

CONSTRUCTION STANDARDS, PROCEDURES & SPECIFICATIONS



THE MERCHANDISE MART

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INTRODUCTION

To ensure that the construction in your space in the Merchandise Mart is successfully accomplished, we have prepared for your use this copy of Construction Standards, Procedures and Specifications for the design development and construction of your space.

These guidelines have been developed primarily for the use of those parties who will be involved in the development of your new space, namely:

- Designers and Consultants to be employed by the Tenant.
- Designers and Consultants to be employed by Merchandise Mart Properties, Inc. (MMPI).
- All Contractors and Suppliers who will be involved with the actual construction.

It is intended that these standards be used as a checklist for items to be considered in the design, construction and remodeling of a Tenant or common area space. These standards represent the historically proven means, method and design intent that has gone into many similar projects. Additionally, LEED-EB (Leadership in Energy and Environmental Design for Existing Buildings) policies and procedures are referenced throughout the document. Merchandise Mart Properties, Inc. is committed to achieving and maintaining LEED certification for its buildings and encourages its tenants to use the LEED alternatives when there is a choice as compared to standard construction methods. All construction in the Merchandise Mart and spaces shall conform to the requirements indicated in these standards unless otherwise approved in writing by MMPI.

By addressing the various subjects and areas of work in a systematic manner, it should permit you, the Tenant, and us, the Landlord, to mutually achieve the best and least costly construction package in the minimum amount of time. Prior to initiating any work, including demolition, repairs, replacements, decorating, alterations, minor decorative or display work and/or improvements to the leased premises, tenant must notify MMPI and obtain approval.

We strongly recommend that you and your construction team contact us to schedule a planning meeting. The purpose of the meeting is to ensure that you are familiar with these construction standards and specifications, including the LEED-EB policies and procedures.

Should any questions arise during the preparation of plans or during construction, please contact our Construction Services Department by calling 312-527-3081. A Project Manager assigned to your specific project will be on hand to answer your questions and address particular needs or concerns you may have.

COMMITMENT TO SUSTAINABILITY

In 2013 the Merchandise Mart achieved LEED-EBOM Gold certification. To that end, the Merchandise Mart has adopted LEED-EB (Leadership in Energy and Environmental Design for Existing Buildings) standards by the U.S. Green Building Council for the Merchandise Mart properties. The LEED-EB Green Building Rating System, established by the U.S. Green Building Council, evaluates the environmental performance from a whole building perspective. Aspects of LEED-EB improve upon building energy efficiency, water use, building materials, waste reduction, and chemical use. It is a method for building owners and operators of existing buildings to implement sustainable operations and maintenance practices and reduce the environmental impact of a building. What LEED means for tenants is a higher level of workplace health and comfort.

MMPI is committed to sustainability in all of its building maintenance and construction practices. While these construction standards specifically identify LEED compliant practices, you are encouraged to implement efficiency and waste reduction measures whenever practicable. This document references several policies and procedures that MMPI has put into place as part of the LEED program including:

1. Waste Reduction and Recycling
2. Reduced Mercury Lighting
3. Erosion and Sedimentation Control Plan and Policy
4. IAQ Management Policy
5. Building Operation Plan

Copies of these policies and plans are available from MMPI Construction Services. A copy of all of the Merchandise Mart's policies and procedures associated with its LEED certification can be obtained by request.

In each section of this document you will find a **LEED Initiative Goal**. The goals outlined in each section are provided to assist you in understanding what must be done to adhere to minimum standards of practice as well as what can be done to achieve certification for your space. And, throughout this document, **LEED Compliant** shall be taken to mean "compliant with the most current version of LEED-EB in place by the building." It is imperative that you maintain the minimum standards set forth in the most current version of LEED-EB and/or LEED ID+C during your build-out. Please contact Construction Services to verify which version is currently in place.

The Merchandise Mart appreciates your assistance in helping us maintain a premier office and showplace facility that provides our tenants with a comfortable workplace that is operated and managed in an environmentally sustainable manner.

STANDARD BIDDING/CONSTRUCTION PROCEDURES

MMPI encourages its tenants to communicate with Construction Services and Operations from the initial design development through to the completion of construction for best results. Although not required, it has been found that the most successful projects are coordinated and completed with MMPI's involvement acting as the Tenant's Construction Manager. It is recommended that the following steps take place:

1. Tenant retains Designer who develops construction plans and specifications which identify the scope of the construction. MMPI encourages you to retain an accredited LEED Designer and/or Architect that is knowledgeable with the LEED process.
2. Tenant must provide MMPI with the following:
 - A. Construction documents on a CD of all drawings in Auto CAD 2007 and PDF file format for pricing.
 - B. Five (5) paper sets are required for review by MMPI Construction Services and Operations staff. One copy of which is to be distributed to FM Global for review. Please allow 10-15 business days for drawing review.
 - C. Revisions to construction documents while project is still being bid or reviewed by MMPI should be submitted on a CD in Auto CAD 2007 and PDF file format reflecting revisions.
 - D. Revisions to construction documents after the project has been awarded to a Contractor should be submitted on a CD in Auto CAD 2007 reflecting revisions and seven paper sets for redistribution to MMPI.
3. MMPI distributes bid sets to contractors and solicits and evaluates competitive bids from prequalified contractors.
4. MMPI drafts a construction contract, including the scope of MMPI's services and its fees, and submits it to the Tenant for acceptance.
5. Upon receipt of a signed contract by MMPI, as well as a deposit, construction will begin. Contact your assigned Project Manager for a current copy of MMPI's standard form of agreement for construction.
6. MMPI will retain Contractors and manage the construction.
7. Construction progress payments to Contractors will be made by MMPI.
8. Upon Tenant's receipt of all qualified bids, a final Improvements Package, issued for construction and permit must be submitted by the Tenant to MMPI's Construction Services Department. This Improvements Package must include a complete set of final plans including all architectural and

engineering drawings where applicable in Auto CAD 2007 and PDF file format. The Tenant Improvement Package should include specifications.

Please note, if the Tenant requests that it contract directly with the General Contractor:

1. It is still the Tenant's responsibility to ensure that MMPI Construction Services receives drawings and documents both in electronic and paper format for review as noted in paragraph 2 above.
2. The Tenant is solely responsible for ensuring that all drawings and documents have been reviewed and approved by MMPI Construction Services and Operations staff prior to the commencement of any work.
3. The General Contractor and all Subcontractors bidding on work must meet certain standards of qualifications which can be obtained by contacting the Construction Services Department.
4. The Tenant and its General Contractor is responsible for communicating with MMPI Construction Services and Operations staff during the entire build-out. MMPI will provide assistance in coordinating the construction as it impacts common areas, adjacent tenants, and/or other activities and events taking place throughout the building.
5. The following additional documents must be submitted to MMPI Construction Services prior to the commencement of work.
 - A. A current copy of the General Contractor's proposal outlining the scope of work and the total cost construction.
 - B. A Schedule of Values with cost per trade and Subcontractors and Supplier's names.
 - C. A complete list of the Contractors and Suppliers involved with the project along with name, address and telephone number for each.
6. Tenant and its Contractors are responsible for obtaining all permits and approvals by the City of Chicago for all work.
7. Upon completion of all work and acceptance of the premises by the Tenant and prior to authorizing final payment, Tenant must send MMPI a final waiver of lien from all Contractors involved with the project.

REQUIRED DRAWINGS AND SPECIFICATIONS

The following is a summary of the drawings and specifications to be supplied to MMPI by the Tenant. Adherence to these requirements will help ensure an accurate bidding procedure as well as eliminate confusion related to materials and methods of construction to be utilized.

When building permits are necessary, the Tenant shall provide, in addition to the previously mentioned electronic drawing submittal, five (5) sets of stamped construction drawings bearing the seal of a State of Illinois registered architect or engineer.

Building permits are required for all projects involving alterations that include but are not limited to structural, mechanical, electrical, plumbing, fire protection and any work that may affect ingress and/or egress. Permits are required for all remodeling and renovation projects except those where only minor cosmetic alterations are being performed. Please visit the City of Chicago's website at <http://www.cityofchicago.org/city/en/depts/bldgs.html> for more information regarding minimum drawing requirements, applications and the permitting process.

Drawings and specifications as prepared by the Tenant's Architect, Interior Designer, Space Planner or Contractor (hereafter referred to as Designer) shall address and/or include the following items:

1. Preparer's name, address, telephone number, fax number and email.
2. Date of Preparation.
3. Key plan indicating floor number and location within the building.
4. Column centerlines on all plans with corresponding column numbers which match the base building numbering system.
5. All floor and reflected ceiling plans, elevations, and details showing all demolition, structural alterations, architectural, mechanical, plumbing, sprinkler, and electrical work. All drawings to be drawn to scale, be dimensioned and noted.
6. Schedules including room finishes, doors, hardware and equipment. Whenever practicable, use environmentally preferable products that are LEED compliant. Indicate such products on the Construction Schedules. You must obtain approval from MMPI if you are considering using products that are not LEED compliant.
7. Complete specifications (on drawing or submitted as a separate document) including all special materials and conditions as well as material sources, installation requirements and performance standards. No shop drawings will be submitted to designer for review, except for those items specifically identified on the drawings or in the specifications.
8. All changes to originally submitted drawings and specifications are to be clearly identified, dated and re-issued by the Designer.

9. All drawings and specifications are to be hand delivered, mailed or emailed to MMPI, Construction Services Department; Attention: Project Manager.
10. Drawings are not to identify names of Contractors or Suppliers. Drawings and/or specifications are to identify product manufacturers. To achieve the most competitive bids, multiple sources should be indicated.

In preparation of all drawings, the following items should be considered and/or included:

1. When Tenant space is set back from corridor lease line, provide fully dimensioned drawings for all vertical and horizontal conditions. Note that Tenant space shall not extend beyond corridor lease line(s). Requests for all signage and projections, including specialty lighting, beyond lease line(s) must be submitted in writing to MMPI with a plan, elevation and section drawings for approval.
2. All main building services (electrical, HVAC, fire protection, plumbing, etc.) shall be located and shown from the point of origin in the building into the new space.
3. Tenant space corridor elevations and designs must conform to Building Standards as applicable to the floor in question. (Contact Construction Services for detailed information.)
4. Design all improvements to allow for access to windows, radiators, plumbing chases, valves, electrical and mechanical equipment, electrical homeruns, dampers, stairwells and all other existing equipment and services. Obstructions of any kind are not permitted.
5. Demising partitions between showrooms and public corridors and showrooms shall be of non-combustible construction and extend from the floor to the underside of the floor slab above. In addition, all demising partitions between showrooms are to be of two-hour rated construction.
6. Demising partitions between showrooms are to have one duplex electrical outlet in each bay on each face of the wall. Outlets are not to be back-to-back. Outlets on each wall face to be on separate circuits. Circuits are to be identified with tags.
7. When required, fire extinguisher cabinets should be readily accessible and incorporated into the design. Fire Hose cabinets should be used sparingly with documentation from City of Chicago justifying its use in the Merchandise Mart.
8. Tenant security designer to indicate location of controls for all systems including entrance lighting, "night" lights, annunciators and alarms. Location to be convenient to showroom entry door.
9. Designer to provide exiting from space per City of Chicago Code. All exits to be identified as required per Code.
10. Storage in electrical, mechanical, telephone, sprinkler, equipment rooms and stairwell and elevator corridor areas is not permitted.

11. As-built drawings must be submitted prior to final payment. All as-built drawings must be field verified before submittal. Submit all as-built drawings both in Auto CAD 2007 file format, PDF and paper copy in a binder with all warranties, etc. This note must be on both drawings and specifications.
12. The Designer must review and approve all the work by ALL of the Tenant's consultants and contractors. Tenant to provide a list of all consultants and contractors and update periodically.
13. Provide plans and details stamped by Structural Engineer showing any areas with a floor load above the allowable floor load stated in the lease.
14. New aluminum exterior building windows are not to be painted.
15. Attachment of partitions, fixtures or equipment to ductwork or piping is not permitted.

GENERAL REQUIREMENTS

LEED Initiative Goal

To incorporate the use of LEED guidelines and LEED compliant products into construction projects.

1. It shall be the responsibility of all persons involved with the design and/or construction of the space to personally inspect the premises and acquaint themselves with the existing conditions and how they may affect the design and/or construction. Where MMPI may provide any party involved with the design and/or construction of the space with drawings or exhibits from the previous build-out, it is the Tenant and/or their consultants sole responsibility to verify all existing conditions and dimensions associated with the space. MMPI shall not be responsible for the inaccuracy of any drawings.
2. Before commencing work, the tenant and tenant's General Contractor must schedule a pre-construction meeting with MMPI personnel to plan aspects of the project. Items to be reviewed during the pre-construction meeting include, but are not limited to, the following: project schedule; dust control; noise control; accessing the loading dock, waste handling; and those days which may be considered non-working days. LEED guidelines and rules for compliance must also be reviewed prior to construction.
3. All Designers and Contractors shall observe and comply with all Federal, State of Illinois, City of Chicago, County of Cook, ADAAG and other local agency Codes, Ordinances and Regulations which may in any manner affect their work. All codes and ordinances take precedence over the information contained in these Standards. Obtaining of permits is the responsibility of the Tenant, Tenant's Architect or Contractor. Permits and all related permit documents must be displayed on site and available for review upon request. Tenant or its assigned Contractor is responsible for the cost of the permit and all inspection fees.
4. General contractors and sub-contractors must be licensed and bonded in the City of Chicago and be signatory to the local union as required to maintain labor harmony. Contractor must submit proof of signatory agreement if requested by MMPI Construction Services or Operations. Contractors that are unable to provide proof of their signatory agreement or those who do not have union affiliation may be asked to leave the premises. If requested, Contractors may also be requested to submit proof of license(s) and bond(s).
5. Before commencing work, all Contractors shall submit certificates of Insurance to MMPI for review and approval. Contractors may not commence work until all certificates have been approved. Contact Construction Services for specific requirements and coverages.
6. Construction cannot begin until authorization has been obtained from MMPI.

7. For all projects, regardless of LEED certification goals, GC to adhere to and submit the following:

A. *During construction*

- 1) Confirm dust and odor controls are in place
- 2) Filtration (pictures by General Contractor are required)
- 3) Entrance carpet/mat (picture required)
- 4) Sweeping Compound (picture required)
- 5) Barricade (picture required)
- 6) Confirm that Project is in compliance with IAQ Plan (picture required)

B. *Post-Construction*

Project documentation including:

- 1) Photos
- 2) Work Control Center Service Tickets
- 3) Air Quality Monitoring Data
- 4) LEED CI Checklist (if applicable)

Note: All of the above listed items are required as part of the close-out documents and package that must be submitted to your assigned Project Manager at the end of the job. Where work is performed directly for MMPI, payment will not be made unless these documents are submitted with Contractor's invoice.

8. Temporary wiring, power lighting and barricades are the responsibility of the Contractor. All required tools and equipment are the responsibility of the Contractor.

9. All work shall be accomplished with minimum disruption to normal building operations. To ensure this, the following items should be addressed:

A. Return and exhaust grills and openings to be filtered during construction. Filtration media with a Minimum Efficiency Reporting Value of 8 (MERV 8) must be used at each return and exhaust grill as determined by ASHRAE 52.5-1999.

