601 CITY CENTER
OAKLAND, CALIFORNIA



Tenant Construction Standards

APRIL 1ST, 2020

SHORENSTEIN REALTY SERVICES, L.P.

TENANT CONSTRUCTION STANDARDS 2
GENERAL CONDITIONS 3
ARCHITECT OR GENERAL CONTRACTOR FORM OF INDEMNITY/ INSURANCE LETTER 13
LIEN RELEASE FORMS 18
GENERAL BUILDING INFORMATION 19
PLANNING & DESIGN GUIDELINES 20
"GREEN" BUILDING CONSTRUCTION STANDARDS 24
HAZARDOUS MATERIALS 28
GENERAL QUALITY REQUIREMENTS 29
TEMPORARY FACILITIES AND CONTROLS 31
METALS 35
WOOD AND PLASTICS 37
THERMAL AND MOISTURE PROTECTION 39
FIRESTOPPING & JOINT SEALERS 46
DOORS AND WINDOWS 48
GLAZING 56
FINISHES 58
GYPSUM BOARD ASSEMBLIES 58
ACOUSTICAL CEILINGS 62
TILE 65
RESILIENT TILE FLOORING 67
CARPET 68
VINYL WALL COVERING 70
WALL FABRICS 71
PAINTS AND COATINGS 72
FIRE EXTINGUISHERS AND CABINETS 74
PERIMETER WINDOW COVERINGS 75
ROOF ANTENNAS AND SATELLITE DISHES 76
CONVEYING SYSTEMS 77
FIRE PROTECTION 78
PLUMBING 85
HVAC 102
ELECTRICAL 138
LIFE SAFETY SYSTEM 165



TENANT CONSTRUCTION STANDARDS

The following construction procedures, requirements, conditions and standards (these "Tenant Construction Standards) are applicable to the building referenced above (the "Building", which term shall include any garage located in, under or adjacent to such building, the parcel(s) of land on which the building and/or garage are located, and any other improvements on such land, including any plaza areas). Any Vendor, Contractor, architect, designer, or consultant ("Vendor") that performs any work or service in, upon or about the Building, and any tenant, subtenant, licensee or other occupant of the Building ("Tenant") that shall engage any Vendor to perform any such work or service (the "work" or the "project", which terms shall include, without limitation, alterations, additions, improvements, renovations, retrofits and other construction or construction related services), shall upon receipt of these Tenant Construction Standards be deemed to have agreed to the provisions hereof. Any breach of these Tenant Construction Standards shall be deemed a breach under Vendor's agreement with the Building Landlord ("Landlord") and/or a breach under Tenant's lease or other occupancy agreement with Landlord, as the case may be. These Tenant Construction Standards shall be interpreted to the maximum extent possible consistent with the terms of Tenant's lease, license, or other occupancy agreement with Landlord ("Lease", which term shall include Landlord's written Consent to Sublease, in the case of a subtenant), but in the case of any irreconcilable conflict between the Lease and these Tenant Construction Standards, the provisions of the Lease shall control. These Tenant Construction Standards shall be interpreted to the maximum extent possible consistent with the terms of Vendors construction contract, service agreement or work order with Landlord ("Vendor Contract"), but in the case of any irreconcilable conflict between the Construction Contract and these Tenant Construction Standards, the provisions of these Tenant Construction Standards shall control. Shorenstein Realty Services, L.P. or Shorenstein Realty Services East LLC for New York City properties ("SRS") is Landlord's agent for purposes of these Tenant Construction Standards, and all rights and remedies of Landlord hereunder may be exercised by Landlord through SRS as Landlord's agent.

GENERAL CONDITIONS

PART 1 - GENERAL

1.0 SUMMARY

A. Field verification is required for all scopes of work. Contractor to verify field conditions including, but not limited to any sound/noise and electrical/harmonic conditions throughout leased premises in regards to design/location of offices, quiet rooms, conference room, etc.

B. Any building engineering, security, elevator, dumpster or maintenance costs related to the project shall be the joint responsibility of Contractor and Tenant and is to be paid at Landlord's prevailing rate for labor and materials.

C. Tenant shall reimburse Landlord for the costs of Landlord's and Landlord's consultants' (including architects, engineers and other construction professionals), review of the project, including, without limitation, review of the plans and specifications for the project and the MEP, fire and life safety, HVAC and structural components thereof.

D. Tenant shall pay Landlord an alterations /operations fee as provided in Tenant's Lease.

E. All new, existing, and relocated equipment and devices must be easily accessible (i.e., not blocked by new or existing construction). Re-use of MEP equipment is not recommended, and should be considered in "as is" condition.

F. All abandoned equipment, building materials, wiring, conduits, duct work, paging speaker, framing track, piping, and supports not being reused, shall be removed back to the source.

1.1 PRE CONSTRUCTION

A. Prior to the commencement of any work, Contractor shall supply three (3) sets of complete, coordinated and comprehensive, sealed and signed drawings and specifications including all relevant architectural (demolition and construction), engineering drawings (and/or structural), full MEP's including life safety, and emergency/exit lighting for Landlord's review and approval.

B. Landlord's approval of Tenant's drawings represents only Landlord's consent to the design intent shown in the plans. It does not constitute any agreement or representation by Landlord that the work called for in the plans complies with Lease requirements, applicable laws, building codes, ordinances, rules or other governmental regulations, nor does such approval relieve Tenant from its obligations to comply with the same. Landlord reserves the right to require corrections of the plans where errors are subsequently discovered.

C. Landlord must be notified during preliminary stages in the planning of any work which may involve installation through adjacent tenant spaces and or common areas of the building, such as floor coring, piping, cables, etc. No work of this nature will be

permitted unless necessary and will only be permitted with the prior written consent of Landlord. Landlord's decision to refuse such consent shall be final. Landlord may require a security guard to be with the Contractor while in the adjacent tenant's space and the cost thereof shall be the joint and several liability of Tenant and Contractor. When and if permitted, the work shall be performed only after normal business hours or on weekends agreeable to the adjacent tenant and Landlord.

D. All work shall be done in a neat and orderly manner. Contractor shall be responsible for replacing disturbed materials back to their original form. The work shall only be done by trade persons experienced and skilled for the work involved. Tenant spaces must be restored to initial condition prior to 7a.m. the next working day, unless the tenant's occupancy requires an earlier business day start.

E. Contractor shall protect all existing finished areas from damage. The flooring, walls, ceiling, lighting, furnishings, etc. shall be protected from dust and debris. If materials are transported during the course of construction; flooring shall be properly protected.

F. Contractor shall arrange a pre-job walk-thru with Landlord. Landlord must approve all on-site staging areas.

G. Throughout the area of alterations, Contractor shall provide and ensure reasonable access to all HVAC equipment (i.e. fire dampers, control devices, valves, filters) and other items that may require inspection, service or maintenance.

H. Prior to commencing any work, Contractor shall provide to Landlord documentation evidencing Contractor's substantial experience in this Locality/Municipality and building type, and with the type of work proposed.

I. Prior to commencing any work, Contractor shall provide to Landlord evidence of a current valid license recognized for the municipality where the work will be performed.

J. Prior to commencing any work, Contractor shall provide to Landlord evidence of the Contractor's ability to obtain performance and payment bonds for the project.

K. Prior to commencing any work, Contractor shall provide to Landlord a copy of all applicable permits required by the city, county, state or federal agencies. Procurement and payment for all permits are at the Tenant's and Contractor's joint and several expense. At the completion of construction, the original permit card of all approved final inspections shall be delivered to Landlord.

L. Prior to commencing any work, Contractor shall provide to Landlord an insurance certificate and additional insured endorsement certifying that the insurance coverages required by Landlord in connection with the work are in force at Contractor's sole cost and expense. Tenant shall maintain insurance coverages as required by its Lease. If Tenant contracts directly with the Architect and General Contractor for the work, prior to commencing any Work, the Architect and General Contractor will execute a Letter Agreement for Landlord which contains an indemnity and waiver and insurance coverages required by Landlord. The Architect and General Contractor shall also provide insurance certificates and additional insured endorsements certifying that the insurance coverages required are in force prior to

commencing any work (see attached Architect or General Contractor Form of Indemnity/ Insurance Letter).

M. Contractor to provide: List for Landlord's review and approval of all Contractor's and Sub-Contactor's personnel, including 24-hour emergency contact numbers for key personnel.

N. Contractor to provide: Letters from locals to verify Union affiliation for Contractor, including its respective subcontractors (when requested by Landlord).

O. Contractor to provide: An accurate and comprehensive schedule of all work, including phasing, if applicable, from project start through completion. Prior to commencing work, a pre-work conference is to be scheduled with representatives of Landlord, Tenant and Contractor to discuss the project scope and schedule.

P. Contractor shall provide and retain on the job site Safety Data Sheets (SDS) for all substances being used and provide copies to Landlord. Deliveries of hazardous materials require prior written approval from Landlord.

Q. Contractor shall ensure that all utility services (electrical, HVAC, etc.) to each suite will be provided specifically for the suite. No shared services will be accepted. When splitting an existing electrical service, the Contractor must restore electrical service to the adjacent suite. Separate metering must be provided.

R. All work on the Base Building's fire alarm system (final tie-ins and programming) will be performed by Siemens Building Technologies and coordinated with Landlord. Only Siemens Building Technologies' components can be utilized and plans must be approved in advance with Siemens Building Technologies. Contractor and Tenant are jointly and severally liable for all costs.

S. No work shall be performed that would alter the building's exterior appearance or common areas without Landlord's approval.

T. No changes to the perimeter window treatment will be accepted unless otherwise noted and approved by Landlord in its sole discretion.

PART 2 - EXECUTION

2.0 REQUIREMENTS DURING CONSTRUCTION

A. No work shall commence without Landlord's prior written approval. Work performed at a time other than during normal business hours of the Building requires 48-hour prior written notice by Contractor. Security and/or engineering charges for operation of elevators outside of normal business hours of the Building shall be charged to Tenant and Contractor, jointly and severally, at Landlord's prevailing labor and material rate. The Building's normal business hours are Monday thru Friday from 8:00a.m. to 6:00p.m.

B. Work performed by Contractor shall be performed in a first-class manner. Materials and workmanship shall be equal to or better quality and grade than that used for existing improvements.

C. Weekly progress meetings must be held. Contractor is to conduct and issue minutes for weekly progress meetings, which may be attended by Landlord's representatives. Weekly progress meetings to include review of weekly look ahead activities.

D. Tenant's Contractor shall provide to the Landlord a weekly look ahead worksheet that identifies all scheduled construction activities for one (1) week including:

1. Each day of week
2. Times of work
3. Location of work; including Floor & Suite
4. Contractors scheduled on-site
5. Brief description of scheduled work activity
6. Mobile phone number of Tenant's Contractor's primary & secondary contacts.
7. Identify with special emphasis:

    a. Any support required by Building Engineering; such a Fire Protection sprinkler drain/fill, Fire Alarm system temporary functionality modification, etc.

    b. Any work scheduled outside of typical business hours.

    c. Any access requirements into Base Building spaces; or leased space of other Tenant(s).

E. At Landlord's sole discretion, any work that does not meet Tenant Construction Standards may be ordered removed and redone at Contractor's and Tenant's joint and several expense.

F. Work performed shall not interrupt or disturb building operations, or prevent tenant's quiet enjoyment of their premises. All work including but not limited to core drilling, roto-hammering, installation of tack strips or construction that may cause excessive noise shall be done before or after normal business hours of the Building unless special arrangements are made in writing with Landlord.

G. Landlord at its sole discretion, reserves the right to refuse entrance to employees of Contractor who cannot meet and maintain the requisite standard of workmanship and/or who violate any or all of the terms enumerated herein.

H. If Hazardous Materials are present, the related work shall be performed in accordance with recommendations of the National Institute of Occupational/Safety and Health (NIOSH) and the requirements of the Occupational Safety and Health Administration (OSHA). Unless approved by Landlord in writing, all work involving hazardous materials shall be done before or after the Building's normal business hours, achieving clean air prior to commencement of the Building's normal business hours.

I. Maintain cleanliness throughout: Public areas are to be kept clean at all times. Contractor shall not clutter or block hallways, exits, service elevator lobbies, electrical

or telecommunications closets. Contractor shall provide walk-off mats at the entrance to construction areas, as well as the entrance to all elevators. Clean up is to be maintained at a satisfactory level. Failure to do so will result in Landlord's clean up at Tenant's and Contractor's joint and several cost.

J. Contractor shall properly protect all traffic areas within the tenant's leased premises and on all common building traffic areas, including freight areas, for the duration of the project.

K. On a daily basis Contractor shall vacuum, broom clean, and/or mop occupied tenant areas and the building common areas that are affected by project construction.

L. Contractor shall provide a separate receptacle for food and wet waste. Waste receptacle shall be emptied daily. No food or drink products shall be added to construction debris piles or receptacles that are not removed daily.

M. Any opening between the common building corridor or lobby and the project site is to be temporarily enclosed by means acceptable to Landlord at Contractor's and Tenant's joint and several cost until the permanent installation is completed.

N. Loading and unloading of material and/or debris boxes at loading dock or within property boundaries is to be coordinated and approved in writing by Landlord.

O. Contractor shall not secure or start any mechanical, electrical, plumbing, life safety, or other Base Building infrastructure systems without prior written approval of Landlord. Contractor shall not enter electrical, telephone/data or riser closets without written approval from Landlord and if applicable Landlord's Riser Manager. All work is to be performed in accordance with Landlord's Policies and Procedures for Communications Riser Management.

P. Contractor shall not close or open any domestic water, condenser water, Fire Protection, and/or heating hot water valves. Contractor shall request from the Landlord that Base Building systems be secured or placed back in service by a Building Engineer.

Q. Contractor shall submit a request in writing to the Building's management office 48 hours in advance if any system is required to be shutdown. Landlord's approval is required prior to any system shutdown. Certain shutdowns i.e. electrical shutdowns that affect other tenants, will require at least two weeks advance written notification and submittal of a step-by-step Method of Procedure to be reviewed and approved by the Landlord.

R. Contractor shall not secure, enable or test any life safety system without prior written approval of Landlord. The Life safety system shall be operational 24 hours per day.

S. All MEP/F work will be inspected by the Landlord. A preliminary inspection of the HVAC work shall be scheduled through Landlord prior to the installation or re-installation of the ceiling grid.

T. Contractor shall inform Landlord and shall take special measures to prevent false fire alarms when performing the following, but not limited to:

1. Welding/torching.

2. Soldering.
3. Seaming carpets with hot iron.
4. Painting with lacquers, and spray painting.

U. Hot work process: Hot work is any work that involves an open flame and/or creates hot debris. The Tenant's Contractor is responsible for managing the entire Hot work process; including issuance and closing of Hot work permits. At the beginning of the construction Project, prior to engaging in Hot work, the Tenant's Contractor shall submit to the Landlord, for review and approval, a narrative of their Hot work process including a copy of their Hot work permit form. Tenant's Contractor shall not complete Hot work until their process, including Hot work permit form, has been verified by the Landlord. From time to time the Landlord will request to review the Tenant's Contractor's Hot work permit documentation.

1. Hot work cannot occur simultaneously with a Fire Protection sprinkler impairment on the same floor.
2. Tenant's Contractor shall be the issuer of Hot work permits; and maintain all Hot work permit documentation on-site in a dedicated binder over the course of construction.
3. Hot work permits:
    a. Shall not be self-issued by sub-contractors.
    b. Shall not last longer than a single work shift and shall not apply to more than one (1) floor simultaneously.
    c. Shall be issued just prior to Hot work activities.
    d. Shall be issued to each sub-contractor, not necessarily each employee, engaging in hot work.
4. A copy of each open Hot work permit is to be posted in the immediate work area.
5. Tenant's Contractor shall:
    a. Provide a fully charged and tagged portable fire extinguisher(s).
    b. Provide basic fire safety training for all workers engaged in Hot work; as a condition of issuing a Hot work permit.
    c. Regularly check the work area for any smoldering materials following Hot work activities.
    d. Provide dedicated fire watch "spotter" personnel; as a minimum under the following conditions:
        1) Worker's field of vision is limited by PPE.
        2) Hot work occurs high above the floor.
        3) Hot debris is falling to the floor below.

V. At Landlord's sole discretion any work that will produce noxious fumes and/or compromise building air quality (i.e.: painting, wall covering installation, carpet and base installation, minor refinishing of existing millwork) shall be performed after the Building's normal business hours beginning at such time as Landlord shall direct.

W. Contractor shall ensure that fire extinguishers and all other safety measures are available to prevent fire. Contractor may request to have smoke detectors in the area of work to be temporarily disabled. Contractor shall immediately notify Landlord when the applicable work is complete so that the fire detection systems may be brought back on line as soon as possible. Any Life Safety devices that are protected or disabled for the purpose of construction are to be returned to operational status at the end of every workday.

X. In case of an accident, involving personnel or property, Contractor and Tenant shall give immediate oral (followed by written) notice thereof to Landlord. Notification shall state the location of the accident, and any actions taken.

Y. The use of any gasoline or propane driven equipment within the Building is prohibited.

Z. Radios, CD players or similar pieces of equipment are not allowed. There will be no smoking or use of tobacco products, alcohol, drugs or seeds permitted in or about the building. Smoking is explicitly prohibited inside the building and within 25 feet of any building entrance, outside air intake, and operable windows. Smoking is only allowed in designated outside smoking areas.

AA. Elevators Usage: Contractor's personnel shall use only freight elevators to access project sites. Freight elevator use is restricted: Its use shall be coordinated with Landlord.

1. Roof hatches in freight elevators will not be opened without:

    a. A hold-harmless agreement in form acceptable to Landlord, signed by each Contractor who will work in or around such elevator, **and**

    b. The presence of the elevator maintenance company at Tenant's and Contractor's joint and several expense.

2. Landlord may require Contractor to directly contract with elevator maintenance service provider for elevator related work. Contractor should arrange with elevator maintenance service provider at least 72 hours in advance.

3. Use of freight elevators after normal Building Hours shall be at Tenant's and Contractor's joint and several cost. Any damage to any elevator shall be repaired at Tenant's and Contractor's joint and several cost. If operators are required for elevators other than the freight elevator and/or on premium time, the cost shall be charged to Tenant and Contractor, jointly and severally, at Landlord's prevailing labor and material rate.

BB. Contractor is to use specified restrooms only. Use of restrooms on tenant occupied floors is not allowed. Contractor is responsible for stocking and maintaining restrooms designated for their use.

CC. Contractor's use of tenant equipment, lunchrooms, vending machines, copiers telephones, etc. is not allowed.

DD. Contractor shall be required to scan slabs prior to coring, drilling, or installation of anchors or bolts as required by Landlord. Contractor to verify all slab conditions prior to work.

a. Any coring planned in a 10' wide circumference around the Base Building Core area shall be scanned using the X-ray method prior to coring.

EE. All abandoned or unused floor cores or penetrations shall be plugged and back filled with concrete to maintain the appropriate fire rating.

FF. All Contractors, and subcontractors shall wear company supplied identification and may be required to wear building supplied building passes.

GG. All pay applications must have all required conditional lien releases, signed and on letterhead from all contractors, subcontractors, material suppliers, and laborers requesting payments for all progress billings and unconditional lien releases, signed and on letterhead from all contractors, subcontractors, material suppliers, and laborers for all previously paid work.

2.1 CLOSEOUT

A. Contractor and Tenant shall ensure that the following procedures are followed:

1. All life safety devices and systems installed in the premises shall be tested, including alarms, smoke detectors, speakers, manual pull stations, water flow switches, valve tamper switches and strobe lights. All testing is to be coordinated with Landlord and completed before or after the Building's normal business hours. The manufacturer of the Building's life safety system must certify the test results.

2. Upon the completion of the Project; Contractor may be required by Landlord, as needed, to paint electrical, mechanical rooms, freight lobbies and common corridors. Floors and walls are to be patched and painted to address damage, scratches, and graffiti etc., which may occur during the course of the project construction.

3. Electric panel schedules shall be replaced with updated schedules.

a. Prior panelboards schedules shall be left inside schedule sleeve.

4. Copies of all warranties, guarantees, and Operating & Maintenance manuals shall be delivered to Landlord.

5. Contractor shall instruct Landlord's Building Engineers in the operation of equipment and systems installed.

6. Also note specific closeout requirements listed at the end of each section; where applicable.

B. As-Built Drawings: Contractor shall provide Landlord with complete and accurate sets of as-built drawings at completion of the project. These shall include, but not be limited to:

1. Architect Floor plans at 1/8" = 1'0" scale showing all partitions, location of glass, doors, built-ins, millwork and cabinets, sinks and plumbing locations and any other generally applicable information.

