.

7. Extra Materials – submit all specified items including but not limited to: ceiling tile, paint/varnish, carpet, VCT tile or other finishes such as filters, and fuses.

8. Submit copies of all disposal records and manifests for contaminated waste if applicable.

9. Agency or department training on use of all new equipment if not completed previously.

10. Finalize SESC Storm Water, measures & notify the DMB SESC Section.

11.3 Existing Conditions

A. Removal and Salvage of Construction Materials: Develop and implement a Construction Waste Management Plan as described in LEED-NC Green Building Rating System for New Construction & Major Renovations.

11.4 Mechanical

A. All pipe is to be labeled and color-coded according to ANSI Z535.1-1991 Safety Color Code and ANSIA13.1-1981 Scheme for Identification of piping Systems. Pipe markings must be effectively communicate the contents of the pipes and give additional information if special hazards (such as extreme temperatures or pressures) exist, i.e. “Steam 110PSIG”. Arrows shall indicate direction of flow. Label placement shall insure that labels can be easily read based upon label elevation and viewing angle of individual. Labels, at a minimum shall be placed near valves (within 6 feet max.), where change in direction occurs, on entry/re-entry points thru wall and floors and on straight segments with spacing between labels that allows for easy identification.

A. Valves and other operable fittings must be tagged. Valve tag schedule to be provided as part of project closeout documentation, shall properly identify all valves and locations.

B. All closed loop heating and cooling systems shall be treated with a corrosion inhibitor.

C. Provide 3 copies of prints identifying HVAC zones.

D. Catwalks with access ladders are to be provided for all equipment that cannot be maintained at floor level.

E. Documentation of all the building systems is to be provided for the guidance of the building engineering staff. Documentation is to indicate actual elements that have been installed, how they performed during testing and how they operate as a system in the completed facility.

The building staff is to be provided with the following: Record drawings and specifications (both hard copy and on CD), operating manuals with schematic diagrams, sequence of operation and system operational criteria for each system installed and maintenance manuals with complete information of all major components in the facility.

F. Provide posted operation instructions for manually operated mechanical systems. They are to consist of simplified instructions and diagrams for equipment, controls and operations of the systems , including boilers, refrigeration equipment, HVAC controls, hot and chilled water distribution and hot and cold water domestic water. Instructions are to be framed and posted adjacent to the major piece of equipment of the system.

G. The amount of instruction time provided is to be commensurate with the complexity of each system.

I. Building Automation System (BAS) for State owned and operated facilities.

1. For facilities owned and or operated by the State of Michigan, the Department of Management and Budget Building Operations Division the Lessor shall comply with specification section 15900-Temperature Control System and specification section 17000-Facility Management and Control Systems (FMCS).

1. These specifications provide an open system architecture that supports integration with DMB's Niagara AX platform and DMB's standardized interface to all building systems. The Niagara AX platform delivers a graphical user interface to all supported building systems via the internet using common web browser software. These specifications address SOM network security, systems maintainability, and technology change management.

2. All systems being installed in DMB owned and or operated facilities are required to support an open exchange of building system information with the DMB Niagara AX platform. The entire Temperature Control System (TCS) shall be comprised of an Operator

Workstation (OW) and a network of interoperable, stand-alone digital controllers communicating via the LonTalk and/or BACnet communication protocol to Network Area Controllers (NAC).

3. DMB strives to keep the bidding for temperature control systems open to the major manufacturers, while maintaining only one common network system for global scheduling, monitoring, and control. Currently Acceptable Manufacturers:

    a. Trane
    b. Johnson Controls
    c. Siemens
    d. Honeywell

5. For buildings that are to be owned and/or operated by DMB the Lessor, design professional or contractor is required to obtain a current version of specification section 15900 - Temperature Control System and 17000 - Facility Management and Control Systems (FMCS) from DMB Building Operations Division.

END OF BUILDING DESIGN STANDARDS