B. Barricades – Merchandise Mart 1st and 2nd Floors: Barricades must be installed no more than 36" off of the face of the neutral pier in the main corridor and must be fully taped, sanded and painted ready to receive tenant promotional graphics. The barricade must be fabricated of metal stud framing to ceiling above at 16" OC and a minimum of one 36" door swinging into the construction site. Double doors are preferred wherever possible. Door must be lockable and a key must be left with MMPI Security and Project Manager in the event of an emergency. Barricade's metal base track may not be shot into the terrazzo floor. A rubber gasket or similar non-slip material must be used to keep the track in place and prevent damage or scratching of the terrazzo. Masonite panels must be installed and taped together on the terrazzo floor within the construction site to fully protect the terrazzo from damage. At all times there must be a carpet walk-off mat (moistened on a regular basis) for foot traffic through that door. Contractors must use the rear door(s) at all times where applicable. Blade signs and sconces must be removed by MMPI prior to the installation of the barricade. Barricade return walls must attach to the neutral piers at the column center. 90 degree return walls are acceptable

where it does not create a hazard. 45 degree return walls are required where egress is compromised near stairs, doors or other storefront entries.

- C. Barricades – Merchandise Mart 3rd through 20th Floors: Solid drywall or fire retardant plywood, full height, visqueen sealed barricades are to be installed across all openings to prevent dust and debris from entering the corridor. Corridor carpet to be protected using Masonite or plastic. Plastic not to be the self-stick or adhesive-backing type. Cutting of corridor carpet is not permitted without prior approval by your assigned Project Manager. Barricades to have double doors wherever possible which are to be lockable. Contractor to provide lock with a key to MMPI Security and Project Manager. Keys to be tagged indicating space number and Contractor name. Barricade to include legible Tenant sign on door with suite number. No Contractor advertising is permitted on barricades. Walk-off mats must be provided on the inside of all barricades using a damp carpet. Barricade doors are to be kept closed at all times.
- D. Corridor carpet inside, under and outside of the barricade is to be protected at all times. General Contractor to order additional corridor carpet as needed per scope of work. Specifications and sourcing information can be obtained by contacting your assigned Project Manager in the Construction Services Department.
- E. Public areas shall be kept free of materials and debris at all times. Carpets shall be vacuumed daily or more frequently if so directed by the Project Manager.
- F. Each Contractor shall be solely responsible for removing his debris and shall keep premises free from accumulation of waste. For use of MMPI dumpsters for removal of construction trash and debris, MMPI will charge Contractors. Confirm value of charge with Project Manager. Construction debris shall be segregated and placed in appropriate containers for recycling. Recyclable construction debris includes, but not limited to: cardboard, plastic, metals, etc. Construction debris shall be segregated at the point of generation and then placed in designated area in accordance with the Merchandise Mart's Construction Waste Reduction and Recycling Policy. During the pre-construction meeting, MMPI will provide you with guidelines for recycling demolition material.
- G. Premises shall be made broom clean daily as a minimum or more frequently if so directed by the Project Manager. Contractor to use sweeping compound and a wet mat for dust control.
- H. Barricades, tarps, etc. are to be used to protect existing improvements including other Tenant spaces and all public areas during demolition, removal of debris, construction and delivery of materials.
- I. If the Contractor fails to, or refuses to, clean up debris, the Project Manager shall, at his option, provide the necessary clean up and back charge the Contractor. Back charging will also apply for damage to adjacent materials and work which has been performed by others.
- J. Freight elevators are to be used for the transportation of all construction materials, tools and equipment.

- K. Construction materials are to be delivered through the dock only during normal dock working hours. Special arrangements for off-hour deliveries should be coordinated with the Dock Manager. Delivery of construction materials shall comply with Merchandise Mart's Erosion and Sedimentation Control Plan and Policy. No construction materials shall remain out of doors unless it is properly covered to minimize potential contamination of stormwater runoff.
- L. Vehicles may not be parked at the delivery dock except for unloading or loading of tools and materials. Permission may be granted under special circumstances or during off-hours and must be approved in advance by MMPI.
- M. All Contractors are to provide their own means for moving materials and will not be allowed to use building owned trucks, carts or garbage bins.
- N. For projects with barricades, Contractor to apply on barricade adjacent to door in 3" high letters the space number and Tenant name. Tenant may also choose to install graphics, approved by the Project Manager, to the barricade.
- O. Any coring, drilling or saw cutting of concrete floor slabs must be approved by the Project Manager before work begins. This work can only be done before 8:00 AM and after 6:00 PM Monday through Friday (special arrangements must be made for weekend work). Special consideration must be taken and coordination provided with and by your assigned Project Manager for work above or near other tenants. Contractor must provide protection of space below prior to commencement of coring, saw cutting or trenching, and, must coordinate access of space below with your assigned Project Director a minimum of 24 hours in advance.
- P. If the performance of any alteration by or on behalf of Tenant, or any other Person claiming by, through or under Tenant, during regular building business hours generates noise, vibration, odor or dust and materially interferes with or interrupts the maintenance, repair, management or operation of the Building in any material respect or interferes with or interrupts the use and occupancy of the Building by other tenants in the Building in any material respect, then Landlord shall have the right to require Tenant to perform work causing noise, vibration, odor or dust at other times that Landlord reasonably designates, from time to time, if Tenant does not otherwise abate such noise, vibration, odor or dust, such that it no longer materially so interferes or interrupts as specified above.

10. Floor slab inspection is required for any saw-cutting, trenching and/or coring. Ground Penetrating Radar is acceptable. Trenching allowed only on topping coats, not on structural slab. Floor boxes can be positioned to occur in the existing 3" concrete slab. Floor boxes should not be placed within the cross section of an existing concrete joist or concrete encased steel beam. All cores and trench plans must be reviewed and approved by MMPI's structural engineer, at Contractor's cost, prior to any work. Structural Engineer is noted below:

Pease Borst & Associates
Anita Dietz
847-842-6930 x 07
adietz@peaseborst.com

11. MMPI cannot and does not guarantee slab thickness. Any penetrations into tenant spaces below through the slab require safing. Penetrations must be patched and repaired using UL approved fire-stopping methods at contractor's cost. Fire rating shall be as specified by Architect/Engineer. Contact your MMPI Project Manager for penetration details where required.
12. All holes in concrete shall be core drilled. If penetrations of a shape other than round are required, they shall be saw cut. At no time shall jack hammering be allowed without the expressed written consent of the Owner and shall not be assumed as acceptable in any bid.
13. All construction will cease the evening prior to Market openings unless otherwise noted. Contact Project Manager for these dates. No construction will be allowed during Markets without MMPI approval.
14. Solvents should be compliant with the California South Coast Air Quality Management District's rule for solvent cleaning operations or LEED approved equal. SDSs for all products must be stored on site in the Contractor's Safety Manual at all times and immediately available upon request. Contractor is to control and ensure that all solvents used, stored and disposed of are in accordance with the manufacturer's recommendations and in compliance with all applicable laws.
15. Contractors and their employees shall be expected to observe the following rules and regulations:
 - A. Playing of radios is not permitted.
 - B. Workmen may use passenger elevators only if wearing clean street clothes and clean street shoes.
 - C. Workmen are to use freight elevators when transporting tools, equipment or materials or if wearing dirty clothes. No exceptions.
 - D. Wearing of shirts is required at all times.
 - E. Hard hats shall be worn so as to comply with applicable laws and situations.
 - F. Observe all posted building rules and policies.

- G. Use of alcoholic beverages or other chemical substances is not permitted on the premises.
 - H. Smoking is not permitted on the construction site OR in any areas within the building.
 - I. Use of profanity will not be permitted on the premises.
 - J. Windows are to be kept closed. A check of all windows must be made by the Contractor at the end of each day to ensure same.
 - K. Parking of cars and trucks is not permitted on the premises.
 - L. Areas for lunch and coffee breaks are to be limited to the construction site. Stairwells and corridors are not to be used for breaks.
16. Coordination with MMPI must be included in the contractor's scope of work to trace, identify and tag existing systems involved in and around all construction work, and to schedule shutdown of any building systems that may be affected by the work.
 17. Contractor must coordinate work with building functions, hours of operation, Market Events, hoisting, access to other floors, roofs, etc. Contractor shall submit schedule before beginning work.
 18. Any connections to Building Systems must be reviewed in the field to confirm that they will or will not affect other public or tenant occupancies. Any connection to systems that affect other occupancies must be coordinated well in advance with MMPI. i.e., any power or plumbing shutdown for final connections, etc.
 19. Tenant spaces are to be opened and closed only by MMPI Security, unless arrangements are approved by Project Manager. After-hour access to other tenant/occupied spaces must be coordinated by contacting the Project Manager. A guard must be present at all times. Cost of guard to access tenant spaces is the Contractor's sole cost and expense unless otherwise approved in advance by the Project Manager.
 20. All materials must be guaranteed to be free from defects for a minimum period of one year from the actual time of acceptance by Tenant of premises.
 21. Materials plus installation shall reference MMPI Building Standards, and meet or exceed building specifications.
 22. Temporary shutdown of power, lights and mechanical systems shall be made only during building's non-working hours and shall be coordinated by contacting the building's Operating Departments, through work control center and the Project Manager. Contractor to provide 24 hour advance notice for all shutdowns.
 23. Fire protection system is to remain active at all times except when being worked on or adjacent work might cause system to be activated. Temporary shutdown, when necessary, is to be

coordinated by contacting the building's HVAC Department. Coordinate Hotwork around sprinkler impairments.

24. Tenant's representative(s), accompanied by the Project Manager, will inspect, prepare and submit in writing to the Project Manager a punch-list prior to occupancy. In cases where this is not possible, the Tenant will "waive" responsibility for items damaged during Tenant move-in or during occupancy.
25. Should any asbestos be discovered during construction, the Contractor is to cease all work in the area of discovery and immediately notify the Project Manager. Upon notification, MMPI will take steps to remove same using qualified persons who will properly dispose of said materials in accordance with applicable laws.
26. Contractor shall confine his work to the premise under construction. All material, equipment, tool storage is to be confined to the premises. No storage in public areas, mechanical rooms, electric rooms, etc., is permitted.
27. Contractor and all Subcontractors are to perform all construction work per drawings and specifications, check all drawings of all trades to verify scope, dimension and other requirements. All construction to be completed so that headroom and access dimensions are maintained.
28. Equipment powered by diesel fuel, gasoline, propane, and other fossil fuels is prohibited in the building.
29. Contractor to provide MMPI with SDSs for all materials which may be considered hazardous. SDSs for all materials to be kept at construction site.
30. Hot Work Permits are required for all welding, torching, soldering, or other work causing sparks or when open flames are used. Hot Work Permits must be obtained in advance by contacting the Chief Building Engineer on staff. Hot Work Permit must be coordinated with your assigned Project Manager or the building engineer in advance to ensure that there are no black-out dates that may prevent this work from occurring.
31. Cost of Building Services including but not limited to dumpsters, sprinkler shutdowns, material management, housekeeping, and coordination, inspections or supervision by building engineers, plumbers, and electricians to be at Contractor's sole cost and expense. Contractors are not permitted to negotiate billing rates or billable party with MMPI or Tenant.
32. Windows are not to be opened at any time without prior written consent of MMPI.

DEMOLITION

LEED Initiative Goal

To increase the proportion of construction debris that is recycled instead of placed in a landfill.

1. All Contractors shall protect adjacent surfaces from damage. Should damage occur, repair of same shall be accomplished to the satisfaction of the Project Manager.
2. Before demolition begins, Contractor is to verify with Project Manager what items of existing construction are to be claimed by MMPI. Contractor to advise Project Manager of any demising wall demolition or modifications.
3. Contractor shall notify Project Manager, in advance, of any required floor openings alterations to demising walls or structural alterations.
4. Designer/Tenant to specify scope of demolition in Construction Documents. All unnecessary equipment conduits, ducts, plumbing piping, etc. are to be demolished.
5. Whenever possible, the Contractor shall recycle demolition material in accordance with the Merchandise Mart's Construction Waste Reduction and Recycling Policy. Demolition recycling will be covered during your pre-construction meeting with MMPI.
6. Demolition is considered an excessively dirty and dusty process. Therefore, it is the Contractor's responsibility to ensure that proper IAQ Management procedures have been set in place in accordance with this document prior to commencing any demolition.
7. Tenant's assigned Project Manager shall determine, based on the scope of work, whether the demolition can be performed during regular business hours or if it must be performed after-hours. Location within the building, special events or market events may affect when demolition can take place. MMPI shall not be responsible for costs associated with Contractor performing demolition on overtime.

CARPENTRY

LEED Initiative Goal

To increase the proportion of sustainably harvested wood products, salvaged materials, recycled content materials, and local materials used in Merchandise Mart construction projects.

DEMISING WALLS

All walls separating the Tenant space from the public corridor or another tenant space are to be constructed of 3-1/2" structural gauge metal studs, 16" on center, extending from floor to underside of floor above. No combustibles are to be used in these walls. Use sound batts, full height between studs. Demising walls between spaces are to be constructed so as to have a two-hour rating. Each side of stud to receive two layers of 5/8" fire-rated drywall. 3/4" gypsum wallboard may be used in special conditions or as approved by the Project Manager.

DRYWALL

Gypsum based drywall is to be manufactured and distributed from a local source within 500 miles of the property in which the material is being use and must be manufactured of a minimum of 50% recycled content as required by current LEED standards which govern this document. Use 5/8" USG Firecode Sheetrock brand wallboard, 3/4" USG Ultracode Sheetrock or approved equal.

INSULATION

Insulation shall be face or unfaced fiberglass batts as required based on usage and installation requirements. All insulation shall be formaldehyde free and meet all LEED criteria as set forth by the USGBC. Verify with the Project Manager which LEED standards are currently being adopted.

SPECIAL WALLS

Walls built to carry multiplex rug racks, fabric wings or baton wings shall be of metal construction and reinforced with a minimum of 4" x 4", fire retardant wood posts, 16" o.c. Ceiling plates are to be a minimum of 2" x 8", fire retardant and anchored securely to the concrete slab above. Designer to provide details for wall construction. See attached Exhibit C-2 for suggested minimum wall design.

SPECIAL CONSTRUCTION

When wall designs require ceiling hangers, they must be hung by using a minimum 3/8" threaded rod, 4' - 0" o.c., fastened to the concrete above using concrete anchors and down through the center of a 2" x 6" fire retardant treated plate. The bottom of the 2" x 6" should be fastened with a large washer and nut. Designer is responsible for design and specification of hangers and plate.

If wood framing is required, it is to be fire retardant and clearly identified as such. Walls which are not full height shall be designed so as to have adequate strength to perform intended use. Wood shall be certified by the Forest Stewardship Council (FSC) or be a LEED-approved equal to ensure that the material has been grown, harvested, and managed in a sustainable manner. Reclamation and reuse of previously used wood (does not have to be FSC certified) is encouraged as an alternative LEED-

compliance path. The value of all new and reused wood shall be officially documented and available upon request by Construction Services.