2. Electrical plans at 1/8" = 1'0" scale showing all electrical receptacles, equipment power, lighting, panel schedules, and special outlets (voice and data, etc.).

3. Life Safety plans at 1/8" = 1'0" scale showing all Life Safety devices: smoke detectors, strobes, pull stations, wire runs, and the locations of the end of line resistors.

4. Reflected ceiling plans at 1/8" = 1'0" scale showing the HVAC system (duct runs, diffusers, VAV terminal units, special units, etc.) and sprinkler locations.

C. Architectural drawings shall be CAD-generated in AUTOCAD Release, most current version, (with no third party software), shall be submitted in one (1) hard copy and two (2) on disk. MEP/F drawings shall be (1) hard copy redlined as built plan(s). All shall comply with reasonable standards established by Landlord from time to time. As-builts shall include all "X-REF" drawings necessary.

1. As-builts shall show new work as well as previous conditions that remain.

2. Notation of any unique or special circumstances pertaining to construction shall be made.

D. System testing, adjusting and balancing (TAB) is to be performed by an independent Contractor under contract with the General Contractor. Approved by Landlord upon satisfactory completion of balance and operation test, three sets of tenant HVAC drawings and three air balance reports, according to the AABC standards, shall be submitted to Landlord.

E. At the completion of construction, Contractor shall submit to Landlord:

1. A Conditional Waiver and Release of Lien from the Contractor and each of its subcontractors, material suppliers and laborers, containing the appropriate provisions, as reasonably determined by the Landlord. (Additionally, upon final payment, based on legal documents specific to the property, an Unconditional Waiver and Release of Lien from the Contractor and each of its subcontractors, material suppliers and laborers, containing the appropriate provisions, is required by the Landlord.)

2. Perform a post-construction cleaning of each work area to include, but not limited to, cleaning of all windowsills, blinds, inside of perimeter windows, light

diffusers, HVAC grilles, cabinets, sinks, carpet, resilient floors, perimeter induction units, and doors.

3. Signed off permit and drawings.
4. City Recycling Summary Report, if applicable.
5. Certificate of Occupancy, if applicable.
6. Completion and signoff of applicable punch lists.
7. Provide all documentation as required on the Construction Project.

AMENDMENT

These Tenant Construction Standards may be amended or otherwise modified, or amended and restated or otherwise superseded, by Landlord upon prior written notice to Tenant. Tenant shall be responsible for delivery of any such amendments, modifications, or restatements to its Contractors, and delivery of the same by Landlord to Tenant shall constitute Landlord's delivery thereof to Tenant's Contractor.

ARCHITECT OR GENERAL CONTRACTOR FORM OF INDEMNITY/ INSURANCE LETTER

[SHORENSTEIN LETTERHEAD]

Date:

[**NAME OF GC OR ARCHITECT**]
Street Address
City, State, Zip

Re: [**General Contractor**] [**Architectural**] services being provided by [**LEGAL NAME OF GC OR ARCHITECT**] ("Contractor") to [**TENANT NAME**] ("Tenant") for Tenant's leased premises at [**NAME AND ADDRESS OF BUILDING**] (the "Building") which Building is owned by **[FULL LEGAL NAME OF OWNERSHIP ENTITY]** ("Owner")

Gentlemen and Ladies:

Owner hereby consents to Contractor performing the above referenced work/services (the "work") at the Building, subject to the terms of this letter agreement.

1. Waiver and Indemnity. Owner, Shorenstein Realty Services, L.P., Shorenstein Properties LLC, Shorenstein Company LLC, Shorenstein Management LLC, Shorenstein MB Inc., and their respective partners, managers, members, subsidiaries and affiliates and the officers, directors, agents, members, managers employees, clients, successors and assigns and authorized representatives of all the foregoing (collectively, the "Indemnified Parties"), shall not be liable to Contractor, and Contractor hereby waives all claims against such Indemnified Parties for, and releases such Indemnified Parties from liability for, any loss, injury or other damage to person or property in, on or about the work site or the Building, provided that the foregoing waiver shall be inapplicable to any loss, injury or damage resulting directly from the gross negligence or willful misconduct of the Indemnified Party seeking to enforce the waiver. Contractor shall hold the Indemnified Parties harmless from and indemnify and defend the Indemnified Parties against any and all claims, liabilities, damages, costs and expenses, including, without limitation, reasonable attorneys' fees and costs incurred in defending against the same (collectively, "Claims"), whether arising before or after completion of the work and in any manner directly or indirectly caused, occasioned by or contributed to by (a) the acts or omissions of Contractor or any agents, employees, subcontractors, licensees, material suppliers, guests or invitees of Contractor (collectively with Contractor, "Contractor Parties") in, on or about the Building, or (b) any construction or other work undertaken by or on behalf of any Contractor Party in, on or about the Building, or (c) any accident, injury or damage, howsoever and by whomsoever caused, to any person or property, occurring in, on or about the work site, except to the extent such Claims are caused directly by the negligence or willful misconduct of such Indemnified Party. The release, waiver, and covenant to indemnify, defend and hold harmless provisions set forth above shall apply to the fullest extent permitted by law.

2. Insurance. Prior to commencing any work at the Building, Contractor shall deliver to Owner an insurance certificate evidencing that Contractor maintains the insurance coverages set forth in Exhibit A attached to this letter agreement with regard to the work. (The parties acknowledge that Tenant is required to maintain certain insurance coverages under its lease at the Building and that this agreement does not release Tenant from such obligation under the lease.) At all times during the performance of the work, Contractor shall maintain (and Tenant is required under its lease to cause Contractor to maintain) such coverages in force, at its sole cost, from companies reasonably acceptable to Owner's agent, Shorenstein Realty Services, L.P. Owner reserves the right to reasonably modify the coverages in attached Exhibit A and Contractor shall comply with such reasonable modifications upon written notice from Owner of such modifications. In addition, Contractor shall cause all subcontractors, suppliers and any other person or party acting under Contractor's direction or control or on its behalf in connection with the performance of the work ("Subcontractors") to maintain in force, from companies reasonably acceptable to Shorenstein Realty Services, L.P., the types of insurance in Exhibit A that are applicable to their work or service and with limits of liability in the greater of (i) the amounts customarily maintained by such Subcontractors in accordance with industry standards or (ii) the amounts, if any, to be maintained by such Subcontractors as set forth in a written notice by Owner. As more specifically provided in Exhibit A, Contractor and all Subcontractors shall name Tenant, Owner and the other Indemnified Parties as additional insureds for ongoing and completed operations.

3. Attorneys' Fees; Miscellaneous. In the event of any action or proceeding between Owner and Contractor to enforce any provision of this Agreement, the losing party shall pay to the prevailing party all costs and expenses, including, without limitation, reasonable attorneys' fees and expenses, incurred in such action. Notwithstanding any other provision of this Agreement, the liability of Owner for its obligations hereunder is limited solely to Owner's interest in the Building as the same may from time to time be encumbered, and no personal liability shall at any time be asserted or enforceable against any other assets of Owner. In no event shall either party be liable to the other party for consequential or remote damages.

The permission granted Contractor to perform the work in the Building is conditioned upon Contractor's delivery to Owner of an original of this letter duly signed by Contractor and the insurance certificate(s) required to be maintained by Contractor under Exhibit A. Nothing herein relieves Contractor from its obligation to comply with Owner's construction standards, procedures, conditions and requirements for the Building as in effect from time to time, a copy of which shall be provided by Owner to Contractor upon request.

(continued on next page)

Please evidence your agreement with the above by signing and returning to us a duplicate copy of this letter.

Very truly yours,

[**OWNER ENTITY**] a Delaware limited liability company

By Shorenstein Realty Services, L.P., a
Delaware limited partnership, its managing agent

By_____

Name_____

Title_____

The undersigned agrees to the terms above:

[**ARCHITECT OR GC LEGAL NAME**]

By_____

Name_____

Title_____

EXHIBITS
Exhibit A – Insurance Requirements

EXHIBIT A

Insurance Requirements

- Commercial General Liability: including blanket contractual liability coverage sufficiently broad to cover the indemnification obligations above; with limits of not less than $1,000,000 Each Occurrence; $2,000,000 General Aggregate; $2,000,000 Products/Completed Operations Aggregate; $1,000,000 Personal & Advertising Injury and including coverage for broad form property damage and independent contractors. Such insurance shall be at least as broad as Insurance Services Office ("ISO") Form CG 00 01. Contractor agrees to maintain this coverage for a minimum of three (3) years following the completion of its work and to name the Indemnities as additional insureds for the entire three (3) year period. Self-insured retention, including costs of defense, shall not exceed $25,000.
- Automobile Liability Insurance, including coverage for owned, hired and non-owned vehicles, with bodily injury and property damage combined single limits of not less than $1,000,000.
- Umbrella Liability Insurance, with limits of not less than $10,000,000 per occurrence and aggregate. For exterior work at the Building, or work that affects the Building's structure, the minimum limits for Umbrella Liability shall be between $10,000,000 and $100,000,000 per Occurrence/Aggregate, which shall be specified in a written notice by Owner.
- Workers' Compensation and Employer's Liability Insurance in compliance with applicable Federal and State laws with Employer's Liability limits in the amount, if any, required by law but in no event less than $1,000,000 Bodily Injury for Each Accident; $1,000,000 Bodily Injury for Each Employee; and $1,000,000 Bodily Injury Disease Aggregate.
- Contractor's Pollution Liability Insurance, for Contractors that present a pollution exposure (i.e. hydraulic elevators, environmental contracts, construction projects where asbestos, lead paint, etc. is present), with limits of not less than $5,000,000 per claim and aggregate.
- Professional Liability (Errors & Omissions) Insurance, for Contractors that provide professional services, with limits of not less than $2,000,000 per claim and aggregate. For exterior work at the Building, or work that affects the Building's structure, the minimum limits for Professional Liability shall be $5,000,000 per claim and aggregate.
- Per-project Aggregate Limit, the general aggregate limit in the Commercial General Liability policy shall apply on a "per project" basis instead of a "per policy" basis. A copy of the actual endorsement as broad as Insurance Services Office ("ISO") form CG 2503 is required.
- Additional Insured Parties: All insurance policies other than Workers' Compensation, Employer's Liability and if required Professional Liability (Errors & Omissions) shall name Owner, Shorenstein Properties LLC, Shorenstein Company LLC, Shorenstein Realty Services, L.P. (or Shorenstein Realty Services East LLC for New York City locations), Shorenstein Management LLC, Shorenstein MB Inc., and their respective Members, Partners, Officers, Directors and Shareholders, and any other party specified

by Owner at any time and from time to time as additional insureds with respect to the work. The Commercial General Liability insurance shall provide coverage for the additional insureds at least as broad as that provided to the named insureds for both ongoing and completed operations. The limits of the coverage provided to the additional insureds shall be the greater of that set forth in this Agreement or the full limits set forth in the policy(ies).A copy of the actual additional insured endorsement as broad as Insurance Services Office ("ISO") form CG2010 1185 must accompany the certificate.

- Primary Insurance: The Commercial General Liability Policy shall provide that such insurance is primary to and non-contributory with any liability insurance carried by Owner, Shorenstein Realty Services, L.P. and the other Indemnified Parties and provide a severability of interests clause.
- Occurrence Basis of Coverage; Exceptions: All insurance policies carried by Contractor or otherwise affording coverage with respect to Contractor's work in the Building, shall provide coverage on an "occurrence" rather than a "claims made" basis. Professional Liability (Errors & Omissions) and Contractor's Pollution Liability (if required) may be provided on a "claims-made" basis so long as coverage remains in force for three (3) years after completion of the work.
- Certificates of Insurance: Prior to beginning any work, Contractor shall furnish to Owner insurance certificates completed by a duly authorized representative of their insurer certifying that at least the minimum insurance coverages required are in effect together with copies or originals of all required endorsements. Contractor shall give Owner not less than thirty (30) days' written notice prior to any cancellation or material change in coverage.
- Waiver of Subrogation, Etc.: Contractor shall cause all liability and Workers' Compensation insurance policies to provide that the insurance company waives all rights of recovery by way of subrogation against Owner, Shorenstein Realty Services, L.P. and the other Indemnified Parties, in connection with any matter covered by such policy. Contractor hereby waives any right of recovery against Owner, Shorenstein Realty Services, L.P. and the other Indemnified Parties, for any Claims for personal injury or property damage arising out of, related to or in connection with the work and for any Claims that are caused or result from risks insured against (or required to be insured against) by Contractor pursuant to the foregoing provisions.
- Financial and Business Standing of Insurance Carrier(s): All policies of insurance affording coverage with respect to Contractor's work in the Building shall be carried by insurers which are authorized to do business in the state where the Building is located and which are rated by AM Best not lower than A-VIII.

LIEN RELEASE FORMS

PART 1 - GENERAL

1.0 SUMMARY

A. Lien release forms are State specific. Landlord to provide appropriate lien release forms.

END OF SECTION

GENERAL BUILDING INFORMATION

1.0 PROJECT DIRECTORY

A. Building Owner:

601 City Center, LLC
c/o Shorenstein Realty Services, L.P.
235 Montgomery Street
San Francisco, CA
Phone # 415-421-7424

B. Building Manager:

Shorenstein Realty Services, L.P.
601 12th Street; Suite 275
Oakland, CA
Phone # 510-488-3500
Contact: Courtney Belanger, Property Manager
Contact: Mark Jones, Chief Engineer

C. Leasing:

Shorenstein Realty Services, L.P.
235 Montgomery Street
San Francisco, CA
Phone # 415-772-7086

D. Building Consulting Mechanical/Electrical/Plumbing Engineer:

Amit Wadhwa & Associates
870 Market Street (Flood Bldg.), Suite 846
San Francisco, CA 94102
Phone # 415-788-9999

E. Building Consulting Structural Engineer:

IMEG
600 Harrison Street; Suite 110 – San Francisco, CA
Phone # 415-836-9309

F. Building Riser Management:

M Networks
1950 Cesar Chavez Street; San Francisco, CA
Phone # 415-826-5105

1.0 MULTI-TENANT ELEVATOR LOBBIES, RESTROOMS AND PUBLIC CORRIDORS

A. Passenger elevator lobbies are constructed and finished according to Building standards at the discretion of the Landlord.

1. Modifications desired by Tenant shall be submitted for review and approval by Landlord (3 copies to be submitted for review and approval).

2. Design of elevator lobby shall comply with applicable codes.

3. Ceilings, vanities, fixtures, trim, lighting, mechanical and plumbing services are to be constructed and inspected by agencies with jurisdiction and approved to comply with applicable code requirements at time work is done.

B. Tenant entry doors shall conform to Building standards unless otherwise approved by Landlord.

2.0 TENANT RECEPTION AREAS AND SIGNAGE

A. Plans and specifications indicating finishes, graphics, artwork, lighting and furnishings to be used in tenant reception area, if visible from building common public area, shall be submitted to Landlord for review and approval.

B. Tenants on multi-tenant floors shall use Building standard entry identification graphics system provided by Landlord unless otherwise approved by Landlord.

1. Multi-floor tenants shall contact Landlord regarding correct spelling of company's name for entry signage before Substantial Completion of buildout.

2. Temporary signage will be provided in event that permanent signage is unavailable at move-in date.

3. Tenants will be required to give final approval and sign-off on graphics text before Landlord will be able to order entry signage.

C. Landlord will supply, install, and maintain a Building standard tenant directory on multi-tenant floors.

D. Identification signage and emergency evacuation signage on floors occupied by full-floor tenant are Tenant's responsibility and shall comply with code requirements. Signage to be submitted for Landlord review and approval prior to approval by the fire department.

3.0 TENANT DESIGN AND ENGINEERING

A. Tenant's Design and Engineering proposed improvements are to be submitted to Landlord for review and approval prior to starting any work.

B. Freight elevators have been provided with an emergency door unlock button. It is the Tenant's responsibility to modify this function for their needs; as approved by Landlord.

C. Office planners shall coordinate the placement of partitions, light fixtures and other interior systems in relation to the Base Building MEP systems.

1. Three (3) sets of plans and specifications shall be submitted to Landlord for review and approval.

2. Adequate clearance for light fixtures, MEP fixtures, etc., shall be maintained below mechanical ducts.

3. Access panels shall be provided where required to service all above-ceiling mechanical, electrical and plumbing devices, but not limited to equipment, valves and connection points, as indicated by Landlord.

4. All equipment shall be installed to allow adequate access for service and maintenance.

D. Where slab-to-slab partitions are specified, transfer ducts shall be installed to maintain the functioning of above-ceiling return-air plenum.

E. Tenant's keying and proximity card access systems shall be approved by Landlord and coordinated with Landlord keying schedule.

F. Electronic security and access control systems that are used in the path of egress for life safety emergencies shall be designed fail-safe and shall comply with applicable codes and shall be integrated with the Building Life Safety system. Alternative communication devices shall be submitted to Landlord for review and approval.

G. Modifications to Base Building HVAC or electrical systems shall be submitted for Landlord's review and approval. Special use areas within Tenant's premises, such as kitchens or computer rooms may require supplemental cooling and venting that shall be installed and maintained at Tenant's sole expense. Supplemental units shall have consumption sub-meter and shall be metered 24/7.

H. Tenants shall maintain clear access to any Base Building mechanical, telecommunications, or electrical closet within Tenant's premises.

I. Improvements visible from common and public areas are to be identified in submittal and require Landlord's review and approval.

J. Base Building Alterations: Plans and specifications for cut-outs in floor slab necessary for stairs, private elevators, or chases are to be identified and structural calculations are to be submitted to Landlord for review and approval.

K. Excess Floor Loading: Excess and unusual floor loading requirements, such as for high-density filing systems, library shelving, moveable partitions, storage areas, equipment rooms, generators, stairways, etc., are to be identified and structural calculations are to be submitted to Landlord for review and approval.

L. At Landlord's sole discretion, any work that does not meet these Tenant Construction Standards and was not properly submitted for approval may be ordered removed and redone at Contractor's cost.

M. Alterations that effect building fire life safety systems and smoke control shall be pre-approved by the Authority Having Jurisdiction and Landlord.

N. Coring requires approval of structural engineer. Scanning is required to locate core.

O. Each floor of the building has structural steel conditions that are "protected zones", where attachments, welds, cores, etc. are not permitted. Contract the Landlord for specific design information on the protected zones if work may be impacted by these restrictions.

P. When plumbing or electrical work impacts the ceiling of the tenant space below, layout must be provided to the Landlord for review and approval. Exposed plumbing and electrical work must be painted to match the existing conditions of the tenant space below.

Q. Tenant supplemental HVAC equipment shall not be integrated with the Base Building BMS.

R. Conduit routing

   a. All visible conduits shall be Electrical Metallic Tubing (EMT). Flexible Metal Conduit will not be allowed.

   b. Layout of exposed conduit in the ceiling of tenant space below must be provided in a drawing for Landlord review and approval.

   c. Landlord requires that conduit shall be installed at right angles to the exterior walls. Diagonal runs are not allowed. Conduit shall run as tight to the deck as possible, with bottom of conduit no lower than 4" from the deck.

   d. Paint conduit to match existing conditions.

   e. Landlord approval is required when conduit impacts the aesthetics of architectural elements of the space below.

S. Data Centers: Data Centers within Tenant's premises shall be metered such that energy usage data can be collected: 1) at a point downstream from any and all uninterruptible power supplies (UPS), and 2) for all IT equipment, and IT equipment only, in the data center. Metering system shall meet the U.S. Environmental Protection Agency ENERGY STAR Portfolio Manager requirements for Data Center benchmarking. Metering system shall conform to Landlord's Design Criteria as specified in this document under Electrical Section 1.3.D.13. Data Center shall be defined as any demised space of more than 500 square feet that is dedicated to high-density computing functions (e.g., server racks) and may, but not necessarily, include a raised floor, dedicated supplemental cooling system, and one or more UPS.

END OF SECTION

"GREEN" BUILDING CONSTRUCTION STANDARDS

1.0 SUMMARY

A. This section includes requirements for environmental "green" building construction standards. Adopting "green" building standards in tenant improvement projects helps to reduce the negative environmental impact of resource usage typically associated with commercial construction projects. Additionally, "green" building standards helps to minimize the comfort and health effects created during the construction process and commonly occurring following the installation of new building products. This section includes both mandatory requirements and voluntary guidelines as delineated below.

B. Where the requirements refer to Leadership in Energy and Environmental Design ("LEED"), the U.S. Green Building Council LEED-Commercial Interiors Rating System ("LEED CI") or LEED-Operation and Maintenance Rating System ("LEED O+M") is the referenced document. It will be the responsibility of Contractor to identify and implement the most current Rating System version that applies to the Project.

2.0 MANDATORY GREEN BUILDING STANDARDS

A. Waste Management

1. Adhere to LEED O+M, MR Credit, Solid Waste Management - Facility Maintenance and Renovation, including but not limited to:

   a. At least 70% of non-hazardous demolition and construction waste, by weight or volume, will be recycled for all projects.

   b. Contractor will provide documentation of performance toward this goal as part of Closeout Package.

2. Contractor will establish a project waste management plan that includes the following components: a waste diversion goal (70%), the materials for diversion, the volume of waste anticipated, safe storage location, appropriate waste removal procedures, and diversion strategies to be used.

3. Comply with all local jurisdiction construction waste management requirements.

B. Indoor Air Quality (IAQ)

1. Ventilation System Design: Adhere to LEED CI, EQ Prerequisite, Minimum Indoor Air Quality Performance.

2. Ventilation System Construction: Adhere to LEED O+M, MR Prerequisite, Facility Maintenance and Renovation Policy, including but not limited to:

   a. Meet or exceed the control measures of the Sheet Metal and Air Conditioning National Contractors Association (SMACNA) "IAQ Guideline for Occupied Buildings Under Construction," 2007 (2nd edition), Chapter 3, as it may be amended, supplemented or replaced from time to time.
   b. Isolate work areas to prevent contamination of clean or occupied areas.

c. Clean the construction area daily.
d. Seal air registers during construction.
e. Shut down the return side of HVAC systems if possible.
f. If air handlers must be used during construction, filtration media with a minimum MERV 8 rating must be used at each return air grill, as determined by most current version of the ASHRAE 52.2 standard.
g. Replace filters on HVAC units with filtration media as specified in the final design prior to occupancy.
h. The construction space and affected ventilation ducts shall be thoroughly cleaned of all waste, dust, residues, and particles after construction has ended.
i. Flush-Out: Contractor shall determine whether, following installation of all interior finishes and completion of all construction but before occupancy, a flush-out or air quality testing is needed. If any materials containing VOCs or formaldehyde were used in construction, flush-out shall be required until no detectible odor remains in the space.
j. Contractor shall notify the Landlord at least two full business days prior to commencement of extremely dusty work (sheet rock cutting, sanding, extensive sweeping, etc.) so arrangements can be made for additional filtering capacity on the affected HVAC equipment. Failure to make such notification will result in Contractor absorbing the costs to return the equipment to its proper condition. Contractor will not proceed with work until filter installation has been completed. Failure to wait for notification of filter installation prior to commencing work will result in Contractor absorbing the costs to return the equipment to its proper condition. All recessed lights must be covered during high dust construction due to plenum return air systems.

C. Sustainable Purchasing

1. Adhere to LEED O+M, MR Credit, Purchasing – Facility Maintenance and Renovation, including but not limited to:

a. Products and Materials: At least 50%, by cost, of the Base Building construction materials purchased will meet the LEED purchasing criteria for LEED O+M, MR Credit, Purchasing – Facility Maintenance and Renovation.

b. Furniture and Furnishings: To the extent reasonably possible, furniture and furnishings will meet the LEED purchasing criteria for LEED O+M, MR Credit, Purchasing – Facility Maintenance and Renovation.

c. Contractor shall provide documentation of the quantity, unit cost, and sustainability attributes of each material being procured.

D. Mechanical, Electrical, and Plumbing Requirements

All building specific information is located in the respective sections of this document.

1. Adhere to LEED CI, EA Prerequisite, Minimum Energy Performance.

2. Lighting Motion Sensors: Vacancy Sensors (manual ON/auto OFF) with manual override are mandatory for all construction. Daylight responsive controls shall be located as per local code. The Building lighting control system is Lutron Quantum.

3. Exit Lights lighting source is to be Light Emitting Diodes (LED). Follow Building Standards for model and style of LED Exit signs.

4. Heating, Ventilating, Air Conditioning and Refrigeration Equipment

   a. Adhere to LEED CI, EA Prerequisite, Fundamental Refrigerant Management.

   b. Adhere to LEED O+M, EA Prerequisite, Fundamental Refrigerant Management, including but not limited to:

   c. Heating, ventilating, air conditioning and refrigeration (HVAC&R) equipment shall not contain CFC.

   d. Once-through, potable water cooling systems shall not be used.

5. All Light fixtures shall be LED with Dimming Drivers compatible with the Base Building Lutron Quantum lighting control system.

6. Variable Air Volume (VAV) boxes

   a. When installing new VAV boxes, use Direct Digital Controls (DDC).

7. Faucets

   a. Adhere to LEED CI, WE Prerequisite, Indoor Water Use Reduction, or local standard if more stringent, for all restroom sinks, kitchen sinks, and shower heads.

      i. Where available, Contractor shall install products certified by the U.S. Environmental Protection Agency's Water Sense program, it being understood that flow requirements stated above shall still be required of the Water Sense-certified products.

8. Low Flow Fixtures

   a. Adhere to LEED CI, WE Prerequisite, Indoor Water Use Reduction, or local standard if more stringent, for all toilets and urinals.

      i. Where available, Contractor shall install products certified by the U.S. Environmental Protection Agency's Water Sense program, it being understood that flow requirements stated above shall still be required of the Water Sense-certified products.

9. Commissioning Process

   a. Adhere to LEED CI, EA Prerequisite, Fundamental Commissioning and Verification.

E. Equipment and Appliances

1. Contractor shall install products certified by the U.S. Environmental Protection Agency's ENERGY STAR program for electric powered equipment:

   a. Audiovisual equipment

   b. Kitchen, Break Room and Food service equipment

F. Water and Energy-Efficient Construction Practices

1. Contractor shall use resource-efficient construction practices including, without limitation, water conservation, turning off lights and turning off or adjusting heating, ventilating and air conditioning systems that are in use during the project.

END OF SECTION

HAZARDOUS MATERIALS

SUMMARY

A. Section Includes: Hazardous materials special procedures.

1. The Contractor shall comply with Title 8 of the California Code of Regulations (Cal-OSHA) and Title 29 of the Code of Federal Regulations (OSHA) for all safety and labor requirements. The Contractor shall also comply with Title 27 of the California Code of Regulations and Title 40 of the Code of Federal Regulations (EPA). The Contractor shall also have a current copy of the Shorenstein's California Hazardous Materials and Conditions Operations and Maintenance Program Manual and comply with additional requirements of Shorenstein's Manual.

a. Obtain copy from Landlord.

END OF SECTION

GENERAL QUALITY REQUIREMENTS

1.0 SUMMARY

A. This section describes general quality control requirements.

1. Quality control in general.
2. Manufacturers' field services.
3. Mock-ups.
4. Testing laboratory services.

B. Related Requirements:

1. Refer to applicable Codes and Specifications sections for test requirements.

1.1 QUALITY CONTROL, GENERAL

A. Maintain quality control over suppliers, manufacturers, products, services, site conditions, and workmanship, to produce work of specified quality.

1.2 MANUFACTURER'S FIELD SERVICES

A. When specified in respective Specification sections, require manufacturer or supplier to have qualified personnel provide on-site observations and recommendations.

1. Observe field conditions, including conditions of surfaces and installation.
2. Observe quality of workmanship.
3. Provide recommendations to assure acceptable installation and workmanship.
4. Where required start, test, and adjust equipment as applicable.

B. Representative shall submit written report to Landlord, Tenant and Architect listing observations and recommendations.

1.3 MOCK-UPS

A. Erect field samples and field mock-ups at locations on site as approved in advance and in accordance with requirements where included in Specifications section.

1. Test mock-ups requiring special equipment may be erected at location having access to necessary equipment; coordinate with Landlord, Tenant and Architect.

B. Field samples and mock-ups not approved and not capable of being acceptably revised shall be removed from site.

C. Approved field samples and mock-ups may be used as part of Project.

1.4 TESTING LABORATORY SERVICES

A. An independent testing laboratory shall perform inspections, tests, and other services required by applicable codes and various Specification sections.

1. Landlord, Tenant, or Architect may also require independent testing of items where doubt exists that product or system conforms to Contract Documents.

2. Contractor shall employ and pay for testing laboratory unless Landlord or Tenant has agreed to pay.

    a. Testing laboratory shall be approved by Landlord prior to beginning testing.

B. Services shall be performed in accordance with requirements of governing authorities and with specified standards.

C. Reports shall be submitted to Landlord giving observations and results of tests, indicating compliance or non-compliance with specified standards and with Contract Documents.

1. Where required, testing laboratory will submit copy of test results directly to enforcing agency.

D. Contractor shall cooperate with testing laboratory personnel; furnish tools, samples of materials, design mix, equipment, storage and assistance as requested.

1. Notify Landlord, Tenant, Architect, and testing laboratory sufficiently in advance of expected time for operations requiring testing services.

END OF SECTION

TEMPORARY FACILITIES AND CONTROLS

1.0 SUMMARY

A. This section describes temporary construction facilities and temporary controls, all of the following to be coordinated and approved by Landlord.

1. Electricity and lighting
2. Heat and ventilation
3. Water and sanitary facilities
4. Construction aids
5. Temporary enclosures
6. Barriers
7. Cleaning during construction
8. Project identification
9. Field offices, telephone service, and storage
10. Removal
11. Project Access
12. Emergency Response

B. Provide temporary construction facilities and temporary controls as required to conform to applicable authorities and as required to complete Project in accordance with Contract Documents.

1. Contact governing authorities to establish extent of temporary facilities and temporary controls required by authorities.

2. Contact Landlord to establish extent of temporary facilities and temporary controls required by Landlord.

1.1 ELECTRICITY AND LIGHTING

A. Provide electrical service required for construction operations, with branch wiring and distribution boxes located to allow service and lighting by means of construction-type power cords.

1. Connection to existing electrical service is permitted and to be coordinated with Landlord. Use of power or outlets outside of project area prohibited unless otherwise approved.

B. Provide lighting for construction operations.

1. Permanent lighting may be used during construction; maintain lighting and make routine repairs.

1.2 HEAT AND VENTILATION

A. Provide heat and ventilation as required to maintain specified Tenant Construction Standards operation, to protect materials and finishes from damage due to temperature and humidity.

1. All returns and exhaust air shall be protected with filtration prior to start of work. Location, install and method of filtration to be reviewed and approved with the Landlord.

B. Coordinate use of existing facilities with Landlord.

1. Supplement with temporary units as required to maintain specified Tenant Construction Standards operations, and to protect materials and finishes from damage due to temperature or humidity.

1.3 WATER AND SANITARY FACILITIES

A. Provide water service required for construction operations; extend branch piping with outlets located so water is available by use of hoses.

1. Connection to existing facilities is permitted but must be coordinated with the Landlord.

B. Provide and maintain required sanitary facilities and enclosures.

1. Designated existing facilities may be used during construction operations, as approved by Landlord; Contractor to maintain in sanitary condition. Failure to maintain assigned facilities in acceptable condition will result in the revoking of such privileges and the use of portable facilities at the loading dock.

2. Additional required sanitary cleaning may be charged back during project if facilities are not maintained.

1.4 CONSTRUCTION AIDS

A. Noise, Dust Pollution Control, First Aid and Safety: Provide materials and equipment necessary to comply with local requirements for noise, dust pollution control, First Aid and Safety.

B. Fire Protection: Maintain on-site fire protection facilities as required by the Authority Having Jurisdiction and Insurance carrier requirements.

C. Use of Existing Facilities:

1. Existing stairs shall not be used.

2. Designated freight elevator may be used, coordinate use with Landlord; provide protective coverings for finish surfaces of elevator cars and entrances.

D. Protection Requirements:

1. Protect all corridors, freight elevators, and lobby doors to project site.

2. Protect all glazing, mullions, window coverings, and doors in project site.

1.5 TEMPORARY ENCLOSURES

A. Provide temporary partitions as required to separate work areas from occupied areas, to prevent penetration of dust and moisture into occupied areas, and to prevent damage to existing areas and equipment.

1. Construction: Framing and sheet materials with closed joints and sealed edges at intersections with existing surfaces; Flame Spread Rating of 25 in accordance with ASTM E84 unless otherwise approved by Landlord.

2. Paint surfaces exposed to view in occupied areas, in accordance with Landlord's Corporate Sign Standards.

1.6 BARRIERS

A. Provide barriers as required to prevent public entry to construction areas and to protect adjacent properties from damage from construction operations.

B. Provide barricades as required by Landlord's Corporate Sign Standards.

1.7 CLEANING DURING CONSTRUCTION

A. Control accumulation of waste materials and rubbish; recycle or dispose of off-site.

B. Clean interior areas prior to start of finish work, maintain areas free of dust and other contaminants during finishing operations.

C. Provide separate containers for food waste. Food waste to be removed daily.

1.8 PROJECT IDENTIFICATION

A. Signs: Subject to approval of Landlord; not typically permitted.

1.9 FIELD OFFICES, TELEPHONE SERVICE, AND STORAGE

A. Office: Maintain field office within Project space, with lighting, electrical outlets, data outlets, heating, ventilating equipment, and equipped with furniture.

1. Telephone Service: Maintain telephone service to field office.

B. Storage for Tools, Materials, and Equipment: Limit on-site storage to Project area; provide weather-tight storage, with heat and ventilation for products requiring controlled conditions.

1. Maintain adequate space for organized storage and access.

2. Provide lighting for inspection of stored materials.

1.10 REMOVAL

A. Remove temporary materials, equipment, services, and construction prior to Substantial Completion Inspection.

B. Clean and repair damage caused by installation or use of temporary facilities.

C. Restore existing facilities used during construction to specified or original condition.

1.11 PROJECT ACCESS

A. All access and deliveries to project site shall be through the loading dock and freight elevators. Passenger elevators shall not be used.

1. The loading dock roll-up gate opening is 14’6” tall by 25’6” wide.

B. Access or deliveries through common areas and main lobby shall be by Landlord approval only.

END OF SECTION

METALS

METAL FABRICATIONS

1.0 REFERENCES – American Welding Society (AWS): D1.1, Structural Welding Code.

2.0 MATERIALS

A. Steel Shapes, Plates and Bars: ASTM A36.

B. Structural Steel Sheet: Hot rolled, ASTM A570; or cold rolled, ASTM A611, Class 1; of grade required for design loading.

C. Steel Pipe: ASTM A53, Type S seamless, grade as selected by fabricator and as required for design loading; minimum standard weight, STD or Schedule 40.

D. Steel Tubing: Cold formed ASTM A500; or hot rolled, ASTM A501; minimum Grade B; seamless where exposed.

E. Castings: Gray iron, ASTM A48, Class 30; malleable iron, ASTM A47.

F. Concrete Inserts: Threaded or wedge type; galvanized ferrous castings, malleable iron ASTM A47, or cast steel ASTM A27. Provide bolts, washers and shims as required, hot-dip galvanized, ASTM A153.

G. Grout: Non-shrink meeting ASTM C1107, non-metallic, pre-mixed, factory-packaged, non-staining, non-corrosive; type specifically recommended by manufacturer as applicable to job condition.

H. Fasteners and Rough Hardware: Type required for specific usage; provide zinc-coated fasteners for exterior use or where built into exterior walls.

I. Welding Materials: AWS D1.1, type required for materials being welded.

J. Paint: Provide primers as recommended by paint manufacturers for substrates and paints specified in Paints and Coatings.

3.0 EXECUTION

A. Handrails: When tested according to ASTM E935, handrails to be capable of withstanding following:

1. Concentrated loads (e.g. of 200 foot-pounds) per code applied at any point in any direction.

2. Uniform loads of (e.g. 50 foot-pounds) per code per linear foot applied in any direction.

3. Uniform and concentrated loads are not to be assumed to act concurrently.

B. Guardrails: Design, fabricate, and install top rails at guardrail locations that, when tested according to ASTM E935, are capable of withstanding following:

1. Concentrated loads of (e.g. 300 foot-pounds) per code applied at any point in any direction.

2. Uniform loads (e.g. of 100 foot-pounds) per code per linear foot applied in any direction.

3. Uniform and concentrated loads are not to be assumed to act concurrently.

4. Erection: Perform field welding in accordance with AWS D1.1.

END OF SECTION

WOOD AND PLASTICS

ARCHITECTURAL WOODWORK

1.0 CERTIFICATION

A. Certification: Provide WIC Certified Compliance Label on shop drawings.

B. General: Before delivery to jobsite, provide WIC Certified Compliance Certificate indicating grade of millwork products to be furnished and certify WIC requirements for specified grades shall be met.

C. Casework:

1. Each unit to bear Woodwork Institute of California (WIC) Certified Compliance Label.

2. Forest Stewardship Council (FSC) certified.

3. No added urea-formaldehyde resins.

D. Plastic Laminate Countertop:

1. Each unit to bear WIC Certified Compliance Label.

2. No added urea-formaldehyde resins.

E. Installation: Provide WIC Certified Compliance Certificate for Installation.

1.1 QUALITY ASSURANCE

A. Fabricator Qualifications: Member of WIC with minimum five years successful experience fabricating architectural woodwork similar to that required for project.

B. Standards: Perform architectural woodwork in accordance with recommendations WIC Manual of Millwork.

1. Installation Certification Program: Install work in this section as specified in the WIC Manual of Millwork, and provide WIC Certified Compliance Certificate for installation at completion of Project installation.

2. Contractor Option: Perform architectural woodwork in accordance with Architectural Woodwork Institute (AWI) “Quality Standards, Guide Specifications and Certification Program.”

a. Millwork Cabinetry is to be AWI 400, Premium Grade.

b. Other Millwork shall be AWI 1700 Premium Grade.

c. Standing and Running Trim are to be AWI 300 Premium Grade.

d. Frames are to be AWI 900 Premium Grade.

e. Paint Grade Shelving is to be AWI 600 Custom Grade.

C. Field Measurements: Take field measurements prior to preparation of shop drawings and fabrication where possible; do not delay job progress, allow for trimming and fitting.

D. Wood Blocking: Fire retardant treated, conforming to AWPA C20 for lumber and AWPA C22 for plywood, and meeting UL FR-5 rating.

2.0 FINISHES

A. Transparent Finished Woodwork: Shop finish architectural woodwork.

1. Transparent Finish: WIC/Premium Grade clear finish producing a dull rubbed effect, as approved by Architect.

2. AWI Finish: "Wood veneer" and "stained wood veneer" items to receive transparent finish equal to AWI Finish System No. 2, Transparent Catalyzed Lacquer, sheen and color to match Architect's sample as approved by Landlord and to match approved submittals.

B. Opaque Finished Casework: Shop finish.

1. Opaque Finish: WIC/Premium Grade opaque "lacquer" finish producing a semi-gloss effect, as approved by Architect.

2. AWI Finish: "Paint grade" items to receive shop painted finish equal to AWI Finish System No. 10, Conversion Varnish, color to match Architect's sample as approved by Landlord and to match approved submittals.

END OF SECTION

THERMAL AND MOISTURE PROTECTION

BUILDING INSULATION

PART 1 - GENERAL

1.0 MATERIALS

A. Thermal Batt Insulation: Preformed slag mineral or glass fiber with thermosetting resin binders conforming to ASTM C665.

B. Thickness/R-Value: Fill space to receive insulation; minimum R-13 at walls, R-19 at horizontal surfaces, unless otherwise approved by Landlord.

C. Flame Spread/Smoke Density Rating: Maximum 25/450, ASTM E84.

PATCHING EXISTING FIREPROOFING

PART 1 - GENERAL

1.0 GENERAL**:** Comply with all of the Contract Documents.

1.1 SCOPE OF WORK: Refer to “Division Scope of Work” in architectural plans or similar.

1.2 QUALITY ASSURANCE

A. Fireproofing work shall be performed by a firm certified acceptable to the sprayed fireproofing material manufacturer.

B. Products, execution and fireproofing thickness shall conform to the applicable code requirements for the fire-resistance ratings called for.