ACCESS PANELS

Access panels are to be provided in all new construction that conceals existing junction boxes, shut off valves, dampers, etc. Size to be approved by Project Manager. Panels to be metal as manufactured by Milcor or equal. Drawings to indicate existing access panels to remain or be relocated. Location of furniture, equipment, closets, raised floor areas over access panels, plumbing clean-outs, etc., must be verified to avoid conflicts for building maintenance or access.

RADIATOR COVERS

All radiator covers must be removable and have access grille openings at the top and bottom (See attached Exhibit C-1). All radiators shall be fully accessible for servicing, repair or replacement. Access shall be provided with appropriate ventilation including ventilation in walls that are constructed in front of radiators. Fixtures, furniture and equipment (FF&E) shall not be permanently installed in front of radiators. FF&E installed in front of radiators shall require no special knowledge for removal. Radiators shall not be enclosed or placed behind walls without these requirements being met.

ANCHORAGE

When securing construction to floors and decks, anchor into floor slab ribs and not into shallow pan area of slab. If design requires fastening in these areas, bridging with channel (i.e. unistrut) is suggested as a minimum. Designer to specify all anchorage.

DOORS AND WINDOWS

LEED Initiative Goal

To increase the proportion of sustainably harvested wood products, salvaged materials, recycled content materials, and local materials used in the Merchandise Mart construction projects.

WOOD DOORS

All interior wood doors are to be birch, oak or other comparable hardwood finish and shall be FSC certified or LEED-approved equal to ensure that the material has been grown, harvested, and managed in a sustainable manner. Reclamation and reuse of previously used wood (does not have to be FSC certified) is encouraged as an alternative LEED-compliance path. The value of all new and reused wood shall be officially documented and available upon request by Construction Services. All wood entrance doors are to be solid core -- all interior doors may be hollow core. If mortise locks or concealed hinges are used, wood door must be solid core. Minimum acceptable door width is 3' -0"; minimum height is 6' -8" unless restricted by existing conditions. All doors and frames to be type required per Code.

WOOD DOOR FRAMES

As a minimum, wood door frames are to be hardwood paint-grade material. Metal door frames to be knock down type or welded with a prime coat of paint. Wood door frames shall be FSC certified or LEED-approved equal. Reclamation and reuse of previously used wood (does not have to be FSC certified) is encouraged as an alternative LEED compliance path. The value of all new and reused wood shall be officially documented and available upon request by Construction Services.

GLASS STOREFRONTS AND DOORS

Glass in corridor/Tenant space walls to be tempered glass including; sliding glass doors, aluminum entry doors and all sidelights. Glass shall be as manufactured by Pittsburgh Plate Glass or Libby Owens Ford Glass Company and meet all current State and Federal Regulations. All glass over 7' in height and/or 5' in width to be a minimum of 1/2" thick tempered. All corridor wall glass to be minimum 1/2" thick tempered.

Full frame glass sliding storefront systems must be manufactured by Kawneer or US Aluminum Corporation with locks to match hardware specifications in this document. Locks to be mounted in vertical rail with thumb turns as required on inside face of door. Where sliding storefront doors are used in frameless storefront systems, only bottom mounted rails with roller are permitted. Rails to be manufactured by Doralco or approved equal. Special permission is required for top hung system. Lock cylinders installed in bottom rail must be accessible for servicing either from the side or through the use of a removable core only. Maximum distance of cylinder shall be 3" on center from end of bottom rail.

HARDWARE

Locks are to be U. S. manufactured and parts must be readily available through local distributors. This includes mortise locks for wood, glass, aluminum, etc. and locks for sliding or swinging doors. Locks must accept standard 1 1/4" threaded cylinders and it is suggested that they be dead latch type.

Entry doors to space to be lockable from both sides - thumb turn or key from inside (if Code allows) and key from outside. Self locking is acceptable.

All locks are to have accessible cylinder set screws in a location that does not require the door to be removed for service or changing of the cylinder. Examples: Adams Rite, Corbin, Schlage, Sargent. All hardware to meet Code requirements.

KEY CONTROL

Contractor to deliver to MMPI Security a key which will open all new entrance hardware installed in the space. Each key is to have attached a tag that indicates which locks it opens in the space and the space number. Should it be necessary for MMPI to rekey locks, cost to be responsibility of the Contractor.

Locks incorporating a removable core cylinder must be accompanied by a tagged control key that must be delivered to MMPI Security. All exterior doors should be lockable from inside as well as outside.

KEY IN KNOB LOCKS

Since it is not possible to service all types of locks that incorporate key in knob locks, they should be limited to Schlage, Corbin or Sargent and be a minimum of STANDARD DUTY. Residential standards are not acceptable.

SECURITY

Tenant's Designer and Contractor shall be totally responsible for the integrity of storefronts and entrances. Designers to detail and specify all materials required for the securing of door tracks, specialty items and hardware. Fronts should not have large open gaps which would allow unauthorized access. Sliding corridor doors are to have locks which will not allow for doors to be opened by lifting doors out of tracks. All drawings submitted to MMPI shall specifically address these items.

SPACE EXITS

All spaces of 4,000 square feet or larger are required to have a minimum of two exits. Size, locations and quantity of exits to be in compliance with City of Chicago Code. Door swings shall not encroach into corridor space.

FINISHES

LEED Initiative Goal

To reduce the volatile organic content of architectural coatings and associated finishing materials used in the Merchandise Mart in order to improve indoor air quality.

PAINTING/WALL COVERING

1. Cover and protect all materials or surfaces not to be painted. Contractor shall be responsible for removing paint on all materials or surfaces inadvertently painted. Protect against over spray.
2. Do not paint prefinished surfaces such as brushed anodized aluminum, stainless steel or similarly finished materials (including sprinkler heads and rings), hardware, laminates or fixtures except as may be specified. Contractor is to cover and/or mask all these surfaces and to remove same upon completion of his work. Painting of existing light track is not permitted.
3. Upon completion of work in a room or area, the room shall be left in a clean and orderly condition. All dirty rags and trash shall be removed.
4. Upon completion of the work, the Painting Contractor must remove all materials, scaffolds, etc. from premises. He shall clean all glass of excess paint and splatters and remove paint that has been misapplied on other surfaces.
5. Painting Contractor shall remove from the building premises all cans containing solvents, paint, varnish, thinner, etc. within 3 days after his work is completed. If Tenant has requested, containers may be left in the Tenant space in a properly stored manner.
6. All spray painting must be pre-approved by MMPI Project Manager and work must be done after normal business hours. All spraying and painting to be confined to Tenant space. No spraying is permitted in corridors.
7. Prior to painting or refinishing corridor walls, Tenant is to obtain approval of MMPI.
8. Paints containing lacquer base products and paints which give off noxious odors are not to be used.
9. All IAQ Management Plans must be in place prior to spray painting including but not limited to sealed ducts and diffusers, return air grilles, plastic barriers and negative air machines.
10. Operation of base building exhaust systems may be required either during or after regular business hours as determined by the Project Manager based on the coatings and/or finishes that have been selected for use on the project. Consider substitutions prior to use of products that may require aggressive IAQ Management Plans.

11. Wallcovering adhesives, adhesive bonding primers, adhesive primers, sealants, sealant primers or any other primers in the building shall be compliant with the California South Coast Air Quality Management District and/or the Bay Area Air Quality Management District, or LEED-approved equal, volatile organic compounds content limits for those products, unless approved by MMPI Project Manager. The value and SDSs of all adhesives, sealants, and primers--whether compliant or not--shall be officially documented and immediately available upon request by Construction Services.
12. Paints and architectural coatings shall be compliant with the volatile organic content limits defined by Green Seal GS-11 Standard, or LEED approved equal. Copies of this standard can be obtained from MMPI. The value and SDSs of all paints and architectural coatings--whether compliant or not--shall be officially documented and immediately available upon request by Construction Services.
13. Contractor is responsible for control, storage and code compliance of all materials being used on the site.
14. Use of liquid strippers is not allowed without prior written approval of MMPI.
15. Contractor to provide MMPI with SDSs for all materials which may be considered hazardous.

FLOORING

1. Cover and protect all flooring materials that will be retained during build-out using plastic Visqueen and Masonite hardboard.
2. Use only approved floor prep products that are compliant with the California South Coast Air Quality Management District and/or the Bay Area Air Quality Management District, or LEED-approved equal, volatile organic compounds content limits for those products, unless approved by MMPI Project Manager. Ardex Feather Finish, Vinyl-Crete, and USG Levelrock are example of floor prep products which have been approved in the past. Verify with MMPI Project Manager if these products meet said requirements.
3. Flooring adhesives, adhesive bonding primers, adhesive primers, sealants, sealant primers or any other primers in the building shall be compliant with the California South Coast Air Quality Management District and/or the Bay Area Air Quality Management District, or LEED-approved equal, volatile organic compounds content limits for those products, unless approved by MMPI Project Manager. Copies of these standards can be obtained from MMPI. The value and SDSs of all adhesives, sealants, and primers--whether compliant or not--shall be officially documented and immediately available upon request by Construction Services.
4. Carpets must meet all requirements of the Carpet and Rug Institute Green Label and Green Label Plus program and USGBC LEED criteria for low emitting materials.
5. Carpet adhesives must have less than 50g/L for volatile organic compounds (VOC).
6. Hard surface flooring materials must be certified to meet FloorScore standards including but not limited to vinyl, linoleum, laminate flooring, wood flooring, ceramic, or rubber flooring and base.

7. Concrete, wood, bamboo, cork or other natural flooring materials which require sealants must be compliant with SCAQMD rules as previously specified in this document.
8. Tile setting adhesives and grouts must meet SCAQMD rules as previously specified and must meet all VOC limits set forth by the most current version of LEED criteria currently in affect.
9. Waterproofing and Flood Testing
 - A. Waterproofing, membranes and/or moisture protection is required in all areas where water may be found or where plumbing is installed including but not limited to food services operations, pantry sinks, toilet rooms, pre-action rooms, mechanical rooms or other areas where excessive water, leaks or overflows may occur. Membrane must be installed a minimum of 4" up all surrounding walls.
 - B. Waterproof membrane systems must meet ANSI and ISO standards and be compatible with sub-surface preparation materials and adhesives, epoxies, mastics and grouts. Waterproofing must also meet LEED requirements for local/regionally available (recycled) materials whenever possible.
 - C. All mortars, grouts, adhesives and membranes shall come from a single source to ensure compatibility and manufacturer's warranties. Waterproofing, membranes and moisture protection systems must be reviewed in advance with MMPI Project Manager, General Contractor and Installer to review and approve surface preparation, material compatibility, grouting and maintenance requirements following installation.
 - D. Contractor and Installer to confirm site conditions of ventilation system and ensure that all IAQ Management Plans are in place and fully comply with MMPI standards and LEED criteria prior to installation.
 - E. Use only approved waterproofing, membrane or moisture protection systems including Mapei Flexible Latex-based fracture proof membrane, Mapelastic AquaDefense or Merkrete Hydro-Guard Elastomeric Waterproof Membrane. Contact the Project Manager to review and confirm.
 - F. Flood Testing with standing water for 12 hours is required on all waterproofing, membranes and moisture protection systems. Flood Test to be performed and supervised by plumbing foreman and inspected by MMPI Project Manager. Flood Test shall not interfere with the business operations of the Tenant below. If required, Flood Test to be performed after normal business hours. Flood test to be performed prior to finished floor application.

HVAC SYSTEMS

LEED Initiative Goal

To improve efficiency of the HVAC system in order to maintain tenant comfort and saving energy.

GENERAL REQUIREMENTS

1. All work shall be in conformance with all State and City Codes and ordinances and in accordance with updated and adopted versions of ASHRAE and SMACNA design and Construction Standards.
 - A. Existing outside air ventilation distribution system to supply the outdoor air ventilation required by ASHRAE 62.1-2004.
 - B. Meet or exceed the Design approaches of the SMACNA IAQ Guideline for Occupied Buildings under Construction 1995, Chapter 3.
 - C. If air handlers are used during construction, filtration media with a Minimum Efficiency Reporting Value of 8 must be used at each return and exhaust grill as determined by ASHRAE 52.5-1999.
 - D. Compliance with ASHRAE Standard 55-2004 Thermal Comfort Conditions for Human Occupancy.

Note that compliance with ASHRAE and SMACNA is **not** limited to the aforementioned sections.

2. Under no circumstances will any attachment of walls, partitions, electrical equipment, lights, support members, etc. to ductwork be permitted.
3. Ductwork from an adjacent tenant space must not be altered without approval from MMPI. Consult the Project Manager to review conditions on site.
4. For projects with extensive MEP scopes, provide shop drawings and equipment information and as-built drawings for new ductwork and equipment. Show interface with existing construction.
5. Work shall be coordinated with the Merchandise Mart Building Operation Plan.

RETURN/EXHAUST SYSTEMS

1. The HVAC Contractor is responsible for installing return/relief grilles, the size of each shall be based on a maximum of 400 feet per minute.
2. Where public corridors or ceiling plenums are used for return air to the fans, all private offices or walled off areas within a general space must be ducted to the corridor or plenum. The Merchandise Mart uses the corridor ceiling return plenum, the corridor, or a ducted return. Contractor is to verify

the type of system in use for the specific floor with the Project Manager. If the Tenant's design uses a ceiling plenum, a transfer grille(s) into the corridor must be provided where corridors are used to return air and rear spaces are to be ducted to corridor grille(s).

3. Connection of return air ducts to the Merchandise Mart's building exhaust system is not allowed.
4. The integrity of the building exhaust system in the Merchandise Mart must be maintained within the Tenant space. Stamped grilles and duct from the grilles to existing outside exhaust fans are to be maintained in services.
5. Exhausts from restrooms and food preparation areas are to be separate.
6. Kitchen exhaust systems must meet the following criteria:
 - A. Type I (Black-Iron): Hoods installed at or above all commercial food heat-processing appliances that produce grease vapors or smoke. Must be constructed from stainless steel not less than No. 16 gauge in thickness or stainless steel not less than No. 18 gauge in thickness. Ductwork to be black-iron with welded connections and wrapped with fire blanket insulation.
 - B. Type II (Galvanized): Hoods installed at or above all commercial food heat-processing appliances that produce fumes, steam, odor or heat. Type II exhaust hoods can be constructed of standard stainless steel sheet metal of not less than No. 22 gauge or stainless steel not less than No. 24 gauge in thickness. Where Type II exhaust systems are installed independent of base building kitchen exhaust systems, exhaust may include an in-line fan at hood and can be discharged from a sidewall or rooftop penetration. Do not include an in-line fan when connecting to base building systems. Sidewall exhaust is only permitted for discharge of heat and odor only where adjacent fan fresh-air intakes are greater than 25 feet in any direction.
 - C. Roof penetrations for exhaust systems must be coordinated with MMPI Project Manager using only MMPI roofing contractors. Contractor is responsible for all cutting, coring, patching and repair and protection of all adjacent areas in and around the site. Proper flashing, coping sheathing, curbing, etc., is required where roof penetrations are made. Contractor to match all existing roofing materials and return roof to "as-new" condition in area of work and warrant same for a minimum period of one year.
 - D. Where rooftop equipment is required, Contractor shall furnish all labor, materials and equipment to install fan, conduit, pipe, wiring controls, etc. All controls to be piped and wired back to Tenant suite and be placed on Tenant's electrical circuits. No equipment may be placed on base building circuits without prior approval of MMPI Project Manager.

DIFFUSERS

It is required that all diffusers are adjustable and all ductwork be dampered. Do not specify linear diffusers for air supply or other diffuser hardware designed for medium or high pressure air unless approved by MMPI Project Manager.

PROCESS WATER PIPING (CHILLED WATER OR CONDENSATE WATER)

1. Prior to filling any piping systems, install an approved backflow device. Device and filling procedure to be reviewed by Chief Engineer.
2. Minimum schedule 40 seamless welded or screwed.
3. All piping to be leak tested prior to fill. Chief Engineer to witness tests.
4. Contact Chief Engineer prior to any filling or flushing of lines.
5. Piping to be supported from building steel where feasible. Piping shop drawings to show anchor locations. Contractor to review with Chief Engineer prior to installation.
6. Pipe insulation should be a minimum of 2" fiberglass; with all joints vapor sealed.
7. For systems exposed to freezing conditions, design and installation to be based on propylene glycol.

DUCTWORK

All sheet metal ducts shall be fabricated to size. No flexible duct is permitted. All connections to the air delivering devices must be made with sheet metal and include a terminal damper, unless approved by MMPI Project Manager.

1. Do not assume a duct discharge temperature lower than 60 degrees Fahrenheit.
2. Ductwork shall be sized on a maximum pressure drop of .1 inch of water column per 100 feet.
3. All new supply ductwork must have a minimum of 1 inch of external insulation. All existing supply ductwork must be insulated externally. Lined ductwork is not permitted.
4. The maximum distance of throw allowed from the air supply device is 30 feet.
5. All elbows shall have a minimum radius of 1 1/2 diameters of the duct width. Turning vanes shall be installed where conditions do not allow this specified radius.
6. Mechanical Contractor to red tag all dampers to alert need for access to be provided by General Contractor and/or other trades.
7. The Contractor is responsible for maintaining objectionable air noises to a minimum. He will be called back at his own expense to correct air noises deemed objectionable by the Tenant.
8. The maximum CFM per square foot that is allowed per building standards to any space is 1 CFM per square foot.

9. When revising main duct runs that supply downstream Tenants, the duct size will not be decreased. Transition pieces will be sized accordingly. Spot checks of air volume to adjacent tenants must be made before and after revisions to assure no air reduction.
10. The Contractor shall provide and install access doors in all duct work to facilitate service and cleaning of entire duct system.
11. Mechanical systems suspended from structure shall be anchored to the floor slab ribs. Contractor shop drawings shall reflect this detail.
12. When ventilating changes are to be made, the Contractor will be responsible for providing adequate volume of air from the duct system to meet space requirements and should coordinate all work through the Project Manager.
13. Air leakage from ducts is to be minimized. Contractor to tightly seal and caulk all joints at tops and connections between existing and new construction using United Duct Sealer or approved equal. Duct sealer must meet LEED criteria for VOC content. Duct tape is not permitted.
14. All new ductwork to be sized for a minimum of one (1) CFM/SF. Fittings VAV boxes/Silencers/dampers should be designed to ensure minimum pressure drop. MMPI reserves the right to review and reject contractor shop drawings.
15. Do not use internal duct lining for thermal insulation. Supply ductwork should be externally insulated. Use of lined ductwork is not permitted as it adversely affects indoor air quality under the LEED criteria. Lined duct may only be used for sound attenuation within the first ten feet of the fan equipment and must be approved in advance by MMPI Project Manager. Where existing duct lining is exposed, it should be inspected for damage and repaired as required. All raw edges should be sealed.

BALANCING DAMPERS

1. Balancing dampers or splitters must be installed in all main and branch duct runs. Each damper shall be installed in an accessible location and constructed of galvanized steel two gauges heavier than the duct in which installed and shall be provided with locking quadrants. Splitter dampers are pivoted at one end at the common joint between the two ducts.
2. Terminal dampers must be included as integral components of each grille, register, diffuser and at the low pressure side of each VAV box with multiple outlets.
3. Damper access panels shall be provided at all balancing dampers. Contractor will be called back at his own expense to install access panels if not installed.

STEAM SYSTEMS/RADIATORS

1. Existing radiators cannot be removed under any circumstances. In some cases, radiators can be disconnected and plugged. Submit request to MMPI for approval.

2. Automatic radiator valves are available from MMPI and will be installed at no charge during showroom renovation.
3. Radiator covers shall be vented on the top and bottom, have removable covers and have practical access openings to the valves, pipes and traps. See Exhibit C-1 (attached).
4. All steam piping and radiators must have at least 2" of free area as allowance for expansion and contraction.
5. No radiator piping shall be buried in concrete floors or coverings.
6. Condensate lines are not to be connected directly to drain lines.

STEAM PIPE EXPANSION JOINTS

The tenth floor perimeter walls, including light courts, at the Merchandise Mart have a steam expansion joint at each column. Expansion joints must not be painted. These must be maintained accessible or have access panels if enclosed.

AIR SUPPLY TESTING AND ADJUSTING

Test and adjust each grille, register and diffuser to conform to the air volumes required. HVAC Contractor is responsible for providing a balance report to the Project Manager for in-house review. Final payment will not be made to Contractor until balancing is complete, accepted by MMPI and a report received.

FAN SYSTEMS

All proposed new fan and/or supplementary cooling systems must be approved by the Project Manager prior to ordering. All engineering data including assumptions such as chilled water temperatures, pressure drops, air source and steam supply as well as prints, layouts, etc., must be provided at the time of submittal. Where condenser water systems are used, flow rate to be based on 2 GPM per ton. Shell and tube condensers are required. System to have chlorine free R-410A refrigerant with 2 pumps in pump room, floor drain, drain valves, vent and curb. Pump room is to be in tenant space. No Pumps are permitted at ceiling or above ceiling height. HVAC unit layout must be approved by MMPI

MISCELLANEOUS HVAC

If the only duct work being performed is replacing diffusers, then construction drawings are not required. All other ductwork changes must be submitted on plans to the Project Manager for MMPI approval prior to installation.

MATERIAL STANDARDS

1. Ceiling diffusers: Titus model TDC Frame Type 3, 6 x 6 through 15 x 15 NK.
2. Supply Registers: Mounted on duct sides, Titus model 272 RL.

3. Thermafusers may be used on floors where constant volume systems are in place where more flexibility and temperature control is required.
4. Return Grilles: Wall mounted, Titus Core 25 model 25 RL.
5. Return Grilles: Egg crate, 1/2" x 1/2" x 1/2" high.
6. VAV boxes where applicable are Titus pressure independent with pneumatic Titus II controllers.
7. VAV boxes where applicable to be open on start-up of fan system and when fans are in smoke mode.
8. VAV boxes where applicable should be sized for approximately 0.75" to 1.25" static pressure in main duct based on relation to fan system. Static probe located 2/3rd's down duct will be set to maintain 1".
9. Thermostats for VAV: Johnson Control T-4002-201
10. Fan powered boxes are Titus pressure independent with pneumatic Titus controllers. Plenum inlet to be filtered.
11. Contractor to provide MMPI with air balance reports with nomenclature that coincides with "as built" drawings. All VAV boxes to be balanced for Code required minimum ventilation. Air balance contractor to be certified and independent from sheet metal contractor. Air balancer to review balance method with MMPI and schedule work through Chief Engineer at least one (1) week in advance of work.
12. DDC VAV boxes to be Schneider Electric (Andover Continuum).

PLUMBING SYSTEMS

LEED Initiative Goal

To maximize fixture water efficiency and reduce the burden on potable water supply and waste water system.

GENERAL REQUIREMENTS

1. All plumbing repairs, improvements and remodeling must comply with the current edition of the City of Chicago Plumbing Code and with MMPI Building Standards.
2. All piping, material, equipment, etc., to be LEED-Compliant, Energy Efficient and Energy Star Compliant.
3. Demolition of plumbing piping must be taken back to main building risers and plugged, removing all abandoned material. Plumbing fixtures, controls, trim and valves are to be returned to MMPI. Contact the Plumbing Department for disposition of same.
4. The design drawings are to indicate, to the Contractor, location and size of all connections to be made on all water, waste, vent and sewer lines and the quality of material to be used.
5. All water shutdowns must be pre-arranged through the Project Manager and initiated by MMPI Plumbing Department staff. MMPI Plumbing Department staff must restore building functions with minimum delays.
6. When off-hours work is required for work that cannot be performed during normal business hours, the Contractor must advise the Project Manager so work can be coordinated with building operations.

MATERIAL STANDARDS

Plumbing fixtures should, at a minimum, meet the Uniform Plumbing Codes (UPC) 2006 and/or International Plumbing Codes (IPC) 2006 fixture and fitting performance requirements. Submit request to MMPI for approval of use of plumbing fixtures that do not meet these requirements. All copper joints to be lead free.

1. Plumbing Hardware:

Grease Traps: Rockford Separators #1412 (14" x 12" minimum)

Liquid Soap Dispensers: Hands free / Technical Concepts

One Handle Mixing Faucets: Moen with Strataflo Checks for Pantry sinks.

Plumbing Fixtures: American Standard, Kohler. (1.6 max)

Pressure Regulators: Watts #U-5-B with valved gauge w/ 2 unions.

Sinks: American Standard Model-OvayIn #0495 . White

Slop Sinks: Kohler Triton 11 K 13639-T

Sink Faucets: Moen Commercial Faucet #8305 #8553

Stainless Steel Fixtures: Elkay, 18 gauge or equal.

Supply Stops for Fixtures: Chicago #442 I.P.S. Fixture Trim: Chrome, Brass, 17 gauge.

Toilets: American Standard Model – Aftwall / 2294.001

Toilet Flush Valves: Moen – Commercial #8311

Urinals: American Standard Model – Decorum

Urinal Flush Valves: Moen – Commercial #8315

White Toilet Seats: Kohler, Bemis or equal

2. Domestic Water Piping:

A. Risers, L copper, lead-free; Branch Lines, L copper, lead-free; brass fitting, nipples, dielectric unions; seamless galvanized pipe, with threaded joints or Victaulic system - cut groove when necessary for all pipe over 4 inches.

B. Soil and waste line service weight soil pipe; water, only Type L, copper, lead-free; waste and vent, galvanized copper.

3. Waste Line Material:

L copper, lead-free, with D.W.V. cast fittings galvanized with screw fittings or soil pipe-service weight; Downspouts soil pipe, galvanized victaulic or L copper.

4. Pipe Covering:

Minimum 1/2" fiberglass covering, 2" thick in cold areas.

5. Valves:

1/8 to 4" brass Apollo screwed 600 W.O.G 4" to 8" iron body flanged by Stockham. No solder valves permitted.

INSTALLATION STANDARDS

1. Each Tenant water service piping to have separate valves at building risers. Each group of plumbing fixtures to have separate valves.

2. Cold water meters are to be installed for Tenants using large volume of water (as determined by MMPI), such as restaurants, shower facilities, kitchen, etc. Water meters by Hersey or equal with remote read in U.S. gallons.

3. Pressure reducing valves are to be installed on equipment, appliances and water cooler so that water pressure does not exceed 50 P.S.I. Watts: U-5B.

4. Leave future, plugged openings on all water, waste and vent piping that is connected to building main lines.

5. All piping installation to have sufficient and proper hangers, cleanouts and pipe supports. No double hangers to other piping system permitted.

6. Install above-floor clean outs for new waste piping. Clean outs to be installed every 50 feet. All plumbing clean outs to be accessible from same floor the fixtures serve. Review clean out locations with Plumbing Department.
7. Location of main shutoff valves for all branch piping to be coordinated with Plumbing Department.
8. Hot water requirements are to be met by using a "Lochinvar" #EJC006-E electric six (6) gallon heater or equal located in the space under construction. Should larger capacity be required, contact the Project Manager. Heater to have a valve at the cold water inlet and a Chicago Code approved T & P relief valve. Hot water heaters should be high efficiency (e.g. Energy Star compliant).
9. All kitchen and bar sinks to have a Rockford G-1412 grease trap with a 2" drain outlet opening. Installing trap primer for kitchen/pantry floor drains is recommended. Sink disposals are not permitted.
10. A utility closet similar to that shown in these Construction Standards, see attached Exhibit P-3, must be provided when installing hot water heaters and/or grease traps.
11. Plumbing lines crossing public corridor ceilings shall be installed as high as possible. Lines running parallel to corridors is not permitted. MMPI approval is required for lines in corridors.
12. Restaurants, cafeterias and kitchens are required to connect sink lines to building kitchen waste lines.
13. No washrooms are to be located on perimeter walls.
14. When tying into existing risers or piping, use "like" materials, such as extra heavy soil pipe or galvanized schedule 40 cold water pipe. Use dielectric fittings when tying into dissimilar piping materials.
15. Schedule all plumbing shutdowns a minimum of twenty-four (24) hours in advance of work. Note that access to affected tenant space(s) may require additional planning and scheduling.
16. Soil or water lines which may sweat or produce noise complaints should be insulated.
17. All floor drains to be minimum 3".
18. Use type L copper on all water lines and drain lines under 3".
19. Locate PRV gauge downstream from PRV in utility closet.
20. All plumbing installations require a water meter including but not limited to pantry and bar sinks, food service operations and specialty water features. Meter to be installed in serviceable location and easily readable. An analog remote reader may be installed if the meter cannot be easily read.

21. Cold water to be connected to approved Merchandise Mart risers. See attached Exhibit P-2. Verify location of six (6) approved risers with Project Manager. Water connection to perimeter wet columns is not permitted.
22. See attached Exhibit P-2 for approved waste and vent connections and locations.
23. All Tenant wet column plumbing must have approval of MMPI Plumbing Department. See attached Exhibits P-1 and P-3.
24. See attached Exhibit P-3 for wet column access panel information. Panels to be 15" x 30" with 1" flange as manufactured by Milcor or equal.
25. Walls at wet column lines must have access panels. See attached Exhibit P-3.

WATERPROOFING AND FLOOD TESTING

Refer to the flooring section under "Finishes" in this document for more information on waterproofing and flood testing requirements. The flood test has to be witnessed by MMPI plumbing staff. The labor cost for this flood test is Contractor's responsibility.

SPECIALTY WATER FEATURES

Water features must meet the following design and construction criteria:

1. Water features, fountains and pools must be designed, fabricated and installed by a certified fountain and/or pool contractor.
2. Fountain contractor must submit complete shop drawings and details to MMPI for review and approval prior to fabrication.
3. Where water features are designed as a pool of standing water, a pump equipment room must be provided to maintain proper water level, chlorination, etc., per industry standards or as required by code (any and/or all governing bodies).
4. Where pump equipment rooms are required, a main shut off valve that feeds the system is required. A secondary shut off is required between the pump equipment and the pool.
5. Back flow prevention and RPZ devices are required on cold water supply side of the system.
6. A floor drain is required in the pump room, minimum 3".
7. In addition to the standard method of drainage, all fountains and pools must be designed with a secondary emergency over-flow drain in the form of a trough or drain pan. Over-flow trough and pans to be fabricated of welded stainless steel, be water-tight and tested prior to installation. Drain pans and troughs to be provided and installed in pump rooms and areas of water feature. In the event that the water feature's fill solenoid valve fails to stop pumping water, the over-flow drain shall collect water to prevent damage to premises in, around and/or below the water feature and/or pump room.