1.3 REFERENCES

A. ASTM Standards

1. E84 – Standard Test Method for Surface Burning Characteristics of Building Materials.

2. E119 – Standard Methods of Fire Test of Building Construction and Materials.

3. E605 – Standard Test Methods for Thickness and Density of Sprayed Fire-Resistive Material Applied to Structure Members.

4. E736 – Standard Test Method for Cohesion/Adhesion of Sprayed Fire-Resistive Material Applied to Structural Members.

5. E759 – Standards Test Method for Effect of Deflection on Sprayed Fire-Resistive Material Applied to Structural Members.

6. E760 – Standard Test Method for Effect of Impact on Bonding of Sprayed Fire-Resistive Material Applied to Structural Members.

7. E761 – Standard Test Method for Compressive Strength of Sprayed Fire-Resistive Material Applied to Structural Members.

8. E859 – Standard Test Method for Air Erosion of Sprayed Fire-Resistive Materials Applied to Structural Members.

9. E937 – Standard Test Method for Corrosion of Steel by Sprayed Fire-Resistive Material Applied to Structural Members.

B. Test Methods for abrasion and impact resistance developed by the City of San Francisco Bureau of Building Inspection.

C. Underwriter's Laboratories, Inc. (UL) Fire Resistance Directory (Latest Edition).

D. Uniform Building Code Standard No. 43-8: Thickness and Density Determination for Spray-Applied Fireproofing.

E. AWCI Publication: Inspection Procedure for Field Applied Sprayed Fire Protection Materials.

1.4 SUBMITTALS

A. Manufacturers' Data: Submit manufacturer's instructions for proper application of sprayed fireproofing. The Contractor will research the W.R. Grace website to find the most up to date version of the specification http://www.na.graceconstruction.com/. The Contractor shall comply with all manufactures recommendations and procedures.

B. Test Data: Laboratory test results for fireproofing shall be submitted for the following performance criteria specified, upon request:

1. Bond Strength per ASTM E736.

2. Compressible Strength per ASTM E761.

3. Deflection per ASTM E759.

4. Bond Impact per ASTM E760.

5. Air Erosion per ASTM E859.

6. Corrosion Resistance per ASTM E937.

7. Abrasion Resistance per City of San Francisco Bureau of Building Inspection Test Method.

8. Impact Penetration per City of San Francisco Bureau of Building Inspection Test Method.

1.5 DELIVERY, STORAGE AND HANDLING

A. Material shall be delivered in original unopened packages, fully identified as to manufacturer, brand or other identifying data, and bearing the proper Underwriters' Laboratories, Inc. labels for fire hazard and fire-resistance classification.

B. Material shall be stored (above ground), under cover and in a dry location until ready for use. All bags that have been exposed to water before use shall be found unsuitable for use and discarded. Stock of material is to be rotated and used prior to its expiration date.

1.6 PROJECT/SITE CONDITIONS

A. An air and substrate temperature above 40°F must be maintained for 24 hours before, during and for 24 hours after application of the sprayed fireproofing. If necessary for job progress, General Contractor shall provide enclosures with heat to maintain temperatures.

C. General Contractor shall provide ventilation to allow for proper drying of the fireproofing during and subsequent to its application. In poorly ventilated areas lacking natural ventilation, forced air circulation will be required. Further detail is in section 3.2 (Mechanical Drying of Fireproofing).

PART 2 - MATERIALS

2.0 MATERIALS

A. The sprayed fireproofing material shall be cementitious fireproofing, as manufactured by the Construction Products Division of W.R. Grace & Co., or its processing distributors, formulated without asbestos or approved equal as determined by Architect.

B. Materials shall be "WR Grace Retro Guard" factory-blended cementitious fireproofing with blue color added from the manufacture or in the field, applied to provide compliance with all drawings, specifications and the following performance test criteria.

1. Dry Density: The field density shall be measured, in accordance with ASTM STANDARD E605. Minimum average density shall be 15 pcf, and minimum individual density shall be 14 pcf, unless otherwise required by the authority having jurisdiction.

2. Deflection: Material shall not crack or delaminate from the surface to which it is applied when tested in accordance with ASTM E759.

3. Bond Impact: Material subject to impact tests in accordance with ASTM E760 shall not crack or delaminate from the surface to which it is applied.

4. Bond Strength: Fireproofing, when tested in accordance with ASTM E736, shall have minimum bond strength of 200 psf.

5. Air Erosion: Maximum allowable weight loss of the fireproofing material shall be 0.005 gm/ft^2 when tested in accordance with ASTM E859.

6. Compressive Strength: The fireproofing shall not deform more than 10 percent when subjected to compressive forces of 1200 psf when tested in accordance with ASTM E761.

7. Corrosion Resistance: Steel with applied fireproofing shall be tested in accordance with ASTM E937 without evidence of corrosion of the steel.

8. Abrasion Resistance: No more than 15 cm^3 shall be abraded or removed from the fireproofing substrate when tested in accordance with test methods developed by the City of San Francisco Bureau of Building Inspection and required by the U.S. Navy (NAVFAC).

9. Impact Penetration: The fireproofing material shall not show a loss of more than 6 cm^3 when subjected to impact penetration tests in accordance with the test methods developed by the City of San Francisco Bureau of Building Inspection and required by the U.S. Navy (NAVFAC).

10. Surface Burning Characteristics: Material shall exhibit the following surface burning characteristics when tested in accordance with ASTM E84:

Flame Spread	0
Smoke Development	0

C. The sprayed fireproofing material shall have been tested and reported by Underwriter's Laboratories, Inc. in accordance with the procedures of ASTM E119.

D. Mixing water shall be clean, fresh and suitable for domestic consumption and free from such amounts of mineral or organic substances as would affect the set of the fireproofing material.

E. Products utilized shall be free of asbestos containing materials.

PART 3 - EXECUTION

3.0 WORKMANSHIP

A. All surfaces to receive sprayed fireproofing shall be free of oil, grease, paints/primers, loose mill scale, dirt or other foreign substances which may impair proper adhesion of the fireproofing to the substrate. Where necessary, cleaning of surfaces to receive fireproofing shall be the responsibility of the Structural Steel Erector, or General Contractor, as outlined in the structural steel or steel deck section.

B. Confirm compatibility of surfaces to receive sprayed fireproofing material:

1. The project architect shall determine whether the painted/primed steel substrates have been tested in accordance with ASTM E119, with specified sprayed fireproofing material, to provide the required fire-resistance rating.

a. Painted or primed steel surfaces may require a fire-proofing bond test to determine if the paint formulation will impair proper adhesion. Determination of the compatibility of paint or primer with the sprayed fire-proofing shall be the responsibility of the paint or primer manufacturer.

b. Rolling compounds or lubricants are commonly used in the manufacture of steel decking. The compounds may impair proper adhesion of fireproofing to the substrate. Steel deck specification section shall call for the deck manufacturer to supply decking free of amounts of these compounds or oils which would significantly impair the adherence of the fireproofing.

C. Prior to application of fireproofing, clips, hangers, support sleeves and other attachments required to penetrate the fireproofing shall be in place.

D. Ducts, piping, equipment or other suspended matter which would interfere with application of fireproofing materials shall not be positioned until fireproofing work is complete.

E. Prior to application of the fireproofing to the underside of steel decking, concrete work above shall be complete.

F. On roof decks without a concrete cover, complete all roofing applications and roof mounted equipment installation prior to application of the fireproofing to the underside of roof decking and supporting beams and joists. Prohibit all roof traffic upon commencement of the fireproofing and until the fireproofing material is dry.

G. Provide masking, drop cloths or other satisfactory coverings so as to prevent over-spray of sprayed fireproofing.

H. Application of sprayed fireproofing shall not begin until the design consultant, General Contractor and the Fireproofing Applicator has inspected the surfaces to receive fireproofing to determine if surfaces are acceptable to receive the fireproofing material.

I. Equipment and application procedure shall conform to the material manufacturer's application instructions.

J. All patching and repairing of sprayed fireproofing, due to damage by other trades, shall be performed under this section and paid for by the trade(s) responsible for the damage.

3.1 QUALITY CONTROL

A. Architect may select, and will pay an independent testing laboratory to sample and verify the thickness and density of the fireproofing in accordance with provisions of ASTM E605. "Standard Test Methods for Thickness and Density of Sprayed Fire-Resistive Materials Applied to Structural Members", the "Inspection Procedure for Field Applied Sprayed Fire Protection Materials" as published by the AWCI, or Uniform Building Code Standard No. 43-8 entitled "Thickness and Density Determination for Spray-Applied Fireproofing."

B. The results of the above tests shall be made available to all parties at the completion of floor.

3.2 MECHANICAL DRYING OF FIREPROOFING

A. Mechanical Drying of the fire proofing shall be designed and engineered with the following minimal standards taking into account site conditions.

B. When connecting the mechanical drying equipment to the building power the following must be followed:

1. Temporary equipment connections, to building electric distribution:

a. All temporary equipment connections to the building electrical distribution will be made via the use of a properly sized, UL approved, fault rated, circuit breaker device. An approved electrical Contractor will make all connections.

b. A branch circuit load analysis will be performed to verify that the temporary equipment load requirements, will not overload existing load distribution equipment, prior to any connections being made.

C. Within 24 hours of starting the application of the re-spray fireproofing mechanical drying shall start.

D. When 50 % of the re-spray application is completed when the construction involves more than 10,000 square feet the Contractor shall partition off with plastic (fire resistant) the completed 50% of the total area and provide mechanical drying at 50% of the total engineered design.

E. When 75% of the re-spray application is completed 100% of the mechanical drying machines shall be placed in service.

F. The fire resistant plastic partition shall remain until there is 100% completion of re-spray application. The 100% complete re-spray does not include the minor application activities associated with spot re-spray after the assessments for thicknesses.

G. All mechanical drying shall be of desiccant dehumidification and deliver at least less than 30% Relative humidity air at greater than 85°F.

H. Within 72 hours of 100% completion of re-spray application the relative humidity in the construction area shall average below 60% relative humidity measured in all zones.

I. The Contractor “shall place fans on all of the columns”, so if there are 40 columns throughout the space the Contractor will place 40 fans during the mechanical drying process and additional fans shall be placed to create air flow in one direction.

J. The Contractor shall remove all water condensation from all of the windows to keep windows free from condensation using wet dry vacuums. The condensation removal shall be done at a minimum of at least daily or more depending on the site conditions.

K. The Contractor shall monitor the relative humidity and temperature to calculate the dew point to ensure that the mechanical drying system is able to remove moisture from the construction space and prevent condensation on surfaces.

L. The Contractor shall take measurements of the moisture concentrations of the fireproofing using a moisture meter calibrated for concrete and plaster. The readings shall be taken in all areas that represent the different thicknesses of application less than 2 inches and greater than 2 inches. The fireproofing shall be considered dry when the all of the representative samples are below 15% moisture concentration.

M. The Contractor shall submit records of the measurements after the completion of the work and request approval from the landlord or landlord representative that the mechanical drying is complete. The landlord shall provide the Contractor with a letter of acceptance of the drying and concur that the mechanical drying system can be removed.

3.3 CLEANING

A. After the completion of fireproofing work, application equipment shall be removed, and other surfaces not to be sprayed shall be cleaned of any applied fireproofing material.

3.4 FIRE-RESISTIVE RATING

A. Fire Resistive Ratings: As indicated by reference to fire resistive designs listed in UL FRD or in the comparable publication of another testing and inspecting agency acceptable to authorities having jurisdiction, for fire resistive assemblies where sprayed-on fireproofing serves as direct-applied protection, tested per ASTM E119.

B. Surface-Burning Characteristics: As indicated for each sprayed-on fireproofing product required, tested per ASTM E84.

3.5 GUARANTEES

A. Guarantee all items of work furnished and installed under this Section for (1) one year, in addition to manufacturer’s standard warranties. All guarantees to be from the date, when **Final Certificate of Occupancy** is issued.

END OF SECTION

FIRESTOPPING & JOINT SEALERS

PART 1 - GENERAL

1.0 SYSTEM DESCRIPTION

A. Design Requirements: Provide materials tested in accordance with following standards, unless otherwise specified.

1. American Society for Testing and Materials (ASTM) Publications:

a. ASTM E84, Surface Burning Characteristics of Building Materials.
b. ASTM E119, Fire Tests of Building Construction and Materials.
c. ASTM E814, Fire Tests of Through-Penetration Fire Stops.

B. Firestop all new penetrations and joints within work area.

C. Firestop all existing penetrations and joints within area of work.

1.1 QUALITY ASSURANCE

A. Regulatory Requirements: Comply with local City and State Building Codes, Uniform Building Code Chapter 7 requirements for fire stopping, including both F Ratings and T Ratings as applicable.

B. Installer shall be trained by the product manufacturer for installing materials.

PART 2 - PRODUCTS

2.0 MATERIALS - FIRESTOPPING

A. Penetration Test: Furnish materials passing ASTM E814 for penetration fire stopping indicating maintenance of time-rated adjacent assemblies.

1. Additional Tests: Where required by applicable authorities, provide materials passing ASTM E119 time-temperature fire conditions for fire ratings for assemblies.

2. Flame Spread: ASTM E84 flame spread rating of 25 or less.

3. Smoke Developed: ASTM E84 smoke developed rating of 450 or less.

B. Fire stopping: Maintain fire rating of assembly in which fire stopping is installed, such as floor, partition, or wall, in accordance with ASTM E119 tests.

2.1 MATERIALS – JOINT SEALERS

A. Elastomeric Sealants:

1. Mildew-Resistant Silicone Rubber Sealant: ASTM C920, Type S, Grade NS, Class 25, compounded with fungicide, specifically for mildew resistance and recommended for interior joints in wet areas.

B. Non-Elastomeric Sealants:

1. Acrylic-Emulsion Sealant: ASTM C834 acrylic or latex-rubber-modified acrylic sealant, permanently flexible, non-staining and nonbleeding; recommended for general interior exposure.

PART 3 - EXECUTION

3.0 PREPARATION

A. Prepare joint surfaces in accordance with ASTM C1193 and as recommended by joint sealer manufacturer.

3.1 INSTALLATION

A. Comply with manufacturer's printed instructions and ASTM C1193, except where more stringent requirements are shown or specified.

END OF SECTION

DOORS AND WINDOWS

WOOD DOORS

PART 1 – GENERAL

1.0 References

A. Existing doors being reused are to be refinished as necessary

B. National Wood Window and Door Association (NWWDA): I.S.1 Series Industry Standard for Wood Flush Doors.

C. Quality Marking: Provide quality marking on each door certifying compliance with applicable requirements of NWWDA I.S. 1, or provide certification of compliance.

PART 2 - PRODUCTS

2.0 MATERIALS

A Solid Core Flush Wood Doors: WIC/Premium Grade, Type A, 1-3/4" thick solid wood framed glued block or particleboard core five ply construction.

1. Forest Stewardship Council (FSC) certified.

2. NWWDA I.S.1: In addition to WIC, conform to requirements of NWWDA I.S.1; where conflicts occur, comply with most restrictive requirement.

3. Transparent Finished Door Face Veneers: WIC/Premium Grade veneers for stained finish; minimum 1/30” (0.033” thick) before sanding; match Building standard doors.

4. Opaque Painted Face Veneers: WIC/Premium Grade White Birch veneers for opaque pain finish; minimum 1/30” (0.333” thick) before sanding; match Building standard doors.

5. Edges: Stile edges to match face veneer, minimum 1-1/8" thick after trim.

6. Core: Bond stiles and rails to core and sand prior to assembly of face veneers.

7. Bond Type: Type II Bond, interior.

8. Size: 3’-0” by 8’-10” (Field verify height) each leaf.

PART 3 - EXECUTION

3.0 INSTALLATION

A. Install fire rated wood doors in accordance with requirements for specified fire label and requirements of NFPA 80.

1. Field cutting of fire rated doors is not acceptable.

3.1 ADJUSTING AND CLEANING

B. Check and readjust operating hardware items immediately before final inspection. Leave work in complete and proper operating condition. Remove and replace defective work that is warped, bowed, or otherwise unacceptable.

C. Remove grout and other bonding material from work immediately after installation.

D. Touch-up surfaces as needed.

E. Rehang or replace doors that do not swing or operate freely.

STEEL DOORS AND FRAMES

PART 1 – GENERAL

1.0 REFERENCES

A. Steel Door Institute (SDI): SDI-100 - Recommended Specifications - Standard Steel Doors and Frames.

B. National Association of Architectural Metal Manufacture. (NAAMM): Hollow Metal Manual.

C. Underwriters Laboratories: Standards as applicable to fire rated doors and frames.

PART 2 - PRODUCTS

2.0 MATERIALS

A. Frames: Conform to SDI-100 and NAAMM Hollow Metal Manual.

B. Fire Rated Units: In addition to SDI and NAAMM, construct in accordance with requirements for fire rating, UBC Standard 7-2, and NFPA 80.

2.1 FABRICATION

A. Conform to requirements of SDI or NAAMM.

B. Provide jamb anchors per SDI-100 and NAAMM; weld floor jamb anchors in place.

PART 3 - EXECUTION

3.0 INSTALLATION

A. Install doors and frames in accordance with SDI-100 and SDI-105 or NAAMM "Hollow Metal Manual" and with manufacturer's recommendations and installation instructions.

3.1 ADJUSTING AND CLEANING

A. Check and readjust operating hardware items immediately before final inspection. Leave work in complete and proper operating condition. Remove and replace defective work; including hollow-metal work that is warped, bowed, or otherwise unacceptable.

B. Remove grout and other bonding material from work immediately after installation.

C. Touch-up surfaces as needed.

D. Rehang or replace doors that do not swing or operate freely.

INTERIOR ALUMINUM FRAMES

PART 1 – GENERAL

1.0 REFERENCES

A. International Conference of Building Officials (ICBO): Research Recommendations for Fire Rated Aluminum Frames and UBC Standard 7-2.

B. Underwriters Laboratories Inc. (UL): Building Materials Directory.

1. Materials tested, labeled and inspected by Warnock Hersey International are acceptable upon approval of authorities.

C. National Association of Architectural Metal Manufacturer (NAAMM): Metal Finishes Manual.

PART 2 – MATERIALS

2.0 MATERIALS

A. Composed of at least 75% recycled aluminum, or as available.

B. Manufactured regionally within a radius of 500 miles, if available.

C. Type: Knock-down (field assembled) door frames; extruded aluminum, ASTM B221, 6063-T5 alloy, profile as directed by Architect.

D. Fire Rated Frames: Provide fire rated frames as approved by California State Fire Marshal and ICBO.

PART 3 - EXECUTION

3.0 INSTALLATION

A. Install aluminum frames in accordance with recommendations of manufacturer.

B. Comply with NFPA 80 for fire rated frame installation.

ACCESS DOORS AND PANELS

PART 1 - GENERAL

1.0 SUMMARY

A. Provide access doors set in finished surfaces.

1. Provide access doors and panels as required for access to controls and valves behind finished surfaces including any equipment requiring maintenance, such as heat pumps, VAV boxes, fan coils, exhaust fans, etc.

2. Coordinate with various trades for controls, equipment and valves that may be concealed.

3. Provide steel access doors and panels in gypsum board walls and drop-in fiber reinforced gypsum access panels at hard ceiling surfaces as required to service new and existing plumbing, mechanical, and electrical equipment at locations indicated by Landlord.

4. Concealed access panels (doors) shall be used at all public corridors and lobbies.

5. Duct access doors shall be finished such that there are no sharp edges at the duct.

1.1 FIRE RESISTANCE RATINGS

A. Where required provide access door assembly from manufacturer listed in Underwriter's Laboratories, Inc. "Classified Building Materials Index" for rating shown.

1. Provide UL label on each rated access door.

2. Materials tested, labeled and inspected by Warnock Hersey International are acceptable upon approval of authorities.

DOOR HARDWARE

PART 1 – GENERAL

1.0 SUMMARY

A. General Requirements for Electrically Controlled Hardware.

1. Fire Rated Doors: If retrofitting an existing rated door, assembly conditions to be maintained. Re-rating of door is required.

    a. Electric strikes are not permitted at rated door assemblies.

2. Mortised or cylinder locksets provided with electrified hinges, also requiring Building standard keyway override and not in public corridors or lobbies, shall be maintained by Tenant at Tenant's expense.

    a. Non-electrified locking devices shall be provided with Building standard override keyway, and not in public corridor or lobbies.

3. Electrically controlled hardware shall be approved by the Authority Having Jurisdiction and be **fail-safe**.

B. Contractor is to coordinate all hardware requirements with any security devices. Contractor is to coordinate installation for proper operation, interface and connection with any security devices and/or security system.

1.1 SYSTEM DESCRIPTION

A. Fire Rated Doors: Comply with requirements of Uniform Building Code Standard 7-2, NFPA 80 and applicable codes for fire rated door hardware; provide hardware bearing Underwriters Laboratory (UL) labels.

1.2 SUBMITTALS

A. Keying Schedule: Coordinate directly with Landlord.

PART 2 – PRODUCTS

2.0 MATERIALS

A. All door lock hardware to be Schlage. All locks installed by Tenant shall accept a Schlage Primus XP full-sized interchangeable key core (#20-740-XP).

1. All Tenant door lock pinning format shall be integrated into the Base Building Master Key system.

2. Only Landlord's locksmith is allowed to provide the Primus XP key cores and pinning & keying services, which are at Tenant's expense.

3. Tenant, or Tenant's contractor, shall coordinate keying needs and materials procurement with locksmith and Landlord.

4. All requests for Tenant keys; including Master, sub-Master, and change keys, are to be submitted in writing by the Tenant. Keys will be delivered to Tenant by locksmith or Landlord.

B. All secured door locks, including electrified, to have a key override feature.

2.1 DOOR ASSEMBLIES

A. Section Includes: This section provides information regarding door and hardware.

1. Locksets shall have interchangeable cores and Building Standard keyways.

2. Suite Entry Door Assembly:

a. Door: 3’-0” wide by 8’-10” high by 1-3/4" thick solid core; match building standard doors.

b. Double Doors: Matched pair with rating.

c. Frame: Painted hollow metal, fire rated one hour assembly.

d. Hardware: Single Leaf Door:

1) Latch set: Schlage L9010_x 626.

2) Lockset: Schlage_L9050 x 626.

3) Hinges: McKinney T2714, 4 ½”x4 ½” x 626 finish.

4) Door Stop: Ives FS436 x 626 finish.

5) Closer LCN 4040 Series x 626 finish. Pair of closers to be used for pair of doors.

e. Hardware: Matched Pair Doors:

1) Lockset: Schlage L9050 x 626 finish.

2) Hinges: McKinney T2714, 4 ½”x4 ½” x 626 finish.

3) Closer: LCN 4040 Series x 626 finish. Pair of closers to be used for pair of doors.

4) Door Stop: Ives FS436 x 626 with required riser and door mutes.

5) Flush Bolts: Automatically operated, edge-mounted flush bolts, DCI 940 series x finish to match door.

6) Dust Proof Floor Strike: DCI series 600 x finish to match door.

7) Astragal: Metal, finish to match door.

8) Coordinator: Ives COR x FL x 626 finish.

3. Tenant Interior Door Assembly:

a. Door: 3’-0” wide by 8’-10” high by 1-3/4" thick solid core: match building standard doors.

b. Double Doors: Matched pair.

c. Frame:

1) Factory painted clear aluminum or painted hollow metal, color per plans and specifications.

2) Frame: Factory applied thermosetting paint finish or anodized aluminum, color per plans and specifications.

d. Sidelights: 2” aluminum frame painted per tenant’s specifications. Color of mini-blinds per tenant’s specifications.

e. Hardware: Single Leaf Door:

1) Latchset: Schlage_L9010, Finish and lever style handle to be per tenant’s specifications.

2) Lockset: Schlage_L9050. Finish and lever style to be per tenant’s specifications.

3) Hinges: McKinney T2714, 4-1/2” by 4-1/2”. Finish to be per tenant’s specifications.

4) Door Stop: Ives FS436 with required riser and door mutes. Finish to be per tenant’s specifications.

f. Hardware: Matched Pair Doors:

1) Latchset: Schlage L9010. Finish and lever style to be per tenant’s specifications.

2) Lockset: Schlage L9050. Lever handle. Finish and lever style to be per tenant’s specifications.

3) Closer: LCN 4040 Series. Pair of closers to be used for pair of doors.

4) Hinges: Butt hinges, McKinney 1B2714, 4-1/2” by 4-1/2”. Finish to be per tenant’s specifications.

5) Door Stop: Ives FS436 with required riser and door mutes. Finish to be per tenant’s specifications.

6) Flush Bolts: Automatically operated, edge-mounted flush bolts, DCI 940 series.

7) Dust Proof Floor Strike: DCI 80.

8) Coordinator: DCI series 600 finish to match door frame, flush bolt #FB8, at 20 minute rated doors only.

4. Building Core Door Assembly:

a. Door: 3’-0” wide by 8’-10” high by 1-3/4" thick solid core, one hour rated assembly door, or as required, solid core, paint grade, building standard door is to be painted to match adjacent wall.

b. Double Doors: Matched pair.

c. Frame: Hollow metal, painted to match adjacent walls.

d. Hardware: Match building standard.

END OF SECTION

GLAZING

PART 1 - GENERAL

1.0 SUMMARY

A. Glazing is required to be fully tempered and certified by SGCC or another recognized certification agency acceptable to authorities having jurisdiction and is to comply with requirements of CPSC 16 CFR, Part 1201.

1.1 REFERENCES

A. Glass Association of North America (GANA): Glazing Manual and Sealant Manual.

1.2 SYSTEM DESCRIPTION

A. Safety Glass Standard: CPSC 16 CFR 1201, ANSI Z97.1, and Uniform Building Code Chapter 24 and Standard 24-2.

B. Fire Rated Glass: Provide glass identical to glass tested per ASTM E163, labeled and listed by UL or other testing and inspection agency acceptable to applicable authorities.

PART 2 – PRODUCTS

2.0 MATERIALS

A. Tempered Glass: Select glazing quality, clear float glass, fully tempered, meeting ASTM C1048, Kind FT; minimum thickness 1/4"; safety glass.

B. Fire Rated Wired Glass: Glazing quality, wired glass, polished both surfaces; square steel mesh, conforming with ASTM C1036; minimum thickness 1/4"; UL listed fire rated glass.

C. Clear Fire Rated Glass: Glazing quality, clear fire rated glass, polished both surfaces; nominal thickness 1/4"; UL listed clear fire rated glass.

D. Laminated Glass: ASTM C1172, Kind LA, two sheets of clear float glass laminated with a film of polyvinyl buteral; safety glass; laminated layers shall be free of air pockets and foreign substances.

E. Frameless Mirrors: Mirror quality q1 or q2, clear float glass; 1/4" thick; full silver coating, copper coating and organic coating; arrised edges; factory treated and sealed after cutting and finishing.

F. Glazing Sealant: ASTM C920, Type S, Grade NS, elastomeric one-component silicone glazing sealants as recommended by sealant manufacturer for application involved.

PART 3 - EXECUTION

3.0 INSTALLATION

A. Comply with GANA Glazing Manual and Sealant Manual and glazing manufacturer instructions.

1. Comply with NFPA 80 for glass in fire rated openings.

B. Frameless Mirror Attachment: Attach mirrors in accordance with mirror manufacturer's recommendations and to provide ventilation to coating; set or trim felt to face of mirror.

END OF SECTION

FINISHES

GYPSUM BOARD ASSEMBLIES

PART 1 - GENERAL

1.0 SUMMARY

A. Provide gypsum board systems including light gage metal framing, suspension system for gypsum board systems, joint treatment, acoustical accessories, and general accessories for complete installation.

1.1 REFERENCES

A. ASTM C754: Installation of Steel Framing Members to Receive Screw-Attached Gypsum Wallboard, Backing Board, or Water-Resistant Backing Board.

B. ASTM C840: Application and Finishing of Gypsum Board.

1.2 SYSTEM DESCRIPTION

A. Performance Requirements: Perform gypsum board systems work in accordance with recommendations of ASTM C754 and ASTM C840 unless otherwise specified.

1. Loads: Comply with applicable requirements of CITY: Oakland and STATE: California. Building Codes for design of metal framing for gypsum board systems.

2. Vertical Dimensions: Typical slab-to-slab heights are as follows.

a. Floor 13’-0”.

3. Seismic Requirements: Comply with code requirements for seismic bracing.

B. Fire-Rated Assemblies: Listed by Underwriter's Laboratory, Gypsum Association (GA) File No's in GA-600 Fire Resistance Design Manual, or other listing approved by applicable authorities.

1.3 PROJECT CONDITIONS

A. Maintain areas to receive gypsum board at minimum 50 degree F for 48 hours prior to application and continuously after application until drying of joint compound is complete; comply with ASTM C840.

PART 2 – PRODUCTS

2.0 MATERIALS

A. Framing Materials: Comply with ASTM C754; provide gauges as recommended by manufacturer for spans and maximum deflections specified and as required by applicable codes.

1. Studs: ASTM C645, screw-type Cee-shaped.

    a. Provide minimum 25-gauge studs.

    b. Provide heavier than 25-gauge as required to comply with performance requirements (deflections).

    c. Composed of at least 40% recycled content, or as available.

    d. Manufactured regionally within a radius of 500 miles, if available.

2. Runners: Match studs.

3. Furring Members: ASTM C645, screw-type, hat-shaped.

    a. Sound Rated Assemblies: Provide resilient channels where required to provide required sound transmission classifications.

4. Channels: ASTM C754.

5. Hangers: ASTM A641, Class 1 wire, not less than sizes in Table No. 5 of ASTM C754 and as required by applicable codes; hanger rods, flat hangers, and angle-type hangers as required.

6. Fasteners and Anchorages: As recommended by gypsum board system manufacturer.

7. Suspension System: ASTM C645, suspension system composed of main beams and cross furring members interlocking to form supporting network; recommended by gypsum board system manufacturer.

B. Gypsum Board: Comply with ASTM C840; maximum permissible lengths; ends square cut, tapered edges on boards to be finished

1. Typical: ASTM C1396, Type X, fire rated gypsum board.

2. Thickness: Minimum 5/8” thickness; 1/4” thick facing board is to be used to prove smooth uniform surface at curved drywall construction.

3. Manufactured regionally within a radius of 500 miles, if available.

C. Gypsum Board Accessories: Comply with ASTM C840.

1. Provide protective coated steel corner beads and edge trim; type designed to be concealed in finished construction by tape and joint compound.

2. Corner Beads: Manufacturer's standard metal beads.

3. Edge Trim: "L", "LK", or "LC" casing beads.

4. Reinforcing Tape, Joint Compound, Adhesive, Water, Fasteners: Types recommended by system manufacturer and conforming with ASTM C475.

    a. Typical Joint Compound: Chemical hardening type for bedding and filling, ready-mixed or powder vinyl type for topping.

5. Control Joints: Back to back casing beads.

    a. Back control joints with 4 mil thick polyethylene air seal.

6. Metal top tract shall be used at all ceiling height partitions.

D. Acoustical Accessories:

1. Acoustical Insulation: Preformed mineral fiber, ASTM C665, Type I; friction fit type without integral vapor barrier; as required to meet STC ratings as directed by Architect, or of thickness as directed by Architect.

2. Acoustical Sealant: ASTM C919, type recommended for use in conjunction with gypsum board.

    a. Type: Paintable, non-shrinking and non-cracking where exposed, nondrying, non-skinning, non-staining, and nonbleeding where concealed.

PART 3 – EXECUTION

3.0 INSTALLATION

A. Metal Framing Erection: Erect metal framing in accordance with ASTM C754 and manufacturer's recommendations.

B. Ceiling Framing Installation: Erect in accordance with ASTM C754 and manufacturer's recommendations.

C. Gypsum Board Installation: Install in accordance with ASTM C840 and manufacturer's recommendations.

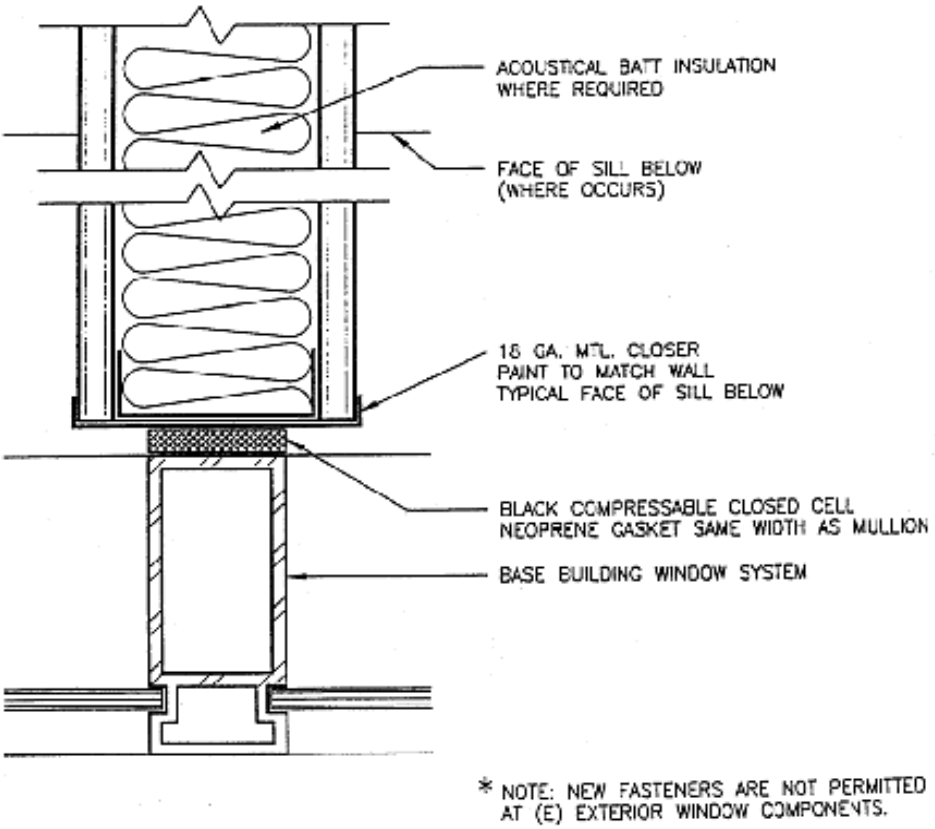
3.1 EXAMINATION

A. Examine panels before installation. Reject panels that are damp/wet, damaged, and/or have evidence of mold.

END OF SECTION

ATTACHMENT:

WALL TO WINDOW MULLION (BUILDING SPECIFIC)



WALL TO WINDOW MULLION

P–16F SCALE: N.T.S.

ACOUSTICAL CEILINGS

PART 1 - GENERAL

1.0 SUMMARY

A. Provide acoustical ceiling systems, with suspended metal grid system, trim, and accessories as required for complete finished installation.

1. Survey space to determine variation of floor slabs from level. Identify high and low points, and coordinate with Architect in field to establish datum for laying out each ceiling area.

a. Ceiling Height in Tenant areas and corridors to be 9’-0” unless otherwise approved by Landlord.

2. Coordinate layout and installation of acoustical ceiling units, suspension system components, and accessories with other work in ceilings, including but not limited to:

a. Light fixtures.
b. Fire and smoke-detection system components.
c. HVAC equipment.
d. Fire-suppression system components.
e. Partitions.

3. Attempt grid layout to align with corridor or existing layout.

1.1 SYSTEM DESCRIPTION

A. Seismic Design Requirements: Comply with code requirements for seismic bracing of ceiling suspension system, and with ASTM E580.

1. Ceiling Struts: Provide struts as detailed on Drawings and as required by code.

2. Slack Wires: Provide safety slack wires, two per square/rectangular luminaire on diagonally opposite corners and a single wire for each recessed down light.

B. Fire Performance Characteristics: Provide products listed by Underwriters Laboratories (UL) or other independent testing laboratory acceptable to applicable authorities.

1. Flame Spread/Smoke Density: Provide products meeting code requirements for maximum 25 flame spread and maximum 25 smoke density.

2. Fire Rated Assemblies: Provide systems rated as part of acoustical material and suspension systems for Floor-Ceiling Assemblies.

1.2 REFERENCES

A. ASTM C635: Metal Suspension Systems for Acoustical Tile and Lay-in Panel Ceilings.

B. ASTM C636: Installation of Metal Ceiling Suspension Systems for Acoustical Tile and Lay-in Panel Ceilings.

C. ASTM E580: Application of Ceiling Suspension Systems for Acoustical Tile and Lay-In Panels in Areas Requiring Seismic Restraint.

PART 2 - PRODUCTS

2.0 MATERIALS

A. Suspension System: Comply with ASTM C635, as applicable to type of suspension system required for type of ceiling units.

1. Exposed Grid Systems: Direct hung, steel “T” exposed grid system, standard 9/16” width, with ¼” reveal. (Field verification required when matching a specific suite.)

a. Provide Armstrong Silhouette XL 1/4” reveal, 9/16” slotted system, or Landlord approved alternate.

2. Attachment Devices: Size for 5 times design load in ASTM C635, Table 1, Direct Hung.

3. Hanger Wires: Galvanized carbon steel, ASTM A641, soft temper, prestretched, yield-stress load of at least three times design load, but not less than 10 gauge.

4. Straps, Tubes and Angles: Provide galvanized steel as required to meet state and local requirements for seismic design loads.

5. Structural Class: Minimum intermediate-duty system.

6. Edge Molding: Manufacturer's standard angle molding for edges and penetrations of ceiling, with single flange of molding exposed.

7. Finish of Exposed Items: Manufacturer's standard white baked enamel.

8. Maximum Allowable Deflection: L/360.

B. Acoustical Panels: ASTM E1264 type and form.

1. Panels: Armstrong Optima Tegular, or Landlord approved alternate.

2. Sizes: 2’-0” x 2’-0”, or Landlord approved alternate.

3. Finish: Standard white painted finish.

PART 3 - EXECUTION

3.0 PREPARATION

A. Coordinate with other work in ceilings, including light fixtures, HVAC equipment and partition systems.

3.1 INSTALLATION

A. Install ceiling suspension system to resist seismic loads as required by state and local codes, including extra hanger wires and compression supports for ceilings and light fixtures.

B. Suspended ceiling support system shall be self-supporting; and shall not attach to duct, piping, other equipment support systems, etc.

C. Install suspended acoustical tile ceilings according to ASTM C636/C636M, seismic design requirements, and manufacturer's written instructions.

D. Install hangers plumb and free from contact with insulation or other objects within ceiling plenum that are not part of supporting structure or of ceiling suspension system.

E. Splay hangers only when required to miss obstructions; offset resulting horizontal forces by bracing, counter-splaying, or other equally effective means.

F. Where width of ducts and other construction within ceiling plenum produces hanger spacing that interfere with locations of hangers at spacing required to support standard suspension system members; install supplemental suspension members and hangers in form of trapezes or equivalent devices.

G. Secure wire hangers to ceiling suspension members and to supports above with a minimum of 3 tight turns.

H. Where steel framing does not permit installation of hanger wires at spacing required; install carrying channels or other supplemental support for attachment of hanger wires.

I. Space hangers not more than 48" o.c. along each member supported directly from hangers; unless otherwise indicated in Tenant Improvement Construction documents. Provide hangers not more than 8" from ends of each member.

J. Install edge moldings and trim, of type indicated in Tenant Improvement Construction documents, at perimeter of acoustical ceiling area and where necessary to conceal edges of acoustical tiles.

K. Install suspension system runners so they are square and securely interlocked with one another. Remove and replace dented, bent, or kinked members.

L. Acoustical panel ceilings that conceal Fire Smoke Dampers shall be marked with specific FSD ID; such that FSD identification can be read while standing on finished floor.

END OF SECTION

TILE

PART 1 – GENERAL

1.0 REFERENCES

A. ANSI A108.5: Installation of Tile with Latex-Portland Cement Mortar.

B. ANSI A108.10: Installation of Grout in Tilework.

C. ANSI A108.11: Interior Installation of Cementitious Backer Units.

D. Tile Council of America (TCA): Handbook for Ceramic Tile Installation.

PART 2 – PRODUCTS

2.0 MATERIALS

A. Floor Tile: Provide non-slip units with minimum wet and dry value of 0.60 coefficient of friction when tested in accordance with ASTM C1028.

B. Latex Thin Set: Thinset bond coat, consisting of latex-cementitious mortar conforming to ANSI A118.4.

C. Latex-Cement Grout: ANSI A118.7, latex-cementitious type, uniform in color, resistant to shrinkage.

D. Cementitious Backer Units: ANSI A118.9 aggregated Portland cement with woven glass-fiber mesh on both faces; approximately 1/2" thick; UL fire rated as required to maintain integrity of fire rated assemblies.