8. On water features where drains are required, a check valve is required to protect the water feature from a potential sewer back-up.
9. A waterproofing membrane is required in the area of the water feature, fountain, pool and pump equipment rooms. Membrane must be installed a minimum of 4" up all surrounding walls and be tested with standing water for 12 hours, inspected and approved by MMPI personnel. Membrane must meet MMPI building standards specs. Refer to the flooring section under "Finishes" in this document for more information on waterproofing and flood testing requirements.
10. Moisture detectors, sensors and alarms are required in the area of water features, fountains, pools and equipment rooms. Alarms must be audible and visual in nature, and if required, provide notification to the building's engineering and/or security office.

FIRE PROTECTION

GENERAL REQUIREMENTS

1. The fire protection work consists of furnishing all labor, materials, tools, equipment, services and supervision required to install, test and place into service a complete and approved fire protection system. Sprinkler permits as required shall be the responsibility of the Fire Protection Contractor.
2. The Fire Protection Contractor shall be one who is regularly engaged in the installation of automatic sprinkler systems. All sprinkler work must be in accordance with NFPA 13 – ordinary hazard – group 2, City of Chicago requirements and MMPI'S insurance company, FM Global.
3. When performing work in the buildings, all Sprinkler Contractors are to provide a 24 hour emergency phone number to Security Department and to Chief Engineer.
4. For projects with extensive fire protection construction, provide MMPI with shop drawings and hydraulic calculations before project begins and as-builts for all sprinkler construction.

SPRINKLER HEADS AND DEVICES

1. All devices and materials shall be UL listed, FM Global approved and must comply with all City and State Codes and Local Regulations.
2. Sprinkler heads, fittings, devices & pipes shall be rated for the appropriate system pressure. Minimum schedule 40 piping is required. Grooved fittings to be Victaulic Zero-flex. Review with Chief Engineer.
3. All flush type pendent heads installed in ceiling shall be chrome plated with chrome plated escutcheons.
4. All drops must be long enough to prevent cover from falling off.
5. All upright heads, sidewall heads and pendent heads connected to expose piping shall be rough brass construction.
6. All heads shall have the proper temperature rating based on City of Chicago Code requirements per area for locations in which they are installed.
7. Replace all painted sprinkler heads and sprinkler heads over thirty years in age. All 3/4" sprinkler lines shall be removed and replaced with 1" diameter lines.
8. Pre-painted, concealed-type sprinkler heads are not permitted.
9. Review sprinkler head type with MMPI. Sprinkler heads to be compatible with existing type. Project to provide attic stock to building.

10. High-Pressure sprinkler heads are required for floors 12 and below.

SPRINKLER DESIGN

1. Sprinkler coverage shall not exceed 130 square feet per sprinkler and shall comply with Code. All small rooms, including but not limited to, storage areas, offices, closets, etc., shall be sprinklered. Ensure areas with ceiling soffits and clouds comply with Code.
2. Sprinkler heads shall be no closer than six (6) feet nor further than fifteen (15) feet apart in either direction and shall comply with Code.
3. The distance from a wall to a sprinkler head shall not exceed one-half of the allowable distance between sprinklers to a maximum distance of seven (7) foot, six (6) inches to any one wall and shall comply with Code.
4. Hydraulic calculations are required for all new installations and for existing installations involving other than minor sprinkler relocations. Must be FM Global approved.
5. System design requires a minimum of schedule 40 piping for sprinklers and firehose cabinets. Grooved fittings shall be Victaulic Zero-Flex.
6. Sprinkler shutdowns and welding/hot work to be coordinated so that overlap is minimized. Contractor shall show item on project schedule.
7. Contractor to pay MMPI for sprinkler drain downs and fills as per lease schedule.
8. Minimum sprinkler design coverage and material should be in accordance with MMPI's insurance company, FM Global.
9. Areas that are not shown to have sprinkler coverage, such as elevator rooms and raised floor areas, to be reviewed with FM global.
10. All wet and dry piping to be minimum schedule 40 seamless. All fittings to be extra heavy.
11. Any mechanical fittings to be Victaulic Zero-Flex.
12. Sprinkler piping to be hydrostatically tested at a minimum of 50 psig over working pressure. Test to be scheduled and witnessed by Chief Engineer.
13. All piping to pitch as needed to properly drain system at existing drain risers.

INSTALLATION STANDARDS

1. Install sprinklers in all areas on a true axis line in both directions with a maximum deviation from the axis line of 1/2 inch plus or minus. At the completion of the installation, remove and reinstall any heads found to exceed the above mentioned tolerance.
2. All sprinkler heads in a space should present a uniform appearance. Match all existing and new sprinkler heads.
3. Demo all unused sprinkler piping to branch outlet and plug.
4. Fire sprinkler valves, fire hose connection, drains, tamper switches and flow switches will be in readily accessible enclosures and identified in the Tenant space and corridor outside the space with signs provided by the Tenant. Corridor signs referencing interior valves shall be reused or Tenant to provide new corridor signs. Obtain corridor sign copy from Project Manager.
5. All drain downs should be coordinated with the Project Manager and Chief Engineer. Fire protection systems must be returned to service at the end of each day.
6. No cross-connection between riser zones is allowed. Review zones with Chief Engineer.

LEAK DAMAGE

The Contractor shall be responsible for any damage to the work of others, the building, its contents, etc., and shall pay for the necessary replacements or repairs to work of others damaged by such leakage during the installation and testing of sprinkler systems.

ELECTRICAL SYSTEMS

LEED Initiative Goal

To improve the efficiency of the Merchandise Mart electrical systems in order to reduce energy consumption.

GENERAL REQUIREMENTS

Project Manager and MMPI Electrical Department are to be notified before starting jobs and upon completion of all electrical work.

1. Quality Assurance

- A. All work shall be in conformance with the City of Chicago Electrical Code, NFPA 70E, and Bureau of Fire Prevention. Chicago Electrical Code, NAFPA 70E, and Bureau of Fire Prevention requirements take precedence over information contained herein.
- B. A City of Chicago electrical permit number must be provided to the Project Manager and the MMPI Electrical Department before any electrical installation is begun.
- C. All products shall be new and bear a UL or CSA labels as well as manufacturer's name and address, model number, catalog number and rating. All equipment and materials, including lamps, shall be without blemish or defect.
- D. The Contractor is to pay for all permit and inspection fees.
- E. Submit to governmental agencies and utility companies all drawings required for their approval.
- F. Notify MMPI's Project Manager of any materials or apparatus believed to be inadequate, unsuitable, in violation of laws, ordinances, rules or regulations of authorities having jurisdiction.
- G. After all electrical work is completed, test the system for continuity, proper phase rotation, short circuit, improper grounds and other defects. Contractor is responsible for proper balance between phases for all new work.
- H. All work shall be performed in a first class manner by skilled mechanics.
- I. Reuse of existing materials is allowed only after Contractor has inspected the item(s) and accepted it. Contractor is responsible for the performance of existing materials.
- J. Connections, terminations, and/or alterations to energize equipment must be coordinated with building before work commences.

- K. MMPI Electrical requires a copy of all systems installed in an Auto CAD 2007 format to be submitted upon completion of job. Operator's sequence of operation shall be part of the documents for all equipment. Special switching sequences are required to be well documented at the time of job completion. A complete set of cuts of electrical equipment used in the project is also required.

2. Submittals

- A. Submit all drawings to the MMPI Electrical Department for review. Drawings should state Architect/Engineer/Building Owner.
- B. Submit an electrical load form to the Project Manager prior to performing any work, see attached Exhibit E-I.
- C. Submit installation drawings prior to roughing in conduits, sleeves, penetrations in walls and floors, and/or channeling of walls and/or floors, show to scale all electrical work inclusive of conduit, sleeves, panels, transformers, bus ducts, switchboards, terminals, pull boxes, elevations and points where conduit enters or leaves structural slabs and walls.
- D. Submit shop drawings for panels, sub-panels, lighting contactors and transformers. Include electrical ratings, dimensions, mounting, material, clearances, terminations, weights, temperature rise, sound levels and wiring and interconnection diagrams.
- E. Project record drawings shall be submitted showing circuiting, branch circuit load schedules and all as built conditions.

3. Warranty

All electrical work shall be warranted for both materials and labor for a period of one year starting from the execution of a certificate of substantial completion. In addition, Contractor shall provide a copy of the respective manufacturers' standard commercial warranties.

4. Job Conditions

- A. Contractor shall inspect the site and examine the work before submitting his proposal. He shall note the location of existing facilities, extent of his work and existing conditions.
- B. Contractor is to schedule shutdowns, disconnections and reconnections with the MMPI Electrical Department. Seventy-two (72) hours advance notice is required. Work shall be arranged so as not to interrupt any power, telephone, fire, communications or other systems during normal building hours of 8:00 AM to 6:00 PM. Where core drilling or cutting of floors and walls is required, Contractor shall x-ray area to determine and avoid interferences with existing construction. Ground Penetrating Radar is acceptable.

- C. All electrical components removed and not reused, including light fixtures, transformers, contactors, sub panels, disconnect switches, time clocks, etc., will be returned to the MMPI Electrical Department.
 - D. No Contractor will be permitted in any electrical cabinet, closet or mechanical room without prior authorization from the MMPI Electrical Department.
 - E. Keys to various electrical and mechanical areas will be authorized in writing by the Project Manager. Keys will be issued by the MMPI Security Department only. Contractors will gain access only to areas that keys are issued for.
 - F. All conduits that are abandoned shall have all wiring removed from source and stubs shall be plugged flush with floor and ceiling slabs. All exposed conduit, including that above dropped ceilings, shall be removed, unless otherwise noted, and removed from premises.
 - G. Mechanical and electrical rooms shall not be used as storage areas.
 - H. Contractor shall provide temporary power and lights to adequately illuminate the construction areas. Light fixtures must be switched and turned off every night at time job sight is locked up for the evening. Light switches shall be located inside the barricade near the entry door. Fixture must have safety basket attached. Temp lights must NOT be wired to EM circuits. Preferred fixtures are: Lithonia Industrial Worklight, #CTL400PPSL 745975136582 and CFL fixtures Garvin # TL85CFW, Tigress # 105CFL, or equal.
5. Installation of Work
- A. Contractor shall not make any connections to the existing wiring where wiring is defective.
 - B. In all cases, Contractors who install apparatuses to existing loaded circuits shall be held responsible for any overloads and improper balance. Load balance sheets are to be completed and submitted to MMPI.
 - C. All unnecessary and complicated wiring is to be avoided where possible.
 - D. Routing of conduit runs on the exterior of Tenant spaces shall be coordinated with, and approved by, the Project Manager and the MMPI Electrical Department.
 - E. Installation of circuits to public or emergency panels must be approved by the MMPI Electrical Department.
 - F. Where items such as pull boxes, junction boxes or other specialties requiring adjustment or service are concealed in construction, provide access panels as required. All access panels shall be designed to be suitable for installation in the material forming the finished surface in which the panel is mounted. Panels to be metal as manufactured by Milcor or equal. Minimum size to be 12x12.

6. Installation of Conduits and Fittings

- A. Electric metallic tubing (EMT) may be used only for lighting and receptacle branch circuits in drywall construction and in suspended ceilings only, unless otherwise approved by MMPI Electrical Department. Set-screw fittings are not permitted.
- B. Intermediate grade conduit (IMC) shall be used for feeders, exposed conduits and conduits in structural slabs, floor fills and masonry walls unless otherwise approved by MMPI Electrical Department.
- C. Heavy wall galvanized (HWG) steel conduit shall be used at all outdoor and underground locations unless otherwise approved by MMPI Electrical Department.
- D. All conduits shall run concealed except in mechanical, electrical, telephone rooms and shafts. Exposed conduits shall run parallel to building construction and be supported at required intervals. When exposed conduits are permitted to run in other than the above areas, such conduits shall be painted or marked in accordance with the Project Manager and Electrical Department's directions. Single electrical conduit runs to be hung by pendant mounted rod, parallel runs exceeding two (2) pipes are to be grouped on trapezes.
- E. Conduits run to and from cabinets shall be run neatly, in accurate manner and shall emerge from the floors and ceilings at right angles thereto.
- F. Final connections to motors shall be made through UL listed liquid tight flexible steel conduits, 1/2" minimum size.
- G. Conduits shall be separated by at least 12" from parallel runs of steam or hot water piping.
- H. Exposed conduit shall be installed after the ventilating ducts are in place and shall be run from ceiling or wall junction boxes in a manner to retain accessibility to junction box covers and to permit future removal or replacement of ducts.

7. Coring/Trenching and Patching

- A. Provide drilling, cutting, fitting and patching as necessary for the installation of conduits, wire ways and other electrical equipment. No cutting of structural work or fireproofing shall be done without the written consent of the Project Manager.
- B. Holes shall be located so as not to affect structural sections such as ribs or beams and shall be laid out in advance of cutting.
- C. Poke-thru devices must be City of Chicago approved and be plenum-rated. Flexible conduit must be no longer than 5 feet. Any conduits installed in tenant space below should be neatly laid out and installed as high as possible. They should be clearly labeled. All penetrations require safing, which shall be Hilti & 3M Fire Protection products. Fire Rating shall be as specified by Architect/Engineer.

EXISTING SERVICES/ELECTRICAL SYSTEMS

1. Metering - MMPI will furnish and install metering facilities to include the following:
 - A. KW HR and demand meters
 - B. Meter sockets
 - C. CT's and PT's
 - D. Circuit allocation in building electrical closets
2. Sub-Meters - MMPI Electrical Department will arrange for furnishing and controlling of sub metering in all areas. A meter request form shall be submitted to the MMPI Electrical Department prior to project completion for areas requiring additional metering facilities.
3. Voltage Availability - The following voltages are available:
 - A. 120/240 1 ph 3w (tenant lighting and receptacle use)
 - B. 480v 3ph 4w (mechanical equipment – special use); 480v 3ph 3w
 - C. 120/280 3 ph 4w (derived from 480v)
4. Maximum Load - The maximum permissible load for Tenant spaces shall be computed at 4.5 watts per square foot for combined lighting and power usage.
5. Branch Circuits - Branch circuits for Tenant use may be derived from the existing electrical closets or by the installation of sub panels in Tenant spaces. Note, however, that sub panels in Tenant areas can only be installed by special permission obtained from the MMPI Electrical Department. The following also apply:
 - A. Building Electrical Closet: When used to supply branch circuits, the circuit allocation shall be computed at 1 - 20 amp circuits for each 400 square feet of space. There are typically one inch home run conduits that run between the Tenant space and the existing building electrical closets that may be reused, if they exist and are reusable, for the installation of branch circuits. Consult MMPI Electrical Department for electrical closets and home run locations.
 - B. Sub-panels in Tenant Spaces: If permitted, shall be installed at the Tenant's expense. These panels and feeders shall be designed for a minimum of 125 percent of connected load. MMPI will size sub-mains to sub-panels for a maximum capacity of 4.5 watts per square foot X 125 percent. Consult MMPI Electrical Department for sub-main and service locations and approval to located panel in Tenant space.