E. Products utilized shall be free of asbestos containing materials.

2.1 MIXES

A. Mix and proportion cementitious materials for site-made leveling coats, setting beds and grout as recommended by the TCA Handbook for Ceramic Tile Installation. Cementitious Backer Units: Install units in accordance with ANSI A108.11, manufacturer's recommendations, and as required for fire ratings.

B. Mix and proportion pre-mixed setting beds and grout materials in accordance with manufacturer's recommendations.

PART 3 – EXECUTION

3.0 INSTALLATION

A. Install tile in accordance with referenced ANSI Standards and TCA recommendations for type of substrate and setting method.

1. Latex-Cement Thin Set Floors over Waterproof Membrane: TCA F122.

2. Latex-Cement Thin Set Wall Tile over Cementitious Backer Units: TCA W244.

3. Granite Highlight Band Latex-Cement Thin Set Floors over Concrete: TCA F113.

B. Locate expansion joints, control joints, contraction joints, and isolation joints where recommended by TCA Handbook and as approved by Architect.

C. Install membranes for restroom, shower rooms, kitchens and anywhere floor drains are installed.

END OF SECTION

RESILIENT TILE FLOORING

PART 1 - GENERAL

1.0 SYSTEM DESCRIPTION

A. Flammability: Provide materials tested under ASTM E648, Flooring Radiant Panel Test, with results of 0.45 watts/sq.cm. or higher.

B. Slip Resistance: Provide materials tested under ASTM D2047, James Slip Test with minimum 0.6 rating for floors.

1.1 PROJECT CONDITIONS

A. Ensure floor surfaces are smooth and flat with maximum variation that meets industry standards and local codes.

PART 2 - PRODUCTS

2.0 MATERIALS

A. Products utilized shall be free of asbestos containing materials.

B. Resilient Tile: 12" by 12" by 1/8" thick; vinyl composition tile conforming to ASTM F1066, Composition 1.

1. FloorScore Certified.

2. Color and Pattern: As selected by Landlord or Architect from manufacturer's full range of available colors.

C. Resilient Base: 1/8” x 4” x 48” Rubber Wall Base Type III Commercial. Provide coved base at hard floor surfaces.

1. FloorScore Certified.

2. Color: As selected by Architect from manufacturer's full range of available colors.

D. Edge Strips – “1” homogeneous vinyl or rubber, tapered or bullnose edge.

1. Provide longest lengths possible. Pieces less than 24” long shall not be permitted.

2. Color as selected by Architect from manufacturer’s full range of standard colors.

E. Adhesives and Sealants:

1. VOC limits less than SCAQMD Rule #1168

2.1 PREPARATION

A. Conform with manufacturer's recommendations for preparation; and with ASTM F710.

END OF SECTION

CARPET

PART 1 - GENERAL

1.0 Flammability: Provide carpet and underlay having passed following tests.

A. DOC-FF-1-70: Pass.

B. NFPA 258 (Smoke Density): 450 or less.

C. ASTM E648 (Flooring Radiant Panel Test): 0.45 or higher.

1.1 Certificate of Compliance: Provide manufacturer's certificate of compliance stating each material delivered conforms to Specifications.

PART 2 - PRODUCTS

2.0 MATERIALS

A. Carpet & Rug Institute (CRI) Green Label Plus.

B. TARR ratings (Texture Appearance Retention Rating or TARR tests a carpet's ability to remain tufted, its original shape, after being properly installed and maintained in a commercial setting)

1.0 - 2.0 = Light Traffic
2.5 = Moderate Traffic
3.0 = Heavy Traffic
3.5 = Severe Traffic
4.0 - 5.0 = Extreme Traffic

Hard back Tile:
Construction: Tufted Textured Loop.
Yarn system: Type 6,6 Nylon.
TARR rating: 3.0 heavy traffic or higher.

C. Base: 1/8” x 4” x 48” Rubber Wall Base Type III Commercial Colors.

D. Adhesives and Sealants:

1. Per the manufactures recommendation and warranty.

2. 2012 OSHA Hazard Communication Standard : 29 CFR Part 1910.1200.

3. VOC limits less than SCAQMD Rule #1168.

4. Products utilized shall be free of asbestos containing materials.

2.1 PREPARATION

A. Ensure floors are level, with maximum surface variation that meets industry standards and all local codes.

PART 3 – EXECUTION

3.0 INSTALLATION

A. Install carpet in accordance with manufacturer recommendations and installation instructions.

1. Maintain pile lay and weave in same direction shown.

END OF SECTION

VINYL WALL COVERING

PART 1 - GENERAL

1.0 REFERENCES

A. Federal Specification CCC-W-408: Wall Covering, Vinyl Coated.

PART 2 - PRODUCTS

2.0 MATERIALS

A. Vinyl Wall Covering: Conform with CCC-W-408 Type II, medium duty quality; Class 2 mildew resistant, with cloth backing; paper backing is not acceptable.

1. Maximum Flame Spread/Smoke Developed: ASTM E84, 25/50.

END OF SECTION

WALL FABRICS

1.0 MATERIALS

A. Maximum Flame Spread/Smoke Developed ASTM E84: 25/450.

END OF SECTION

PAINTS AND COATINGS

PART 1 - GENERAL

1.0 SUBMITTALS

A. Certificates: Furnish certificates from each manufacturer stating materials are top quality lines and suitable for intended use on this Project.

PART 2 - PRODUCTS

2.0 MATERIALS

A. Paints: Provide paints comparable to following unless otherwise directed by Architect and approved by Landlord.

1. Gypsum Board:

a. Green Seal Standard GS-11 certified.
b. First Coat: Vinyl Latex Primer Sealer.
c. Finish Coats: Latex Eggshell Enamel to cover.

2. Metal:

a. Green Seal Standard GS-03 Certified.
b. Primer: Rust Inhibitive Paint.
c. Finish Coats: Latex Semigloss Enamel to cover.

3. Wood, Opaque Paint:

a. Meets the requirements of South Coast Air Quality Management District (SCAQMD) Rule #1113.
b. First Coat: Vinyl Latex Enamel Underbody.
c. Finish Coats: Latex Semigloss Enamel to cover.

4. Wood, Stained Finish:

a. Meets the requirements of South Coast Air Quality Management District (SCAQMD) Rule #1113.
b. First Coat: Stain to match existing.
c. Finish Coats: AWI System No. TR-2 transparent catalyzed lacquer or equivalent per AWI 1500, premium grade.

NOTE: Refer to Architectural Woodwork, 2.3 Finishes, for Transparent Finished Woodwork and Opaque Finished Casework.

5. Sheens: Comply with ASTM D523, reflectance of paint.

B. Volatile Organic Compound (VOC) Emissions: Select materials that generate least amount of pollution; consider pollution and volatile organic compound (VOC) emissions generated during manufacturing, transport, installation, use, and disposal.

1. Avoid materials that contain ozone depleting chemicals and that emit potentially harmful volatile organic compound (VOC) emissions.

2. Avoid materials that can leach harmful chemicals into ground water; do not allow potentially harmful chemicals to enter sewers nor storm drains.

3. Select materials that can be reused or recycled and materials with significant percentage of recycled content; set specific recycled content percentages for individual materials; avoid materials difficult to recycle.

2.1 PREPARATION

A. Measure adhesion of existing paints using ASTM D3359 tape test; remove existing coatings not achieving minimum ratings of 9 to 10.

PART 3 - PRODUCTS

3.0 CLOSE OUT

A. Provide product information for each type of paint system installed; including manufacturer, “name” of color, sheen, product identification number, and location installed.

END OF SECTION

SPECIALTIES

FIRE EXTINGUISHERS AND CABINETS

PART 1 - PRODUCTS

1.0 MATERIALS

A. Fire Extinguishers:

1. As required by the AHJ.

2. Hot food preparation kitchen areas shall have a portable “K” type fire extinguisher.

B. Fire Extinguisher Cabinets:

1. Cabinet Depth: Provide cabinets designed for space available in walls with fire extinguisher cabinets, and of sufficient depth to house multi-purpose dry chemical type fire extinguisher.

    a. Hazardous Areas: Provide cabinets designed to house multi-purpose dry chemical type fire extinguisher at locations designated as hazardous.

2. Frame: Trimless, recessed, door frame flush with finish wall.

3. Metal Gauges: Manufacturer's standard for series specified.

4. Box: Provide manufacturer's standard box with white baked enamel interior finish and baked enamel exterior finish.

5. Doors & Cabinets: Steel, full flush metal panel, with latch and view panel; provide thermosetting primer compatible with factory finish white paint.

6. Door Hardware: Continuous type hinge permitting door to open 180 degrees; provide either lever handle with cam action latch, or door pull and friction latch, suitable for use by persons with disabilities.

7. Identification: After installation and finishing is completed, silk-screen or apply decal letters spelling "FIRE EXTINGUISHER" as applicable.

    a. Letter size, style and location as selected by Architect.

8. Fully recessed in corridors and common areas. Semi recessed in tenant spaces.

END OF SECTION

FURNISHINGS

PERIMETER WINDOW COVERINGS

PART 1 - GENERAL

1.0 SUMMARY

A. Provide window covering systems with operating hardware, attachments, and accessories as required for complete finished operational installation.

PART 2 - PRODUCTS

2.0 MANUFACTURER

A. Mechoshade

B. Substitutions: Not permitted unless otherwise approved by Landlord.

2.1 MATERIALS

A. Style: EuroTwill Reversible Broken Twill Weave 6000 Series (3% open)

B. Color: 6016 Slate – Tv: 6%P91 Oyster/Pewter Shades.

END OF SECTION

SPECIAL CONSTRUCTION

ROOF ANTENNAS AND SATELLITE DISHES

(If allowable per Lease)

PART 1 - GENERAL

1.0 SUMMARY

A. New and relocated roof antennas shall be structurally mounted; satellite dish mounting shall be structurally engineered and permanently mounted to building, no sleds permitted.

1.1 SYSTEM DESCRIPTION

A. Design Requirements: Design structural supports for antenna and satellite dishes in accordance with applicable state and local code requirements.

B. All cabling related to the installation or relocation of roof antennas, satellite dishes and receiver/transmitters, to be enclosed in conduit and routing of such to be reviewed and approved by Landlord. Conduit to be painted to match adjacent surfaces.

END OF SECTION

CONVEYING SYSTEMS

FREIGHT ELEVATOR

PART 1 - GENERAL

1.0 SUMMARY

A. The Building Freight Elevator is available for use by Tenant's and their Contractors when reserved in advance with Building Management.

1.1 SYSTEM DESCRIPTION

A. Interior dimensions:

1. Height: 9' 4"
2. Width: 5' 6"
3. Depth: 7' 8"

B. Door Opening

1. Height: 8' 0"
2. Width: 4' 0"

END OF SECTION

FIRE PROTECTION

PART 1 - GENERAL

1.0 SUMMARY

A. Fire Protection system, which shall be pre-engineered or handled as "design-build" contract.

1. Contractor/Design Engineer is completely responsible for verification of design criteria, design, installation and performance of system.

2. Installation Contractor shall have a Class C-16 Fire Protection Contractor's License.

3. Extent of Base Building upgrade fire protection work shall be depend upon Tenant Improvement criteria, Authority Having Jurisdiction and risk insurer's requirements; all of which shall be taken into account.

    a. Where no special Tenant Improvement criteria exists and existing system complies with Authority Having Jurisdiction requirements, no upgrade other than sprinkler head relocation shall be required.

4. Design piping and layout of sprinklers for full coverage of Tenant Improvement area, and verify proper operation of flow and tamper switches serving area.

5. Coordinate with Landlord, and with the Electrical section for supervision, testing, remote alarm, and trouble monitoring.

6. Include incidental work that can be reasonably inferred and necessary to provide systems described.

7. Coordinate work schedule with Landlord.

8. No mechanical "T's" shall be installed.

9. All Fire Protection work shall have a hydrostatic test, with water from the Fire Protection riser, completed; as required by the Authority Having Jurisdiction. This testing shall be coordinated with the Landlord.

10. Existing Base Building sprinkler test and drain piping arrangement at fire water riser or standpipe riser area shall remain unaltered.

11. Tenant shall be solely responsible for correcting deficiency items, pertaining to the Tenant Improvement construction, that are recorded during annual Title 19/NFPA 25 inspections and/or by the Oakland Fire Department Inspector during recurring annual High-rise inspections.

12. Approval Calculations: Prepare hydraulic calculations of fire protection system.

    a. Submit to Authority Having Jurisdiction.

b. Submit one approved copy to Landlord, bearing stamp and/or signature of Authority Having Jurisdiction before proceeding with installations.

13. Coring requires approval of a Structural Engineer licensed in the State of California. Scanning is required to locate core. Landlord shall be requested to verify scan results and approve location prior to coring taking place.

    a. Any coring planned in a 10' wide circumference around the Base Building Core area shall be scanned using the X-ray method prior to coring.

    b. Contractor shall have person below during all coring activities to catch the concrete slug and any slurry from the coring activity.

14. Fire protection piping grooved pipe couplings shall not be installed in wall cavities.

    a. This applies to existing fire protection pipe couplings that line up with new walls; as well as all new construction.

15. Contractor shall not close or open any Fire Protection system valves. Contractor shall request from the Landlord that Base Building systems be secured or placed back in service by a Building Engineer.

B. Related Sections:

1. Electrical - Life safety system.

1.1 SYSTEM DESCRIPTION

A. Design Criteria: Verify following design criteria, available pressure and apply latest NFPA 13 and all local and State Code and Regulation.

1. Occupancy: 24 stories above grade and 2 stories below grade, mixed use.

GROUP B/BUSINESS: OFFICES
GROUP A-2/ASSEMBLY: RESTAURANT
GROUP S-2/STORAGE: PARKING GARAGE
GROUP M/ MERCANTILE: RETAIL SPACE
GROUP F-1/MECHANICAL ROOMS
S-1 STORAGE

2. Hazard: Light hazard. (Typical Office Floors)

3. Construction: Type 1-A fully sprinklered

STRUCTURAL FRAME :	3 HOUR
BEARING WALLS :	3 HOUR
NON-BEARING WALLS EXTERIOR:	PER TABLE 602
NON-BEARING WALLS INTERIOR:	0 HOUR
FLOOR CONSTRUCTION:	2 HOUR
ROOF CONSTRUCTION:	2 HOUR
SHAFT ENCLOSURES:	2 HOUR
SMOKE BARRIERS:	NONE

4. Zoning: Verify.

5. Hose Streams: Verify.

6. Existing Application Rate: Verify.
7. Existing Area of Application: Verify.
8. Comply with State Building Code, State Fire Code, State Fire Marshal requirements, applicable City codes and requirements, and applicable National Fire Protection Association standards and pamphlets.

B. Existing System:

1. Building is Type: Wet. Location: Overhead, to supply existing or future automatic fire sprinkler loops on each floor.

2. The Base Building fire protection system includes a combined fire standpipe riser in the stairwell No. 01 vestibule and a wet standpipe riser in the stairwell No. 2 vestibule, fire hose valve connections in each stairwell vestibule, floor loops, branch piping, and automatic sprinkler heads.

1.2 SUBMITTALS

A. Sprinkler plans and specifications shall be submitted to Landlord for review and comment prior to commencement of work.

B. Certificate of Installation: Submit certificate upon completion of fire protection piping that indicates work has been tested in accordance with NFPA 13, and that system is operational, complete and has no defects.

PART 2 - PRODUCTS

2.0 MATERIALS

A. Piping: Piping and related fittings shall be manufactured domestically and Factory Mutual (FM) and UL approved and stamped.

1. Pipe shall be black steel, Schedule 40 domestic seamless, conforming to ASTM standard applicable to the required pressure class.

a. No Schedule 10 piping shall be allowed.

b. For 2” and smaller diameter pipe – black steel, schedule 40 conforming to ASTM A53. Fittings, threaded cast iron conforming to ANSI B16.4. Threads, ANSI B2.1.

c. For 2 ½” and larger diameter pipe – black steel, schedule 40, high pressure class flanged cast iron, with welded joints in concealed spaces and risers.

d. Mechanical joints are allowed in exposed areas only.

2. Fittings are to be ductile iron conforming to ANSI standards applicable to required pressure class.

a. Union pipe fittings shall not be used except on the low pressure side of drain piping.

3. Pipe Supports: Install pipe supports, braces and anchors per NFPA 13 and as required by all local and State Code and Regulation.

a. Use B-line, Elcen or Grinnell hangers and structural attachments to properly support the piping system according to good standard practice and according to the manufacture's recommendations. Minimum safety factor of 5.0.

b. No piping shall have direct contact with the structure.

c. Size hangers properly to fit around bare pipe.

d. Use cadmium plated or galvanized hangers, attachments, rods, nuts, bolts and other accessories.

e. Do not burn or weld any structural member without the written approval of the Landlord.

f. No valve or piece of equipment shall be used to support the weight of any pipe.

g. Provide a support or hangers close to each change of direction; either horizontal or vertical.

h. When piping is installed using a trapeze hanger, attach the pipe to the trapeze using a pipe clamp, strap, or "U" bolt. Do not weld the pipe to the trapeze.

i. Powder driven concrete inserts shall not be allowed.

4. Flexible automatic sprinkler hose fitting assemblies are allowed only when listed by the California State Fire Marshal and UL; and are FM approved. Installation of flexible automatic sprinkler hose fitting assembly components shall be in accordance with the requirements of the listing and the manufacturer's installation instructions.

a. Victaulic VicFlex Sprinkler Fittings, Series AH2 and AH2-CC braided flexible hoses.

b. Landlord approved equal.

c. Fitting assemblies shall not exceed 36" in length and shall not have excessive slack. The installing contractor shall utilize the shortest available flexible hose fitting as needed to eliminate excessive slack

B. Piping Specialties:

1. Gauges are to be Marsh No. 8, 3-1/2" Dial, 0-300 psi scale, UL listed and approved, 1/4" bottom connection stainless steel bezel.

2. Flow Switches: Vane tape with adjustable time delays, UL listed, each with two contacts for local and remote alarms. Coordinate with Life Safety System vendor.

C. Sprinkler Heads:

1. Manufacturer: Viking.

2. Sprinkler heads shall be VK 300 (Upright) and VK 302 (Pendant) rated at 155° F, quick response, UL listed, and FM listed; with factory brass finish.

3. For hard ceiling installations where concealed heads are specified, sprinkler heads shall be VK 462 155°F ½ inch Quick Response FM Approved with factory painted white cover rated at 139°F.

4. Newly installed and relocated sprinkler heads are to be placed in center of ceiling tile.

5. Provide and install UL Listed, factory painted red enamel, sprinkler head guards in the following areas:

    a. Electrical rooms and closets.

    b. Mechanical Rooms

    c. Any sprinkler lower than 7’ 0” above finished floor.

D. Pre-action System: Pre-action system shall be UL listed and FM approved with battery backup.

1. Provide required test connection and drain. Test drain shall be connected to main sprinkler drain.

2. All pre-action systems shall be monitored by the Base Building fire life safety system.

3. System instructions and sequences of operation shall be posted at the Pre-Action system panel.

    a. Instructions & Sequences of Operation shall be type written and posted in frames.

E. Fire Suppression System: Gaseous Fire Extinguishing System.

1. Gaseous Fire Extinguishing system shall be reviewed by Landlord prior to installation.
2. All suppression systems shall be monitored by the Base Building fire life safety system.

F. Valve Identification Signs.

1. Signs shall be made of minimum 18 gauge baked enamel aluminum to meet NFPA 13 criteria.

2. Signs shall be secured with brass chain and “S” hooks.

3. Signs shall identify the service of the valve and if normally open or normally closed.

    a. “Normally OPEN” & “Normally CLOSED” shall be spelled out.

4. Do not attach signs to valve handles.

PART 3 – EXECUTION

3.0 INSTALLATION

A. Seismic restraint: Provide seismic restraints per NFPA 13 & 14 and applicable codes and standards. Design and provide restraints to prevent permanent displacement in any direction caused by lateral motion, overturning, or uplift.

B. Piping: Install pipe, fittings and hangers in accordance with latest NFPA 13 criteria and Authority Having Jurisdiction requirements, including seismic sway and uplift bracing; as well as head clearance between deflectors and walls or ceiling.