6. Existing Home Runs - For all new or remodeled spaces, home runs shall be a minimum #10 THHN stranded wire.
7. New Home Runs/Feeders - MMPI Standard Home Runs feeders are a minimum of #10 THHN stranded, branch circuits.

MATERIAL AND INSTALLATION STANDARDS

1. Acceptable Manufacturers

- A. Generally, any one of the manufacturers listed in each category is acceptable provided the products meet the requirements.
- B. Substitutions shall be approved only by the MMPI Electrical Department. If a Contractor wishes to substitute with a non-specified manufacturer, he shall request permission to do so one week prior to the bid due date. It is the Contractor's responsibility to provide conformance to the specification.

2. Hangers, Supports and Anchors

- A. Provide hangers, angles, channels, anchors and other supports required by field conditions to install items of electrical equipment. Design of supports and methods of fastening to building structure shall be acceptable to the Project Manager and in compliance with OSHA and City Code requirements.
- B. Hangers and supports exposed to moisture or outdoors shall be hot dipped galvanized.
- C. Trapeze type hangers shall be used where two (2) or more conduits are to be installed at the same elevation. Space trapeze hangers at intervals computed for the smallest conduit to be installed.
- D. Vertical conduits shall be supported by heavy wrought iron clamps or collars anchored to building structure.

3. Metallic Conduit and Fittings

- A. Provide complete metal raceway systems and enclosures for all wiring related to the system specified. Approved manufacturers: Allied, Republic and Steelduct.
- B. Intermediate grade conduit (IMC) and heavy wall conduit (HWG) shall be hot-dipped galvanized or electro-galvanized steel.
- C. IMC and HWG conduit runs shall be made up with threaded joints and fittings.

- D. EMT couplings and connectors shall be compression type. Setscrew and indenter type fittings shall not be used. Approved conduit fitting manufacturers: Appleton, Crouse-Hinds, Raco, Steel City and T & B.
- E. Flexible conduit shall be galvanized steel, 1/2" minimum size except for lighting fixture whips that may be 3/8" minimum size. In air plenum areas or other hazardous areas, provide the type of flexible conduit in accordance with Code requirements.
- F. Flexible liquid tight conduit shall be galvanized steel with a UL approved, moisture and oil proof plastic coated jacket, 1/2" minimum size. Approved manufacturers: Anaconda, American Brass or O. Z. Gedney.
- G. When running conduits outside of the lease space, conduits should be run on racks, all piping to be at 90 degree transitions. All of this piping will need to be identified at 5 feet intervals. A complete CAD drawing showing all piping shall be submitted to the Building's Electrical Department along with the file.

4. Cable Supports

Cable supports where required by Code or shown shall be compatible with wire and cable type and conduit size. Approved manufacturers: O. Z. Gedney, T & B or Crouse-Hinds.

5. Junction and Pull Boxes

- A. Pull boxes, cable support boxes and large junction boxes for indoor use shall be made of cold-rolled gauge steel. Paint exterior surfaces with rust inhibitive paint.
- B. Boxes located in mechanical rooms shall be cast metal or alloy, fitted with screw fastened covers and gaskets and with threaded conduit connections. Fasteners shall be stainless steel or brass.
- C. Junction and pull boxes installed in air plenum ceilings shall be in accordance with Code.
- D. Weatherproof boxes shall be NEMA 3R enclosures with gasketed cores.

6. Outlet Boxes

- A. Outlet boxes shall be galvanized pressed steel, knockout type with suitable plaster rings and covers or plates. Approved manufacturers: Appleton, Raco or Steel City.
- B. Unused knockout holes shall remain closed and those opened by error shall be closed with snap-in blanks.
- C. Outlet boxes installed in plenum ceilings shall be in accordance with specified Codes.
- D. Outlet boxes for exposed interior work and all exterior work shall be case metal or alloy with screw fastened covers and gaskets and with threaded conduit connections. Fasteners shall be

stainless steel or brass. Approved manufacturers: Adalet, Appleton, Crouse-Hinds and Pyle National.

- E. All ceiling outlets installed in plaster ceiling shall be in 4 inches octagon 2 1/8 inches deep box with plaster rings of the same depth as the plaster.
- F. No more than two (2) Gem boxes shall be ganged together.

7. Wire And Cable - 600 Volt

- A. 600 volt wire and cable for branch circuit home runs shall be copper minimum #10 THHN stranded.
- B. All other branch circuit wiring shall be copper minimum #12 THHN standard except where noted otherwise.
- C. Wire insulation for controls, lighting and receptacle circuits shall be type THHN or as shown. Wire insulation type XHHW shall be used for all feeders.
- D. Wire for control circuits and signal systems shall be minimum #14 THHN, unless otherwise indicated.
- E. Wire type per MMPI is standard, except at device.
- F. Manufacturers: Anaconda, G.E., Collyer, Coleman Wire & Cable, Okonite, Phelps Dodge, Triangle.

8. Feeder Taps and Cable Splices

- A. Provide parallel clamp connector with insulating cover. GedneyjOZ type XTP, T & B "CT" Series or Ideal "GP" Series.
- B. Connector shall be constructed of an all copper alloy with bolted tangential plates which will receive the clamping pressure and redistribute the pressure uniformly over the entire surface of the clamping mechanism.
- C. Insulating cover shall be of the same manufacturer as the connectors and shall have openings suitable for the cable type being installed. Where insulating covers do not completely seal taps, tape the insulation. The insulating cover shall not kink or crimp the cable insulation when the cover is completely closed.

9. Wiring Devices

- A. Wiring devices shall be of specification grade. Each receptacle shall be constructed to include a grounding pole from which a connection to ground shall be provided. Color of devices shall be white or as directed by the Designer. Switches, 20 Amp. 120-277 volt.

Switches with pilot lights: With pilot receptacle mounted in a two gang box equipped with a suitable plate having an indicating jewel.

- B. Receptacles: 20A, 120 volt, NEMA 5-20R.

10. Panels

All access panels shall be sized to make wiring readily accessible.

11. Plates

Provide painted metal cover plates for all outlets with opening configuration suitable for devices to be covered.

12. Lighting fixtures

Whenever possible, new fixtures shall be of the high efficiency (e.g. T-8 Fluorescent, LED) or better type with low mercury content to help meet LEED standards for energy efficiency performance and low mercury lighting. All fluorescent fixtures to be internally fused. All fuse holders must be connected within 6" of ballast.

13. Exit Signs

- A. All new or remodeled spaces shall include proper exit signage. Exit signs shall be Energy Star-rated or equivalent.
- B. All exit and directional signs are to be wired to the "Building Emergency Lighting Branch Circuit panel."
- C. All exit signs must be City of Chicago approved.
- D. Approved manufacturers: Western, Alkco, or equal.

14. Emergency Battery Lights

- A. All new or remodeled spaces that exceed 1,000 square feet shall include battery operated emergency lighting
- B. All emergency battery lights shall be City of Chicago approved.
- C. Approved manufacturers: Teledyne, Lightalarm, Surelight.

- D. Base building Emergency Lighting, Stairway, and Public Lighting conduits must never be removed or buried by air ducts, water piping, etc. Relocation of such conduits and junction boxes must be approved by the Electrical Dept.
- E. Emergency Lights in the elevator lobby must be wired to the building Emergency Lighting Panels.

15. Ryan Boxes

- A. Ryan boxes are to be mounted in the electrical closets according to the zones they serve. They must be clearly labeled and the locations should be approved by the Electrical Dept. Ryan Boxes that serve spaces on floors 1 and 2 shall be mounted inside the tenant's space, within 3 feet of the tenant's electrical panel.
- B. Battery backup Emergency lights and battery Exit Signs are not to be wired to building Emergency Lighting Panels. They must be wired to a Ryan Box which is wired to the tenant's lighting panel, connected directly to the main buss detail.

16. Panels and Sub panels

- A. Main Distribution Panels
 - 1) Main distribution panels shall be indoor type, front accessible, dead front, metal enclosed with 12 gauge cold rolled steel, primed and painted with ANSI #60 gray.
 - 2) Panels shall be braced for a minimum of the available fault current.
 - 3) Provide lugs suitable for terminating copper conductors.
 - 4) Lugs intended for use with 500 MCM cables or larger shall be equipped with two mounting holes or shall be equipped to prevent rotation of lug after installation.
 - 5) Bus bars entering or leaving molded case circuit breakers shall be insulated unless circuit breakers are specifically approved for use with bare bus.
 - 6) Provide adequate space in enclosure to accommodate conductors to be installed without overcrowding.
 - 7) Allow adequate wiring and bending space to properly terminate conductors without injury to the conductor or the conductor insulation.
 - 8) The main bus shall be silver plated copper with a minimum 98 conductivity.
 - 9) Provide a main breaker sized in accordance to the Panel Schedule.
 - 10) Sub mains shall be ITE bolt on type BQ, QJ, or BL.

11) Furnish one (1) set of current transformers, bar type, installed in main distribution panel with full bus capacity, 5 amp ratio.

B. Panels - Sub panels

- 1) Panel board cabinets shall be made of 14 gauge cold rolled steel, primed and painted with ANSI #60 gray.
- 2) Devices shall be bolt on type ITE BQ or BL.
- 3) Enclosures to have hinged covers.
- 4) Breaker spaces to include all necessary bus details to accommodate future installed breaker.
- 5) Voltage, amperage and interrupting ratings for main breakers shall be suitable for the panel board in which same are installed.
- 6) Sub panels shall be equipped with a main breaker.
- 7) All bus bars are to be copper.
- 8) Approved manufacturer: Peterson Electric Panel Manufacturing Company. Substitutions to be submitted for review.

17. Lighting Contactors

Lighting contactors shall be the mechanically held type as manufactured by Asco. Lighting contactor enclosures shall have hinged covers.

18. Dry Type Transformers

- A. Transformers shall be air cooled, indoor, quiet, dry type with KVA ratings and proper system connections.
- B. Insulation materials shall be in accordance with NEMA standards for a 115 degrees Centigrade UL component recognized insulation system.
- C. Primary windings of three phase transformers shall be delta connected with not less than six 2 1/2 percent taps, 2 above and 4 below rated degrees Centigrade insulated copper conductors and shall not exceed this limit. Connections to separately mounted transformers shall be made through "Sealtite" flexible conduit. Provide supplementary grounding connection for case and neutral ground.
- D. All transformers shall be floor mounted.
- E. Transformers shall be mounted on isolation vibration springs, type as recommended by the manufacturer.

- F. The core of the transformer shall be visibly grounded to the enclosure by means of a flexible grounding conductor sized in accordance with applicable NEMA, ANSI and Code standards.
- G. Sound levels shall be limited to those allowed by NEMA standards for critical areas and shall be guaranteed, by the manufacturer, not to exceed the following:
 - 25 to 50 KVA, 40 db
 - 51 to 150 KVA, 45 db
- H. The transformer shall be listed by Underwriters' Laboratories for 115 degrees Centigrade rise.
- I. Approved manufacturers: Heavi-Duty, Sorgel Electric Corporation or Westinghouse.

19. Disconnect switches

- A. Switches shall be heavy duty type fusible or nonfusible of amperes and of voltage rating, number of poles and NEMA enclosures as required for locations. In mechanical rooms and plenum spaces, disconnect switches to be provided with padlock provisions.
- B. Fuse holders shall be equipped to accept Class R fuses only.
- C. Disconnect switches for motors shall be horsepower rated.
- D. Enclosure shall be cold gauge steel, phosphate coated, primed and finished with high grade lacquer, ANSI 60 gray color.
- E. Provide equipment disconnect switches in strict compliance with Code requirements.
- F. Approved manufacturers: Square D, Westinghouse, ITE.

20. Motors and Controls

- A. Electrical characteristics of motors shall, in general, be as follows:
 - 1) Motors ½ horsepower and larger shall be 3 phase, 60 hertz, 480 volts, high efficiency, inverter duty rated, unless noted otherwise.
 - 2) Motors 1/3 horsepower and smaller shall be single phase, 60 hertz, 115 volts, high efficiency inverter duty rated, unless noted otherwise.
 - 3) Motors 10 horsepower and larger shall be inverter duty rated, high efficiency and class H insulation.
- B. Starters for single phase, 120 volt motors shall be UL listed, manually operated, across the line type with integral thermal elements and pilot lights except that magnetic starters shall be

furnished where required for proper function. Three position selector switches shall be included in all cases where motors are interlocked or otherwise automatically controlled.

- C. Single phase starters shall be suitable for mounting in a standard box for flush recessed installations in finished areas or a surface type enclosure for exposed work.
- D. Starters for 3 phase motors, shall be UL listed, magnetic combination type with fused disconnection switch, across the line with fuse control transformers with 120 volt secondary's, minimum four additional auxiliary contacts and three overload trips. Each starter shall have "hand off auto" selector switch and red "on" indicating pilot light in cover. Where circuit breakers are used in combination with starters, they shall be provided with built-in current limiters to withstand the maximum available short circuit.
 - 1) Control transformer primaries shall be fused and not be rated less than actual line voltage.
 - 2) The minimum starter size shall be Size 1.
- E. All motors 15 Horsepower and above shall be provided with combination, closed transition, reduced voltage auto transformer type starters, UL listed and with short circuit rating exceeding the short circuit available at the starter.
- F. Heaters in motor overload relays shall be sized in accordance with the starter manufacturer's heater table for the nameplate amperes of the motors. Provide 3 overload relays per 3 phase starter, wire 1 per phase on the line side of the holding coil. Branch circuit over current devices shall be sized in accordance with the device manufacturer's recommendations for the nameplate amperes of the motors.
- G. Provide 2 N.O. and 2 N.C. auxiliary contacts in each starter.
- H. Starters serving motors which are interlocked or which are automatically controlled shall have hand-off automatic selector switches and red running lights in the cover.
- I. Extend internal wiring of control circuit to 30 ampere copper terminal blocks for connection of the following devices:
 - 1) Two (2) terminals marked T1-T2 in the "automatic" branch of the selector switch.
 - 2) Two (2) terminals marked T3-T4 wired to the ungrounded side of the starter coil and thermal overloads.
 - 3) Two (2) terminals marked T5-T6 in parallel to the coil.
 - a) Starter enclosures shall be of NEMA class as required by applicable Codes or shown on drawing.
 - b) Remote start-stop stations, where required, shall have red pilot light to indicate motor running.

- c) Pushbutton stations shall be heavy duty "unitized" type in standard combinations of pushbuttons and indicating lights. Special combinations and enclosures shall be provided as necessary for application.
- d) Manufacturer for starters, motor control devices and motor control center: Allen Bradley and Siemens exclusively.
- e) Motor leads are to have mechanical terminations and/or bolted connections.
- f) All drives must be IGBT technology and rated @ 500v and equipped with a bypass sequence.
- g) Placement of drives should not be installed near occupants sitting close or near the mounting wall of the fan room.

SPECIALTY ITEMS

1. Modular Office Partition Displays

An exception to the City of Chicago Electrical Code has been permitted for the installation and connection of factory prewired office partition furniture systems for display purposes only. Such installations must have:

- A. A sign posted on each wall assembly with 1/4" lettering indicating the following: WIRING SCHEME DOES NOT CONFORM TO CHICAGO ELECTRICAL CODE. RECOGNIZED FOR DISPLAY WITH GFCI AND 5A OCP.
- B. The supply connection made with an approved metal raceway. A flexible power supply cord is not acceptable.
- C. The supply connection installed with a Ground Fault Circuit Interrupter (GFCI) with a 5 ampere maximum over current protection.
- D. Any display showing exposed internal wiring identified as not approved by the City of Chicago.
- E. Tenants who have such displays and who need assistance including signs are to contact the MMPI Electrical Department. Note that compliance with these standards applies not only for a Market but throughout the entire year as long as the display is in place.

2. Lighting Tracks

Where lighting track is installed without specified fixture quantities and/or wattage requirements, Contractor to review and confirm fixture quantities with Designer. Report discrepancies to MM Electrical Dept.

3. Telephone Systems

Tenant is responsible for the installation of a phone system. When Tenant space is set back from the corridor lease line, drawings must indicate that the telephone cable trough must be relocated. All such work shall be done at the Tenant's expense. Tenant to contact Telephone Company to determine service entry and hookup requirements.

4. Security System

Security shall be notified as to its operation and location of control mechanisms.

5. All heat tracing must be alarm device indicating trouble.

6. Hand dryers to be Sloan Xlerator model #EHD-501.

7. Other Specialty Items

Installation of all cabling, antennas and other items outside of Tenant spaces must be approved by MMPI. Contractor and/or Tenant to provide appropriate documentation for approval.

FIRE ALARM SYSTEM

Architects and/or contractors are to supply MMPI and Johnson Controls with a complete set of fire alarm and occupant notification (speakers and strobes) design drawings in compliance with the Chicago Building Code, Americans with Disabilities Act, and Merchandise Mart Properties specifications prior to the start of installation. Johnson Controls must engineer the Fire Alarm design in each tenant space. Fire Alarm systems within tenant spaces must be installed by Rex Electric or Titan Electric. Contact for Johnson Controls, Titan and Rex are as follows:

Bryce Dearborn
Account Executive
JOHNSON CONTROLS
847-721-2769
bryce.e.dearborn@jci.com

John Finn
Senior Project Manager
TITAN ELECTRIC
630-625-1715
JPF@titan-elec.com

Steve McNamara
Senior Project Manager
REX ELECTRIC
312-251-3634
smcnamara@rexelectric.com

DRAWINGS

Design drawings must include the following:

1. Above floor finishes and ceiling heights throughout the space
2. Partition heights
3. All room designations and door swings
4. Occupant notification appliances must indicate the wattage tap (1/4 watt to 2 watts) for the speakers and the candela settings for the strobes (15, 30, 75, 110, etc.)
5. The design drawings shall include any ceiling obstructions that may block or impair the distribution of light from a strobe appliance, such as duct work, exit signs, A.V. equipment, etc.

MATERIAL AND INSTALLATION STANDARDS

1. Notification appliances shall be manufactured by Wheelock, no exceptions, as noted below:
 - A. Speakers, model E90-R round ceiling mount, model E70-R square wall mount
 - B. Strobes, RSS-24MCC-FR for ceiling or RSS-24 MCW -FR for wall mount
 - C. Combination speaker/strobe appliances E90-24MCC-FR round ceiling mount, E70-24MCW-FR square for wall mount
2. System smoke detectors shall be manufactured by EST, no exceptions: model SIGA2-PS with base SIGS-SB.
3. System monitor modules shall be manufactured by EST, no exceptions: Model SIGA-WTM to monitor additional valve supervisory switches, kitchen extinguishing system (if any), any additional waterflow switches, or any gaseous extinguishing systems.
4. Any speakers, strobes, and/or combination speaker/strobe appliances that are to be surface mounted shall be installed on a manufacturers back box: Model SBB-R square. Use of 1900 back box and extension ring for surface mounting is not acceptable.
5. The following wire shall be specified for all fire/life safety projects:
 - A. Speakers appliances, FPPL 14 gauge minimum
 - B. Strobes appliances, FPPL 12 gauge minimum
 - C. Signaling Line Circuit (SLC) wire FPPL 18 gauge minimum
 - D. Color Coding is as follows:
 - 1) Visual Circuit 1 Red / Black #12 THHN Stranded
 - 2) Visual Circuit 2 White / Blue #12 THHN Stranded
 - 3) Visual Circuit 3 Yellow / Brown #12 THHN Stranded
 - 4) Visual Circuit 4 Violet / Pink #12 THHN Stranded
 - 5) Visual Circuit 5 Orange / Grey #12 THHN Stranded
 - 6) Visual Circuit 6 Red / Black #12 THHN Stranded
 - 7) Visual Circuit 7 White / Blue #12 THHN Stranded
 - 8) Visual Circuit 8 Yellow / Brown #12 THHN Stranded
 - 9) Speaker Circuit 1 Red / Black Twisted #14 THHN Stranded
 - 10) Speaker Circuit 2 White / Blue Twisted #14 THHN Stranded
 - 11) Speaker Circuit 3 Yellow / Brown Twisted #14 THHN Stranded
 - 12) 16-2 FPLR Red and Black
6. Landlord-provided fire alarm system on each floor consists of two Data Gathering Panels (DGPs) on the WEST side at Stair 1 and two DGPs on the EAST side at Stair 4.
 - A. Each DGP has a total of 60 watts at 70VRMS or a total of 120 watts/side.
 - B. Each DGP has 8 strobe circuits or a total of 16 circuits/side.
 - C. One Signal Line Circuit (SLC) for each side of the building.
7. The Contractor must submit as-built drawings showing all devices and junction boxes that have been installed.

8. The installed devices should be marked as follows:
 - A. Control Relays, Monitor Modules, and Smoke and Heat Detectors shall be labeled with their point number on the exterior, with a P-touch®, using a white background and black text. Lettering and/or numbering must be 3/8-inch tall.
 - B. Monitor Modules and Control Relays shall also be labeled with their system number, i.e, Riser 13, Riser 16, etc. and intended functions, i.e. fire pump running, fire pump phase reversal, valve supervisory switch, dry system high/low air pressure, door closers, etc.
 - C. The back of the Smoke Detectors shall also be labeled with a permanent marker.
 - D. Junction Boxes and End of Line (EOL) Resistor Locations shall be marked with phenolic labeling using a red background with white lettering 3/8-inch size.

9. EOLs cannot be installed inside a tenant space. EOLs must be installed back at the Common Corridor Terminal Cabinet.

SUPPLIERS

Fire and Voice Alarm devices:

Bryce Dearborn
Account Executive
Johnson Controls
847-721-2769
bryce.e.dearborn@jci.com

Name Plates:

Midwest Nameplate
708-614-0606

TESTING

When the system is ready for final acceptance test, Johnson Controls and MMPI Engineers must be present to verify the system complies with all design documents. Please allow a minimum of two weeks' notice prior to the acceptance test.

DISTRIBUTED ANTENNA SYSTEM (DAS)

Contractor must review any and all work that affects the existing DAS system with MMPI and building vendor, AT&T, contact information below. Any and all modifications to existing DAS system, as approved by MMPI & AT&T, shall be done at Tenant's expense.

Tim Ramsden
Sr. Real Estate & Construction Manager –
Construction & Engineering (DAS) IL/WI AT&T Services, Inc.
O: 847-762-2130
C: 331-625-2418
tr6232@att.com

Paul Weinstein
Principal-Technical Consulting Engineer
AT&T Radio Access and RF Engineering
Office- 312.364.0461
Paul.Weinstein@att.com

sheet 1

Merchandise Mart Properties Inc.

Electrical Load Form

MM Load Form revised 9-1-12.xls

Date

See sheet 2 for fixture schedule

Tenant Name

Space #

Service Location (s)

Electrical Contractor

Foreman Name

Foreman cell #

General Contractor

Brief Description
Of Work

	Yes	No	
Existing Circuits	<input type="text"/>	<input type="text"/>	
New Circuits	<input type="text"/>	<input type="text"/>	
Split & Tag	<input type="text"/>	<input type="text"/>	"drop link" and metering work performed by in-house electricians.
Fire Alarm Work	<input type="text"/>	<input type="text"/>	If yes, provide Engineered Dwg's to Mart Electrical Dept. and AON Fire Protection Co. (see below)
Ryan Box	<input type="text"/>	<input type="text"/>	
Appliance Circuits (exceeding 30 amps)	<input type="text"/>	<input type="text"/>	If yes, provide details.
Engineered Dwg's	<input type="text"/>	<input type="text"/>	AON Fire Protection Engineering
Voice/Data Work	<input type="text"/>	<input type="text"/>	Rich Pawlish Manager rich.pawlish@aon.com (847) 953-7746
Demo	<input type="text"/>	<input type="text"/>	
Battery Back-Up and Exit Signs	<input type="text"/>	<input type="text"/>	Marc Buickel Project manager marc.buickel@aon.com (847) 953-7753
Total Connected Load	see sheet 2		

EXHIBIT E-1 (PAGE 2)

sheet 2

**Merchandise Mart Properties Inc.
Electrical Load Form Light Fixtures / Plug Loads**

Tenant

RSF 3,250
USF 2,826

Space #

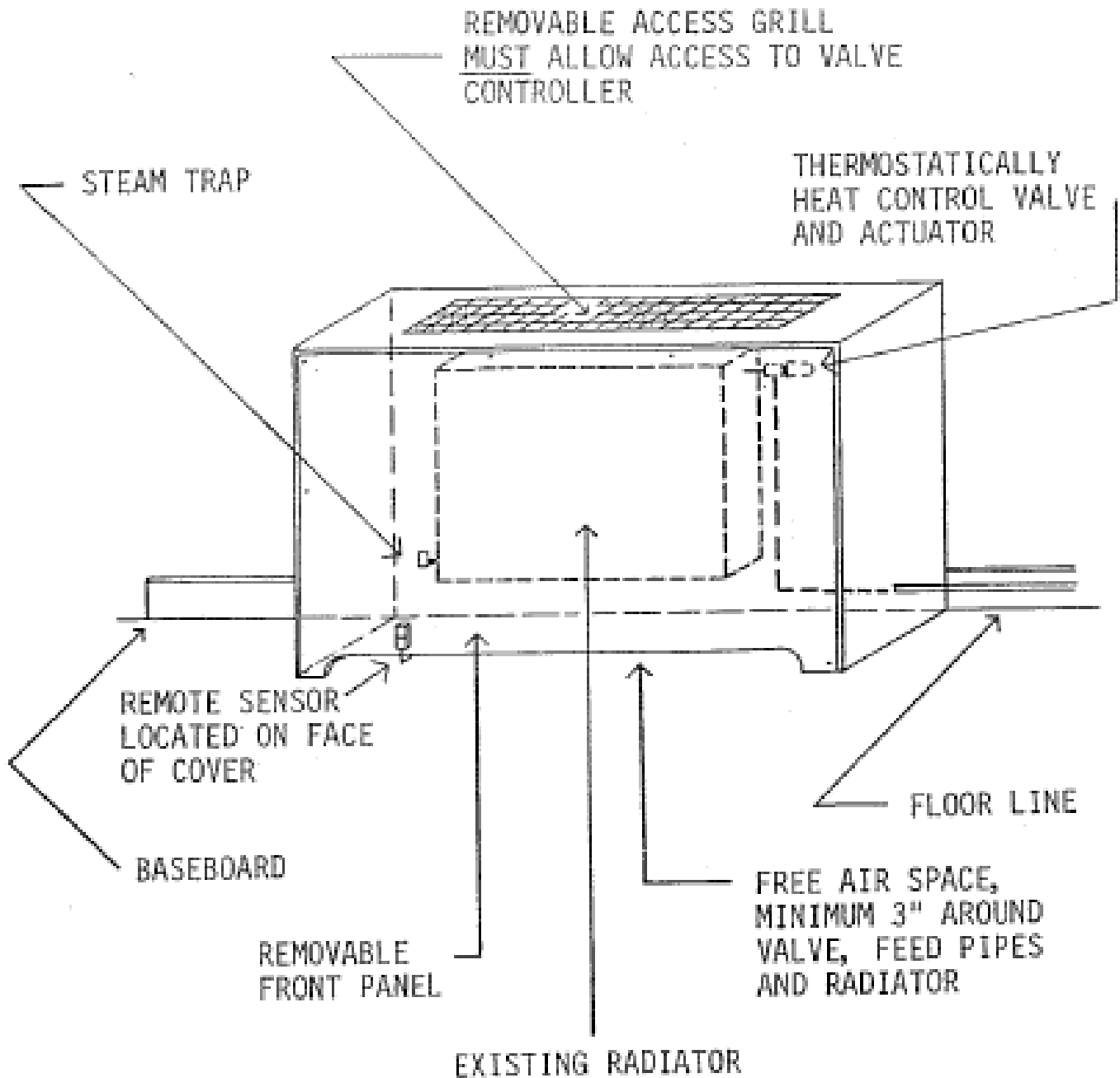
Date

Available Watts per Sq. Ft. @ 1.9	5,370	Lighting Loads	5,320
Available Watts per Sq. Ft. @ 3.5	9,891	Plug Loads	7,590
Available Watts per Sq. Ft. @ 4.5	12,717	Total Connected Load	12,910
Watts per Sq. Ft. Lighting Only	1.88		