1. Reducers: Make reductions in pipe sizes with one piece reducing fitting. Bushings are not acceptable.

2. Except where length of the pipe exceeds 20 feet, do not use couplings.

C. General Contractor to contact Landlord for impairment of the water supply to the existing automatic Fire Protection sprinkler system. General Contractor to verify Authority Having Jurisdiction fire safety precautions to be observed during sprinkler impairment, such as fire watches, charged hose lines, etc. General Contractor shall request Building Engineering staff support to drain & refill automatic Fire Protection sprinkler system(s); as needed to complete Tenant Improvement construction.

1. Only Building Engineering staff will secure, drain, and refill automatic Fire Protection sprinkler systems; and only upon request from General Contractor. Contractor shall not operate Fire Protection system valves for typical work.

a. General Contractor and/or sub-contractors shall operate Base Building Fire Protection system valves if an emergency condition exists, such as a broken automatic fire protection sprinkler head while the system is pressurized, and operating the valves will minimize property damage.

b. General Contractor shall immediately notify Landlord of any instance that the Fire Protection system valve positions were altered.

c. General Contractor shall post temporary signage at Tenant Improvement construction floor(s) to identify location of fire protection loop control and drain valves.

D. General Contractor shall be responsible for fire safety precautions during the entire time of an impairment. All associated costs shall be the Tenant's responsibility. All required fire watch personnel must remain on-site, or be properly relieved of duty, during the entire length of time that an automatic Fire Protection sprinkler system is impaired.

1. Automatic Fire Protection sprinkler system impairment shall be limited to only one floor at a time; unless multiple crews are on-site to work on each floor simultaneously.

2. Automatic Fire Protection sprinkler system impairment is not permitted concurrent with hot work activities.

E. General Contractor shall submit a weekly look ahead schedule document to provide notice of intended schedule that the functionality of the automatic Fire Protection sprinkler system will need to be modified.

F. Duct work, beams, light fixtures, and other potential obstructions shall not interfere with the engineered spray patterns of the sprinkler heads. The General Contractor shall ensure that the type and location of potential obstructions is considered in the installation of the system.

G. Install auxiliary drain valves for trapped lines in accordance with NFPA 13. When trapped water volume is:

1. 5 gallons or greater: Provide minimum 1” globe valve with hose adapter and cap.

2. Less than 5 gallons: Provide minimum 1” pipe nipple and cap.

3.1 CLEANING

A. After fire sprinkler piping installation has been completed, flush system under pressure as required by NFPA 13.

3.2 FIELD QUALITY CONTROL

A. Site Tests: Test installation in accordance with following requirements and applicable codes

1. Notify Landlord in writing at least three business days in advance of any test.

2. Perform testing in presence of following persons:

a. Authority Having Jurisdiction.
b. Chief Engineer.

3. Test piping at no less than 200 psig pressure or 50 psig above system static operating pressure, whichever is greater.

4. Perform operational and alarm test under simulated service conditions in the presence of the Fire Life Safety vendor.

5. Coordinate testing procedures with Landlord.

B. Tests Certificates and Approvals: Submit to Landlord certificates, in triplicate, indicating approval of Work, performance of tests, and final inspection issued by Authority Having Jurisdiction before final acceptance of sprinkler system.

3.3 ATTIC STOCK

A. Sprinkler heads: Provide to Landlord six (6) pieces of each type, size, and rating installed; or three (3) pieces of each if 10 pieces or less installed.

B. Escutcheons: Provide to Landlord six (6) pieces of each type and size installed; or three (3) pieces of each if ten (10) pieces or less installed.

C. Sprinkler head wrench: Provide to Landlord one (1) for each type of automatic sprinkler head installed.

END OF SECTION

PLUMBING

PART 1 - GENERAL

1.0 SUMMARY

A. Plumbing work is to depend upon actual alterations and improvements that have to be performed. However, a minimum scope of work for a typical tenant is to include all functions listed below:

1. Prepare design drawings based upon proposed tenant layout.

    a. Obtain building permit for construction using design drawings.

2. Reroute existing and/or provide new piping as required.

    a. Provide seismic restraints required by Code, or this Specification, for all equipment, pipe and materials furnished under this Section.

    b. Contractor is responsible for design of restraints and for proof of adequacy of restraints.

3. Add, relocate and/or remove existing plumbing fixtures. Plumbing to be abandoned shall have water, vent, and waste lines removed back to source.

    a. Install plumbing fixtures per State Code of Regulations, (e.g. Title 24, Part 2, Chapter 11 B) requirements for access for persons with disabilities.

4. Notify Landlord prior to any core drilling.

    a. All coring locations shall be scanned prior to coring.

        1) Any coring planned in a 10’ wide circumference around the Base Building Core area shall be scanned using the X-ray method prior to coring.

    b. All coring shall be performed after hours or as directed by Landlord.

    c. Contractor shall notify Landlord so that Landlord can verify scan results of all core locations prior to coring.

    d. During coring; contractor shall be below the core location to catch any coring slurry and the concrete plug.

5. Review drawings with Landlord and Chief Engineer prior to construction.

6. Arrange for necessary inspections, pay fees for inspections, and turn over copies of inspection reports and certificates to Landlord.

7. Provide sub-metering for all gas installations, as allowed by the Lease.

8. Provide sub-metering for water usage when consumption is projected to be more than 100 gals/day, or as allowed by the Lease.

9. Hot work is not permitted when Fire Protection systems are impaired.

10. Provide piping and equipment isolation to avoid excessive noise and vibration.

B. Submit request and schedule for disruptions to Landlord at least 48 hours in advance.

1. Contractor shall not close or open any Plumbing system valves. Contractor shall request from the Landlord that Base Building systems be secured or placed back in service by a Building Engineer.

1.1 SYSTEM DESCRIPTION – DESIGN

A. Each office floor is provided with four 4" waste, four 3" vent, two 1" condensate drain, and one 1-1/2" and one 1" domestic cold water stub out.

1. Water piping serving Base Building Core areas shall not be tapped into for tenants' use.

B. Building provides Domestic Hot Water to Base Building Core restrooms only. If Tenant requires hot water, provide instantaneous electric type tankless water heaters for hot water within Tenant kitchen/break room at point-of-use.

C. Reclaimed water lines (Purple lines) are provided for supplying water to the Base Building Core Restroom urinal and water closet flush valves.

D. Design Criteria:

1. Soil, Waste and Vent System shall be per California Plumbing Code, Latest Edition and applicable local regulations.

2. Water Piping: Size piping per California Plumbing Code, Latest Edition

a. Size domestic cold water piping for maximum allowable velocity of 6 feet per second.

b. Size domestic hot water piping for a maximum velocity of 5 feet per second.

c. Size domestic hot water return piping for a maximum allowable velocity of 4 feet per second.

3. Gas Piping: Size per California Plumbing Code, Latest Edition.

a. Medium pressure natural gas is provided by PG&E

b. Provide regulators and vent piping as needed to supply gas pressure required at equipment.

4. Plumbing design drawings and calculations shall be signed by a competent mechanical engineer registered in the State of California.

5. Grooved fittings are not allowed for water piping installed in concealed spaces or at risers.

6. All fixtures and equipment shall have service stop valves.

7. Isolation ball valves shall be installed to segregate like plumbing fixtures and/or geographical areas; such that large areas do not need to be isolated and drained to support repairs and/or future alterations.

8. Condensate drains shall be trapped per equipment manufacturer's instructions, minimum slope of 1/8" per 1', have wide radius fittings, wye fittings where drains are combined, and wye fitting clean-outs at each change of direction. Combining equipment condensate drains shall require upsize of downstream pipe.

PART 2 - PRODUCTS

2.0 MATERIALS

A. Piping: Pipe and fittings are to be domestically manufactured.

1. Sanitary, waste/soil and vent piping aboveground, is to be cast iron, standard weight, with Husky type heavy-duty no-hub couplings.

2. Domestic water piping is to be Type "L" hard copper throughout.

3. Natural gas piping and fittings shall be schedule 40 rated for no less than 100 PSIG:

a. 2 inches diameter and less in size: ASTM A53 Black steel pipe with ASME B16.3 Class 150 threaded black malleable iron fittings.

b. Greater than 2 inches diameter: ASTM A53 Black steel pipe and wrought steel ANSI B16.9 butt-welding fittings.

c. Exposed to outside: Galvanized steel pipe and fittings. Following construction; any exposed pipe threads shall be painted with spay-on cold zinc galvanizing compound if all piping and fittings will not be painted.

4. Press-fit fittings, such as "Shark-bite", and crimped O-ring type fittings are not allowed.

5. Use of mechanical/saddle tees and T-drill collaring, or similar, are not allowed. Only pre-manufactured tees are allowed.

B. Piping Accessories:

1. Clean-Outs:

a. No-hub cast iron pipe cleanouts are to be permitted in horizontal drainage piping.

b. Provide wall or floor covers for cleanouts in concealed piping.

c. Provide polished chrome-plated escutcheons in finished rooms.

2. Pipe hangers and supports shall be installed to support piping as required by Code. Pipe hangers shall be sized to include pipe protection insulation saddles and shields; as applicable.

    a. Pipe hangers for copper pipe shall be felt-lined.

    b. Powder driven anchors are not allowed.

    c. Supports directly in contact with copper piping and tubing shall be Superstrut “Cush-a-Strip” or “Cush-a-Clamp” isolators; or Landlord approved equal.

    d. Adjust hangers to distribute loads equally and to achieve indicated slope of pipe throughout.

    e. Trim excess length of support rods to 1 inch; or less than 1 inch such that end of rod is not less than 1 inch to pipe, or pipe insulation, outer diameter.

    f. Insulated piping shall have properly sized calcium shields at support locations.

3. Fittings:

    a. Fittings for use with sanitary waste/soil and vent piping are to be coated, cast iron, no-hub type with Husky type heavy duty couplings of stainless steel band with neoprene sleeve.

    b. Fittings for use with domestic water piping are to be wrought copper solder joint ANSI B16.22.

    c. All pipe and fittings are to be domestically manufactured.

4. Thermometer wells shall be dry type and have heat conductive paste installed.

C. Valves:

1. Valves shall be domestically manufactured and have NPT ends.

2. Valves and valve construction shall be suitable for the pressure, temperature, and fluid quality of the service in which they are to be used.

3. Gate valves shall not be installed.

4. Manufacturers:

    a. Apollo

    b. Milwaukee

5. Angle stop valves shall be heavy pattern commercial grade, have metal handle, brass valve stem, and be rated for minimum 150 PSIG. Plastic valve stems and handles are not allowed. Full open to full closed shall be achieved by ¼ (90°) turn of valve handle.

    a. Manufacturer – Brass Craft

6. Valves ½ inch through 3 inches diameter are to be full port ball valve with threaded connections. Greater than 3 inches diameter valves are to be full port ball valve or butterfly valve, lug type with infinite throttling and memory stop handle.

7. Valves used for venting and draining applications shall have ¾ inch hose bib fitting with male threads and brass cap installed on open end of valve.

8. Provide AGA/CSA/UL listed and FM approved gas valves for natural gas piping systems.

    a. 2 inches diameter and smaller: MSS SP-110; full port, two piece body, blowout proof stem, lever handle, threaded ends.

    b. Greater than 2 inches diameter: Lubricated plug type, bronze body, standard port, spring balanced plug & stem, quarter turn operation, and flanged ends; including operating wrench and locking means.

D. Valve schedule:

1. Valves shall be tagged with stamped brass tag that identifies valve as recorded in valve schedule. Tags shall be attached to valve bodies or valve handles with brass chain.

    a. Upper portion of tag; service type:

        i. CND – condensate
        ii. DW – domestic water
        iii. DHW – domestic hot water
        iv. DHWR – domestic hot water return
        v. RW – reclaimed water
        vi. NG – natural gas

    b. Lower portion of tag; valve ID number:

        i. Office Space: Floor ## - Valve ID # (#01, #02, #03, etc.)
        ii. Retail Space: Floor ## - Suite # - Valve ID # (#01, #02, #03, etc.)

2. Valve schedule shall be consistent with current Building valve schedule and include the following:

    a. Valve tag ID

    b. Service type

    c. Valve size

    d. Valve location (example: ceiling of Room #)

    e. Valve serves (example: sink for kitchenette Room #)

    f. Drain valves, vent valves, and angle stop valves are not required to be tagged or included in the valve schedule.

E. Water Heaters:

1. Point-of-use electric tankless water heaters:

   a. Chronomite Model SR-30-277V or Landlord approved equal.

   b. Shall have p-Touch type label installed that identifies source of power; sub-panel and circuit(s).

2. Domestic Hot Water Heaters:

   a. Commercial Grade water heater approved by Landlord.

      1) Manufacturer – AO Smith model DSE @ 480V/3-phase.

   b. Pressure vessels shall be ASME rated & stamped.

   c. Electric heating elements shall be controlled such that use is staged between multiple heating elements.

   d. Provide a pan or other form of containment under water heater.

   e. Domestic hot water heaters with greater than 10 gallon storage capacity shall be floor mounted.

   f. Domestic hot water heaters shall be seismically braced as required by State of California and Oakland Code regulations.

   g. Provide a complete leak detection system which will stop water flow into the water heater when a leak is detected.

   h. Shall have mechanically fastened engraved laminated plastic identification tag; as approved by Landlord. Equipment identification tag shall also include electrical source circuit(s) identification.

   i. Install analog thermometer in dry-well at outlet of domestic hot water heater.

3. Automated water leak detection system – Flood StopperTM or Equal.

   a. Controller shall have AC power option and battery back-up.

   b. Sensor to be located in water heater containment pan.

      i. Wireless or hardwired is acceptable.

   c. Location of control panel to be approved by Chief Engineer.

   d. Electrically actuated shut-off valve to be located on supply line for water heater.

   e. Local alarm to be provided.

   f. Installation to be inspected and approved by Chief Engineer prior to acceptance.

F. Tubing:

1. Plastic tubing is not allowed; including PEX tubing.

2. Stainless steel braided hose, 18 inches long or less, and soft drawn copper tubing are allowed for connections to appliances.

G. Water Filtration Systems:

1. All water filtration systems must be rated for Building pressure requirements, and have stainless steel housings; regardless if installed by Tenant or Tenant's Contractor.

2. Plastic tubing is not allowed; including PEX tubing.

3. Stainless steel braided hose, 18 inches long or less, and soft drawn copper tubing are allowed.

H. Sub-meters: Tenant shall furnish & install sub-meters to measure consumption; as allowed by lease. Meters shall be pulse output type and be integrated with the Base Building sub-meter network. Integration shall include tracking and reporting functions for the purpose of billing back the Tenant for actual consumption. Tenant shall submit to Landlord sub-meter matrix that identifies each load captured by each DENT sub-meter.

1. Contractor shall utilize Twisted Pair Automation for start-up and commissioning of the sub-meter equipment.

    a. Contact: brian@twistedpairautomation.com

2. Natural Gas: Provide sub-metering for all natural gas installations.

    a. Natural gas sub-meters shall be the 400A series by E-Mon D-Mon for natural gas loads up to 400 ft^3/hr.
    b. Natural gas sub-meters shall be the FM series by E-Mon D-Mon for natural gas loads 400 ft^3/hr and greater.
    c. Natural Gas sub-meter pulse output shall connect to an Obvious Flex I/O A8332-8F2D Analog/Digital Modbus converter.

3. Water: Provide sub-metering for water usage when the consumption is projected to be more than 100 gals/day.

    a. Cold water sub-meters shall be the E-Mon MultiMag Cold Water Meter series with pulse output by Honeywell. Hot water loads shall be metered from the cold water source.
    b. Water sub-meter pulse output shall connect to an Obvious Flex I/O A8332-8F2D Analog/Digital Modbus converter.

I. Equipment and Piping Identification:

1. Equipment shall have Black with white lettering engraved equipment identification, as approved by Landlord, mechanically fastened to Equipment.

2. Pipe labels shall be installed in parallel with piping.

   a. Self-Adhesive Markers: W. H. Brady Co., Seton, or Landlord approved substitute.

   b. Flow arrows to wrap entire circumference of bare pipe, or piping insulation lagging if applicable, and shall be installed at each end of label.

   c. Pipe labels to be installed every 30 feet in straight runs, at each branch line, at both sides of wall/ceiling penetrations, and within 1' of valves and control devices.

3. All electrical power sources shall be identified at equipment, including control panels and power disconnect switches.

   a. Label shall be mechanically fastened engraved nameplate or p-Touch style label; as approved by Landlord.

J. Plumbing Fixture maximum water consumption:

1. Water closets – 1.28 GPF (gallons per flush)

2. Urinals – 0.125 GPF

3. Lavatory faucets:

   a. Metered – 0.15 GPC (gallons per cycle)

   b. non-Metered – 0.5 GPM (gallons per minute)

4. Kitchen faucets – 1.5 GPM

5. Showerheads – 1.5 GPM

K. Hydro-pneumatic Pressure tanks shall be ASME certified and stamped.

1. Tank shall have pressure gauge installed at inlet piping.

   a. Pressure gauges shall have glass lens, 4-1/2" dial, 1% accuracy, meet ANSI B40.1 Grade 2A standards, and be rated for full system pressure.

   b. Pressure gauges shall have isolation pet-cock.

L. Building Standard Wireless Leak Detection System

1. Data Closets – All Tenants with water-cooled air conditioning systems within their space are to furnish and install a building standard wireless leak detection sensor(s) that is connected to the buildings wireless leak detection network AND provide manual shut-off valves to be able to stop the water flow to their individual system (s). The shut-off valves are to be easily accessible without a ladder.

2. Kitchen/Kitchenette Equipment – All Tenants are to furnish and install a building standard wireless leak detection sensor in locations within the kitchen that will sense leaks that occur from any source that uses water which includes but is not limited to; refrigerators, dishwashers, coffee makers, filter systems, etc. Consult Chief Engineer for sensor specifications and where sensors should be located.

3. Private Restrooms – All Tenants are to furnish and install a building standard wireless leak detection sensor(s) in any private restrooms within their space. Each sensor shall be connected to the building wireless leak detection network for monitoring. Consult Chief Engineer for sensor specifications and where sensors should be located.

M. Insulation:

1. Materials shall have flame spread/smoke developed rating of 25/50 or less in accordance with ASTM E84, NFPA 255 and UL 723. Thickness shall be in accordance with Title 24 energy regulations.

   a. Domestic tempered water and refrigerated water mains and branches are to be fiberglass, rigid molded, non-combustible.

2. Insulation Jackets: Domestic tempered and refrigerated water pipes are to be all service 24 ASJ/SSL, fire retarding vapor barrier, factory applied, stapled.

3. Pipe Protection Saddles are to be Insul-coustic Div., Insul-Shield Model 704 or Pipe Shields, Inc., Model A1000 or A2000.

4. Pipe Protection Saddles are to be Insul-coustic Div., Insul-Shield Model 704 or Pipe Shields, Inc., Model A1000 or A2000.

PART 3 – EXECUTION

3.0 INSTALLATION

A. Tenant's Contractor shall provide "Base Building Systems Shutdown" request document to Building Management, in accordance with established Building procedures, at least 72 hours prior to major impacts to the existing Plumbing systems. Only Building Engineering staff shall open/close Base Building system isolation valves; including riser stub-outs for Tenant's use. All costs for shutdowns requested by Tenant, or necessitated by Tenant's Improvements, by Building personnel shall be at the Tenant's cost.

B. Hot Work process: Hot work is any work that involves an open flame and/or creates hot debris. The Tenant's Contractor is responsible for managing the hot work process and providing hot work permit documentation to the Building's Engineering Team upon request. Tenant's Contractor shall provide a copy of their hot work permit form for Landlord's approval at beginning of Project; prior to engaging in hot work.

1. Hot work cannot occur simultaneously with an automatic Fire Protection sprinkler system impairment on the same floor.

2. Tenant's Contractor shall be issuer of Hot work permits and manager of Hot work process.

3. Hot work permits:

    a. Shall not last longer than one work shift and shall not apply to more than one floor simultaneously.

    b. Shall be issued just before hot work starts.

    c. Shall not be self-issued by sub-contractors.

    d. Shall be issued to each trade engaged in Hot work.

4. A copy of open Hot work permit(s) are to be posted in the area(s) of Hot work activity.

5. Tenant's Contractor shall:

    a. Provide fully charged and tagged fire extinguisher(s) in the work area(s).

    b. Provide basic training for employees engaged in hot work activities.

    c. Check the work area for any smoldering materials following work activities.

6. Tenant's Contractor shall provide dedicated fire watch "spotter" personal as required under the following conditions:

    a. Workers' field of vision is limited by PPE.

    b. Work is occurring high above the floor.

    c. When hot debris is falling to floor level below.