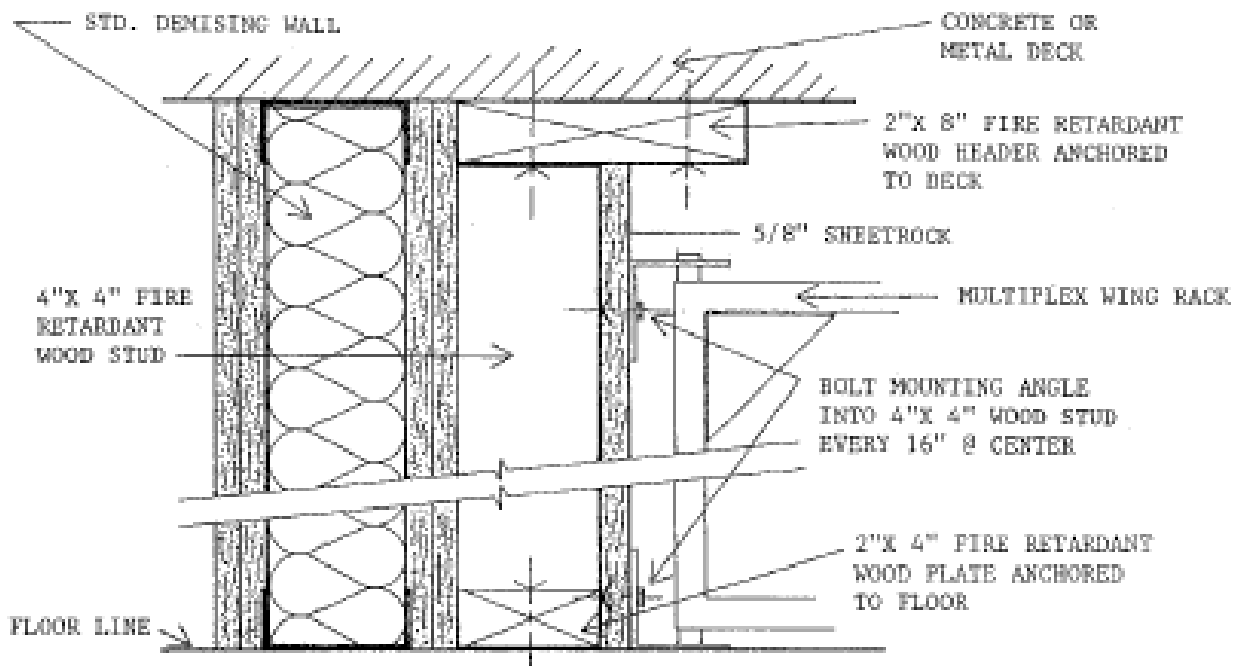
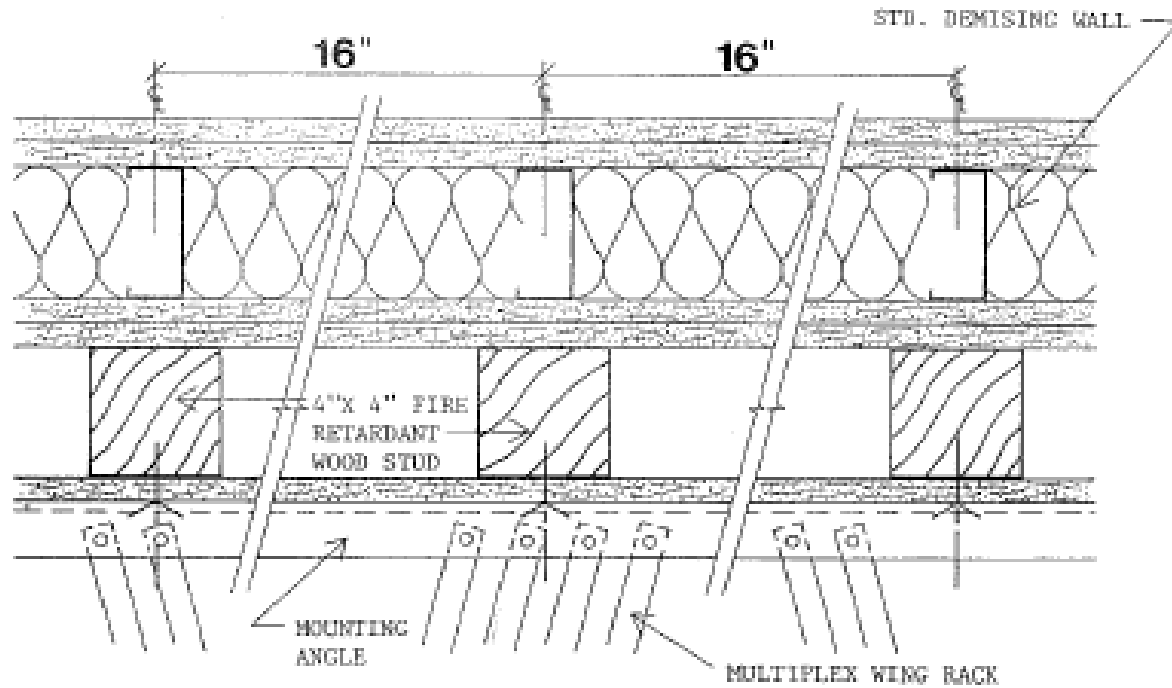
Lighting Loads: List and describe lighting fixtures:	# of fixtures	wattage (each)	type of lamp and Manufacturer	sub total (watts)
Lightolier universal trac can	20	18	Phillips LED	320
Lightolier trac can MR-16	100	50	Sylvania MR-16 / EXN	5000
				0
				0
				0
				0
				0
				0
				0
Total Watts Lighting				5,320

Plug Loads: List and describe devices	# of devices	wattage (each)	other	sub total (watts)
20 amp duplex receptacles	23	180		4140
hot water heater	1	1800		1800
copier large	1	1650		1650
				0
				0
				0
				0
				0
Total Watts Plug Loads				7,590

RADIATOR ENCLOSURE

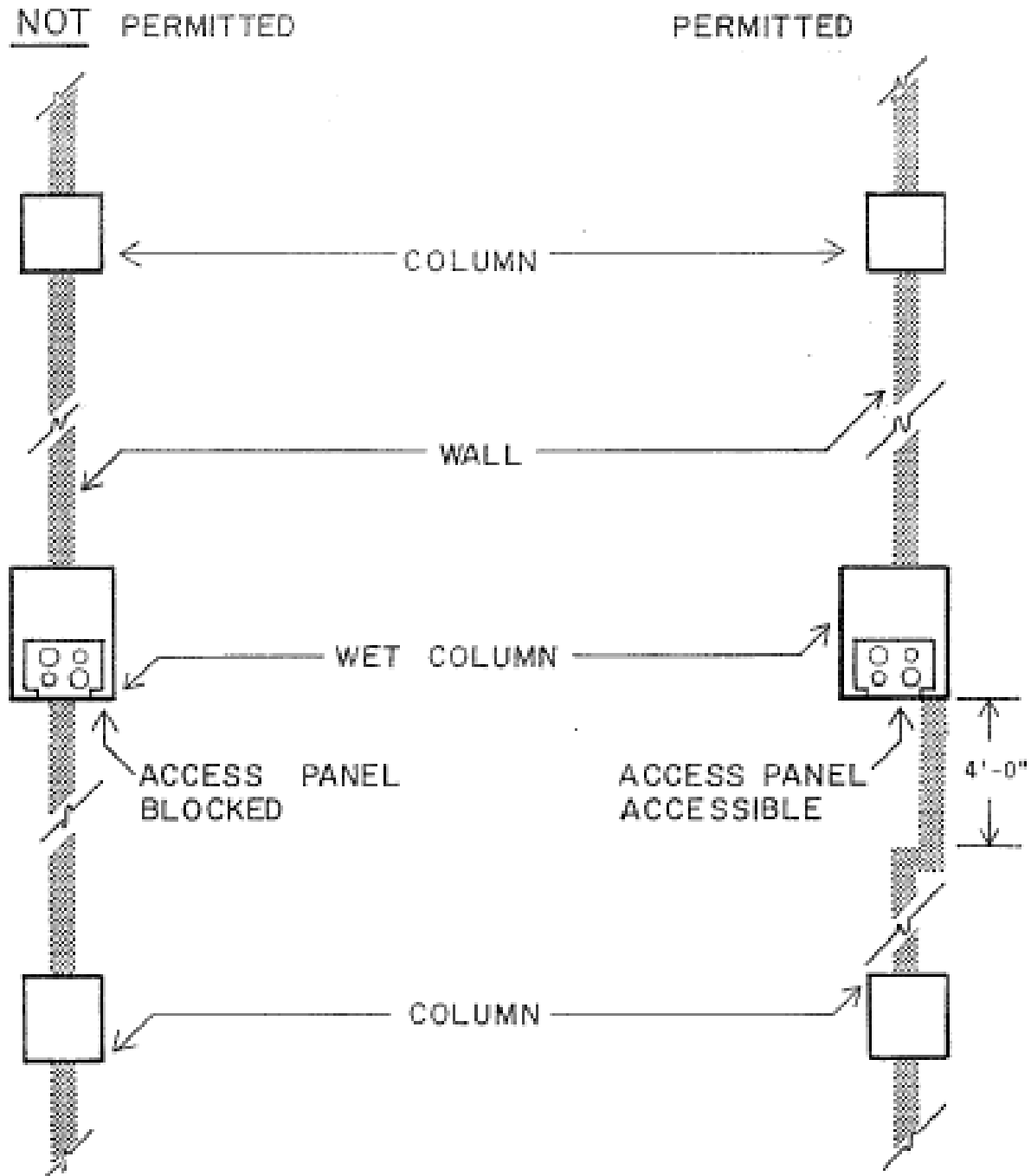


MULTIPLEX SUPPORT WALL

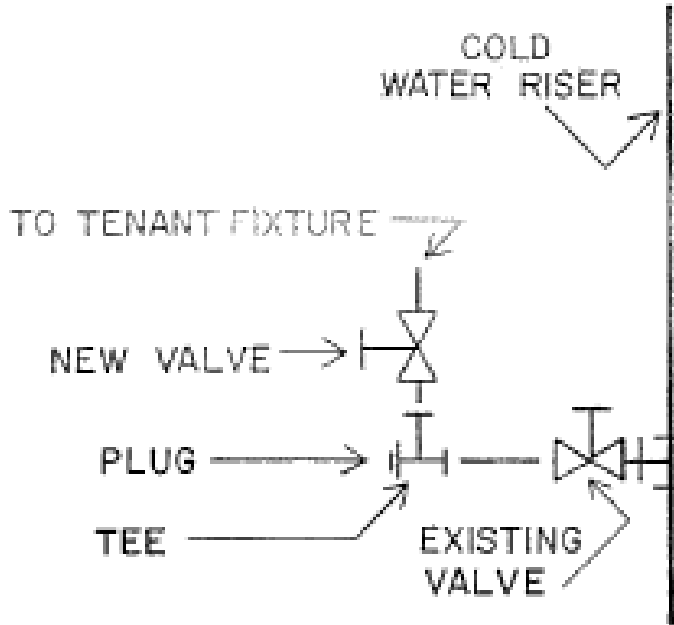


NOTE: DESIGNER TO VERIFY ALL CONDITIONS IN THE FIELD AND STRUCTURAL DESIGN OF ALL THE WALLS.

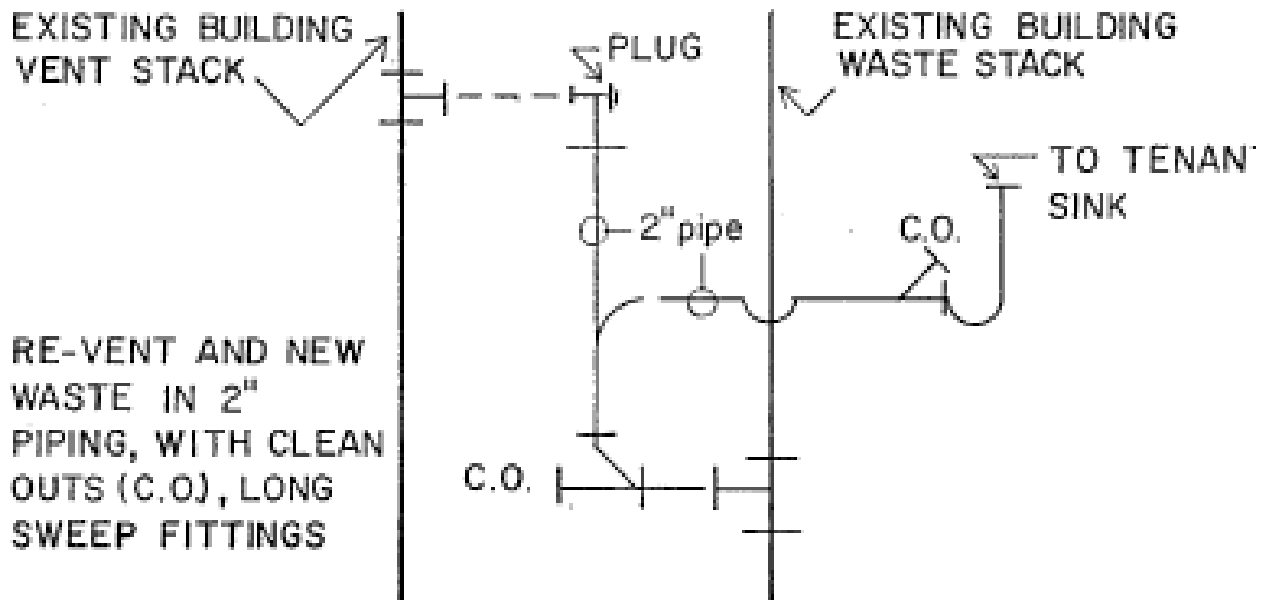
WALL LAYOUT AT WET COLUMN



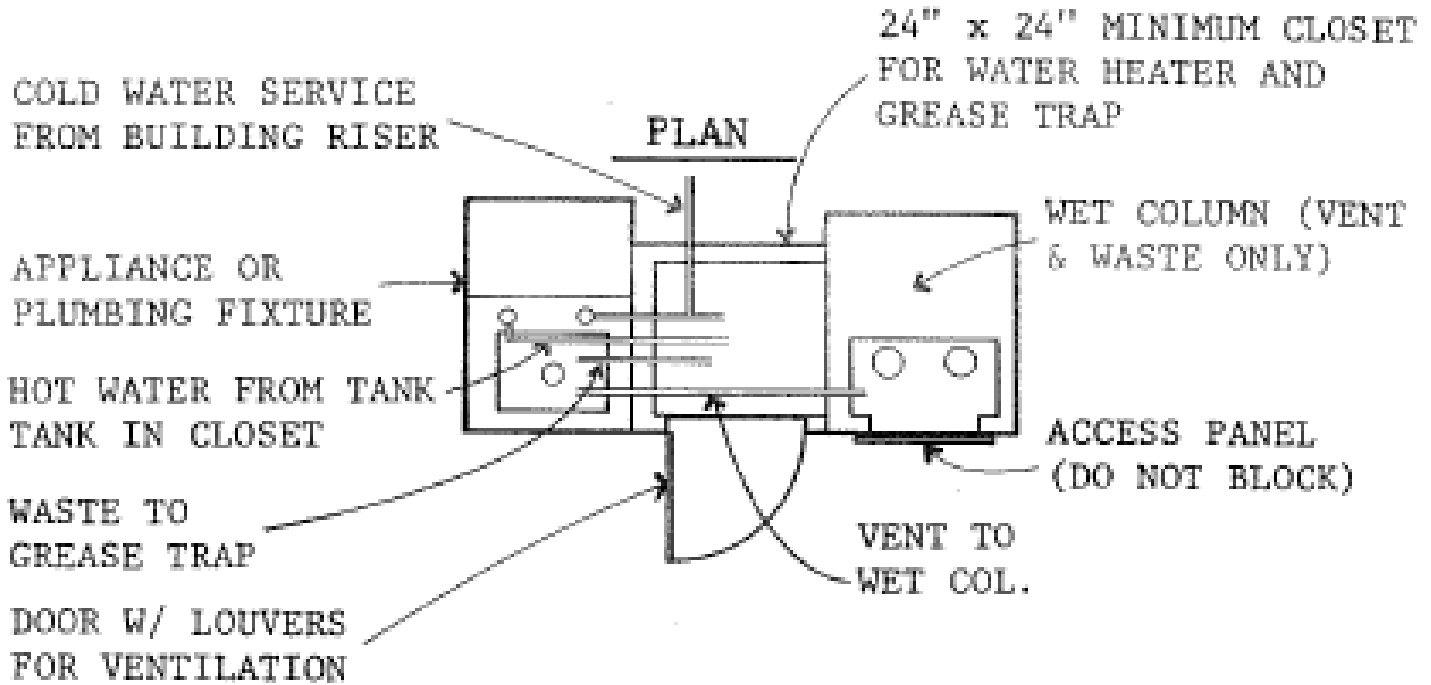
COLD WATER CONNECTION TO MART RISER



WASTE AND VENT CONNECTIONS



WET COLUMN PLUMBING IN TENANT AREA



ELEVATION