C. Rough-In and Final Connection: Contractor is to provide rough-in and final connection for all fixtures and equipment requirements.

1. Contract Drawings are to indicate general arrangement of required rough-in, however, details and dimensions are to be determined from information obtained from supplier of item.

2. Requirements apply equally to equipment furnished by Tenant or other Contractors.

3. Fasten plumbing fixtures securely to required supports or building structure; and ensure that fixtures are level and plumb.

4. Secure plumbing supplies behind or within wall construction so as to be rigid, and not subject to pull or push movement.

5. Support piping independent of wall construction.

6. Waste water line from a dishwasher shall pass through the code required listed air gap and shall terminate to an industrial grade in-sink garbage disposal unit. Submit to the Landlord disposal unit submittal data for approval.

D. Coring requires approval of structural engineer licensed in the State of California. Scanning is required to locate core.

1. Contractor shall notify Landlord when scanning has been completed. Landlord will verify the scanning results prior to the Contractor starting coring work.

2. Any coring planned in a 10’ wide circumference around the Base Building Core area shall be scanned using the X-ray method prior to coring.

3. Contractor shall have person below during all coring activities to catch the concrete slug and any slurry from the coring activity.

E. Piping: Conceal piping in walls, furred spaces, pipe spaces or above suspended ceilings as shown on Drawings.

1. Group piping wherever practical and install uniformly in straight parallel lines, squarely with building lines.

2. When plumbing impacts the ceiling of the tenant space below, layout must be provided to the Landlord for review and approval. Exposed Plumbing must be painted to match the existing conditions of the tenant space below.

3. Contractor is to support horizontal piping with pipe hangers. Do not use perforated metal tape. Install and secure piping so that pipes are not in contact.

4. Contractor is to verify equipment dimensions and requirements for rough-in work. Bending or offsetting of finished piping connections and “cocking” of fittings or trim is not allowed. Do not support any piping weight from equipment.

5. Contractor is to install sanitary piping according to the following guidelines:

   a. Install piping at the uniform grade, making all joints close and square.

   b. Maintain a minimum 1/4" fall per foot on all waste lines.

   c. All waste lines and fittings are to be no less than 17-gauge brass or chrome-plated tubing material.

   d. Acid or chemicals of any nature are not to be dumped into the Sanitary System.

6. All potable water piping is to have copper joints with 95-5 Tin-Antimony or other non-lead solder.

7. All piping, fittings, escutcheons, valves, supports, hangers, etc. where installed in conjunction with plumbing fixtures or benchwork-containing items requiring plumbing connections, are to be chrome-plated where exposed to view.

   a. The term “exposed to view” is to apply to all piping from the point that it leaves the wall, ceiling or floor construction to the point of final connection to the fixture.

   b. Piping built into fixed benchwork with concealing doors is not considered exposed.

8. Contractor is to provide 12"- long air chambers (full pipe size) or Nibco Model 620L on all hot and cold water connections to fixtures.

9. Contractor is to install a set of shut-off ball valves whenever making connections into wet columns. Valve future outlets are to be left no less than full size of tee coming off said riser.

    a. Piping is not to be permitted to be up sized after connecting to wet column.

    b. All waste lines are to have no less than full-size futures.

10. Copper piping with adequate slack or stainless steel hose shall be used for all domestic water lines to Tenant owned appliances, such as water filters, coffee machines, icemakers, refrigerators, etc.

11. Piping should be resiliently attached to framing using Hubbard Holdrite silencer or LSP specialty products Acoustoplumb pipe isolation products.

12. Pipe fittings and couplings shall not be installed directly above, or within 1 foot on either side, of electrical distribution system components such as bus ways, distribution boards, panel boards, Motor Control Centers, Variable Frequency Drives, etc. Piping that is subject to “sweating” shall be insulated.

F. Hangers and Supports

1. Contractor is to use Superstrut or Grinnell hangers and structural attachments. Install properly braced for seismic restraint and spaced as follows:

    a. ½" – ¾” for 5'-3/8” minimum rod size
    b. 1" – 1 ¼” for 6’-3/8" minimum rod size
    c. 1 ½" - 2" for 8'-3/8" minimum rod size
    d. 2 ½" - 3" for8’-1/2" minimum rod size
    e. 4” for 8’-5/8” minimum rod size

2. Contractor is to use cadmium plated or galvanized hangers, attachments, rods, nuts, bolts, etc.

3. Supports directly in contact with copper piping and tubing shall be Superstrut “Cush-a-Strip” or “Cush-a-Clamp” isolators; or Landlord approved equal.

4. Contractor is not to burn or weld structural members without Landlord’s approval.

5. Contractor is to provide 19 gauge galvanized steel sleeves when pipes pass through partitions, walls, floors, concrete slabs. Sleeves are to be 2" larger than the pipe and extend 2" above floor slabs.

    a. On Non-rated walls seal annular space with fiberglass.

    b. On Fire walls seal with UBC approved and UL listed fire stopping system with the same “F” and “T” rating as the firewall.

6. Contractor is to support hangers by attaching hangers to existing steel beam, or where such is lacking, by providing auxiliary structural support consisting of channels, angles or Unistrut. Do not use expansion shields. The rods on all hangers are to be of adequate size to support the load they carry.

7. Contractor is to support no-hub cast iron pipe with a minimum of two hangers per each length of pipe.

    a. Hangers are to be installed on each side of joint. Where a large number of fittings are installed between hangers, provide additional hangers.

    b. Securely anchor fittings to building construction at changes of direction to eliminate horizontal movement.

8. Anchors installed in ceiling slab shall be installed in low flutes of pan deck.

G. Valves:

1. Shall be installed such that handle can move freely between full open and full closed.

2. Install valves with stem vertical and handle up wherever possible. If this is not possible notify Landlord before installing valve.

3. Valve handles shall not be field modified.

4. Valves shall have Building Standard identification tag installed.

5. Spare ports on angle stop valves shall be properly capped.

H. Insulation:

1. For cold service, longitudinal laps and 4” vapor barrier strip at butt joints shall be sealed with BP 85-20, white and seal off ends of pipe insulation at valves, fittings and flanges and at 21' of continuous runs with BF 85-20 or IC-225.

2. Seal vapor barriers and make continuous through hangers, sleeves, etc.

3. Domestic Tempered Water Service: Use pre-molded glass fiber covers on all fittings and valves. Insulate fittings with OC 110 insulation cement to a thickness equal to the adjoining insulation.

4. Contractor is to finish fittings and valve bodies with open-weave glass cloth applied with BF 30-36 adhesive on hot service.

5. For Cold Service (Domestic Refrigerated Water) Contractor is to install a vapor barrier on fittings and valves consisting of open-weave glass cloth applied with BF 30-35 adhesive and finished with a flooding brush coat of the same adhesive.

6. Fasten insulation with aluminum bands on approximately 18" centers at all fittings and valves.

7. Protect insulation on tempered and cold service pipes from hangers and guides with pipe protection calcium shields.

8. All waste piping from ice machines shall be insulated for at least 10 feet from the point of connection to the ice machine.

I. Vacuum Breakers: Install pressure vacuum breakers 12" above the highest outlet they are protecting.

1. Install accessibility for periodic testing and assure unit will not become inoperative if subjected to long periods under pressure.

2. Vacuum breakers are to render positive protection against back-siphonage and incorporate a check valve and vacuum relief with inlet discharge shut-offs and field-testing cocks in one assembly.

3. Vacuum breakers are to be rated to 150 PSI working pressure and are to withstand water temperatures of 170 degrees Fahrenheit.

4. Vacuum relief valves are to be brass construction with spring loaded diaphragm member to assure positive opening of air inlet when back-siphonage occurs.

J. Check valves, valves, nipples and other fittings are to conform to piping material in which they are installed.

K. Plumbing fixtures and equipment are to have their own sets of shut-off valves.

L. Piping Identification:

1. Pipe labels shall be installed in parallel with piping; such that label can be read while standing on floor.

2. Flow arrows to wrap entire circumference of bare pipe, or pipe insulation lagging if applicable, and shall be installed at each end of label.

3. Pipe labels to be installed every 30 feet on straight runs, at each side of wall and ceiling/floor penetrations, at each branch line, and within 1’ of each valve and control device.

M. Equipment Identification:

1. Equipment shall have Building Standard mechanically fastened engraved, black tag with white lettering, on laminated plastic tag that identifies Equipment unique identification, and identifies power source if electrical

2. Identification shall be approved by Landlord.

N. Natural gas piping shall originate from the Tenant manifold. Tenant shall provide and install natural gas sub-meter; as approved by Landlord. Tenant shall fully integrate, including consumption tracking and reporting functionalities, natural gas sub-meter into Base Building sub-meter network.

1. Natural gas piping shall include sediment trap(s) constructed from a tee fitting with bottom outlet plugged or capped. Traps shall be accessible for periodic cleaning.

2. Install earthquake seismic shut off valve(s) and vent piping; as required by State of California and Oakland Code requirements.

3. Installation shall comply with NFPA 54 requirements.

O. “Future use” pipe stubs with isolation ball valves have been installed on Base Building domestic water risers for the purpose of Tenants’ use. When utilizing these stubs the integrity of the original diameter shall be maintained. Accommodations shall be made for additional use of stubs without impact to water riser operation; including installing no less than full size tee coming off riser stub isolation valve with new full size isolation ball valve.

1. Piping is not to be up sized after connecting to wet riser.

P. Resiliently isolate any copper piping with pipe insulators to prevent steel to copper contact.

Q. Welding shall only be completed by persons with current welding certifications.

1. Copy of certification shall be provided to Landlord.

R. Tenant’s Contractor shall provide and install ¾ inch NPT manual air vents, with full port isolation valve, at the high point of all piping as required to eliminate air or to manually vent the piping while draining.

S. Thermometer wells shall have heat conductive paste installed.

3.1 FIELD QUALITY CONTROL

A. Site Tests: Contractor shall test all systems in accordance with applicable codes, regulations, and ordinances.

1. Test drains, waste and vent piping as follows:

a. Test system to hydrostatic pressure equivalent to at least 10' head of water.

b. After filling, shut off water supply and allow water to stand two hours under test, during which time there is to be no loss or leakage.

2. Test water distribution systems to pressure of at least 50 PSIG higher than their normal operating static or street main pressure; minimum test 150 PSIG. Run test for two hours with no loss in pressure.

3. If any test shows work to be defective in any way or at variance with specification requirements, make necessary changes and remedy defects.

4. Test piping systems after installation and prior to being put to use, covered or concealed by insulation or building construction.

5. Provide results of testing to Landlord.

6. Contractor is to furnish and pay for all devices, materials supplies and labor required in connection with tests.

a. Contractor is to make tests in presence and to satisfaction of Landlord, Engineer of Record and inspectors of Oakland.

b. Contractor is to notify Landlord at least 48 hours in advance of making required tests so arrangements may be made for their presence to witness tests.

7. Natural gas piping shall be pressurized to minimum 20 PSIG with Nitrogen gas. Run test for four (4) hours with no loss in pressure; or length of time required by Authority Having Jurisdiction. Tenant's Contractor shall protect pressure sensitive devices such as regulators so as not to be damaged during testing.

B. Inspection by Chief Engineer: Contractor is to notify the Landlord at least 48 hours in advance of substantial completion of construction.

1. A walk-through and punch list is to be scheduled for Landlord and/or Chief Engineer to review installation for conformance with approved construction documents and Tenant Construction Standards.

3.2 CLEANING

A. Contractor is to thoroughly blow out, rod out or wash out piping at least twice before final connections are made and before operation of equipment and piping.

B. When connecting to existing waste piping, excluding waste riser stacks, Contractor is to snake out existing waste lines back to riser stack.

3.3 STERILIZATION OF PIPES

A. After preliminary purging, cleaning, and flushing of the system, chlorinate entire potable domestic water system in accordance with current recommendations of American Water Works Association and in accordance with pertinent state and local health codes and regulations.

1. Chlorinate only when prescheduled and provide proper warning signs at outlets.

2. Upon completion of sterilization, thoroughly flush entire potable water system and immediately fill system.

3. When sterilization and flushing are complete, arrange with pertinent agencies for required tests on piping system.

3.4 CLOSE-OUT

A. Provide full-sized record drawings.

B. Provide AutoCAD record drawings.

C. Provide full-sized Contractor's final shop drawings.

D. Provide signed-off construction permits.

E. Provide valve schedule.

F. Provide approved equipment submittals.

G. Provide one (1) complete set of equipment manufacturer manuals including sequences of operation; organized into loose leaf binders and indexed.

H. Provide backflow preventer testing and certification documentation.

I. Provide potable water piping sterilization documentation.

J. Provide copies of test reports.

K. Provide copies of any keys for equipment control panels, access doors, etc.

END OF SECTION

HVAC

PART 1 – GENERAL

Related Sections: Electrical

1.0 SUMMARY

A. Scope of HVAC work for Tenant will depend upon actual alterations and improvements to be performed. However, minimum scope of work for Tenant will typically include functions outlined below.

1. Design and Drawings: Calculate HVAC loads and prepare new design drawings based upon proposed Tenant layout.

    a. HVAC zones are not to be split between two suites.

2. Use available air quantities from Base Building system.

3. Provide copy of professional engineer licensed in California stamped plans to Landlord for review and comment.

4. Obtain building permit for construction for same approved scope of work.

5. Coordinate demolition inside pre-leased space with Chief Engineer to maintain integrity of Base Building systems. Include all equipment, piping, and duct work that are not to be reused in the new design.

    a. Tenant's Contractor shall provide adequate dust control during all demolition activities.

    b. Costs for repair of damage to building systems and unauthorized interruption of building services will be charged to Tenant as applicable.

    c. Contact Building Management to examine materials before disposal.

    d. Demolish and remove from premises items not to be reused in new design.

    e. Prior to the demolition of any air terminal units or walls, which contain an existing thermostat, temperature sensor, or controller contact the Chief Engineer for the approved procedure to safe-off HVAC control devices and associated wiring.

    f. Equipment, piping systems, conduit, and duct work shall not be abandoned in-place. Remove piping, conduit, and duct work back to source.

6. Reroute existing and provide new duct runs as required for Project.

7. Provide acoustically lined transfer air duct boot with ends turned up to create proper return air path in areas enclosed by full height (slab to slab) walls. Transfer air boot shall be sized at no more than 400 FPM air velocity.

8. Add new heating hot water and/or condenser water piping if needed to serve Tenant space.

    a. Flexible expansion fittings are to be installed in heating hot water piping; such that the installed piping will not distort, or create additional force on piping supports, anchors, and equipment, over the entire range of system temperature fluctuations.

    b. Extend new futures of equal size and install isolation valves in manner that allows dedicated shutdown without the interruption of existing tenants.

9. Add, relocate and/or remove air outlets.

10. Provide new thermostats, temperature sensors, and controls as required to meet current Tenant Construction Standards.

11. Provide new VAV air terminal units complete with heating water reheat coil (where required for perimeter zones) and necessary controls.

12. Test, adjust, and balance air and mechanical water systems to obtain designed performance and provide written report to Landlord prior to completing functional testing.

    a. Submit copy of field hand written preliminary report to Landlord and Chief Engineer prior to technician leaving premises after conducting TAB work.

    b. TAB sub-contractor is not be contracted by HVAC sub-contractor. TAB contractor shall have contract with Tenant's Contractor and shall be completely independent from the HVAC sub-contractor.

    c. Tenant to hire Landlord's preferred Commissioning agent. Tenant's HVAC systems and equipment are to be functionally tested by Commissioning agent to adhere to the current edition of LEED CI, EA prerequisite, Fundamental Commissioning & Verification standard.

13. Odor producing activities including but not limited to photo processing, printing, copying, food preparation or storage shall have adequate ventilation and exhaust to prohibit odors or elevated levels of contaminants from entering other Tenant spaces, public spaces, non-public spaces, and adjacent properties.

    a. Special ventilation, exhaust and pollution control equipment may be necessary.

14. Notify Landlord prior to any core drilling. Scanning of floor slab is required prior to any core drilling activity. All proposed coring locations must be approved by a State of California licensed Structural Engineer and the Landlord.

    a. Tenant's Contractor shall request that Landlord verify field scan results prior to coring.

    b. Coring planned within a 10' perimeter of the Base Building Core circumference; shall be scanned via X-ray method.

15. Exhaust from Tenant space terminating to outside of building shall be approved by Landlord.

16. Plans showing complete exhaust duct routing and termination point shall be submitted to Landlord for approval.

17. Tenant is responsible for maintenance and repair of Tenant supplemental equipment and systems.

18. Contractor shall not close or open any Mechanical water system valves. Contractor shall request from the Landlord that Base Building systems be secured or placed back in service by a Building Engineer.

19. Water source heat pumps and other Tenant specific supplemental HVAC equipment shall have the electrical consumption sub-metered; as allowed by Lease.

    a. See Electrical section for sub-meters

1.1 BASE BUILDING SYSTEMS DESCRIPTION

A. Air Systems:

1. Office Floors: The Base Building air system includes (2) Built-up Air Handlers located on the Mechanical floor. Each Built-up Air Handler supplies conditioned air to each floor via a sheet metal duct riser. Return/relief air from each floor flows back to the Built-up Air Handlers via sheet metal duct risers.

    a. Supply-air is distributed at each floor through a looped primary-air duct. Conditioned air is distributed through pressure independent VAV air terminal units.

        1) Design quantities of supply-air available; equally distributed from both supply air duct risers.

            i. L2 thru L8 – total of 20,800 CFM per floor
            ii. L9 thru L23 - total of 21,800 CFM per floor
            iii. L24 – total of 24,200 CFM
            iv. The minimum outside-air per floor is designed for 3300 CFM

        2) Cooling design air flow shall not exceed 30% diversity.

    b. Return/Relief-air utilizes a ceiling plenum for each floor.

    c. Interior zones are cooling only.

    d. Perimeter zones are fitted with hydronic reheat coils; minimum 2-row coils.

    e. Air flow and mechanical water flow are controlled by DDC controls via the Base Building BMS.

    f. BMS network architecture is such that floor-level TECs report to a Floor Level Network Controller (FLNC); via a Local Area Network (LAN). Communication to the BMS network is via the FLNCs.

B. Mechanical water systems:

1. Chilled water is supplied to the Base Building Built-up Air Handler Units only; and not available for Tenant use.

2. Heating hot water:

    a. Supply temperature to be reset based on outside-air temperature and load; with minimum supply temperature of 140°F and a maximum supply temperature of 180°F.

    b. One (1) set of HHWS/R risers distributes HHW to/from the office floors. Tenants shall utilize pipe stubs located on each floor as the point of connection to the HHWS/R risers. Water from one floor may not be utilized for another floor.

    c. 19 GPM available for each office floor; except L24 has 21.5 GPM available.

    d. For floor distribution run the HHWS/R loop in a reverse-return configuration.

3. Condenser water:

    a. Supply temperature 65°F - 95°F

    b. One (1) set of CWS/R risers distributes closed loop CW to/from the office floors. Tenants shall utilize pipe stubs located on each floor as the point of connection to the CWS/R risers. Water from one floor may not be utilized for another floor.

    c. 21 Tons (nominal) of condenser water is available for each office floor.

    d. As allowed by lease; use of the condenser water system requires approval by the Landlord. A fee per Ton, or any fraction thereof, may be assessed.

    e. Tenant's supplemental HVAC units are subject to monthly charges for electricity, water, and chemical water treatment. All supplemental HVAC units shall be sub-metered for electrical consumption; with sub-meter to be furnished, installed, and integrated into the Base Building sub-meter system at Tenant's expense.

4. Condensate:

    a. There are (2) 2" condensate drain risers; (1) at each end of the Core area.

    b. Each 1" point of connection is designed to accept condensate from a 10T load; for a total of 20T load per each office floor. Piping from floor loads to condensate risers shall be distributed such that the 10T per point of connection is not exceeded.

    c. Condensate piping receiving condensate waste from more than (1) evaporator outlet shall be upsized following the second load and provided with an accessible clean-out (wye fitting) at each change of direction.

1.2 DESIGN PARAMETERS

A. Design shall meet or exceed the State of California Title 24 energy requirements. Calculate mechanical loads and prepare design drawings and Title 24 energy efficiency calculations based upon proposed Tenant layout.

1. Include HVAC zoning and load summaries.

2. Obtain building permit for construction using design drawings.

B. The following are values upon which the Base Building HVAC system was designed. Tenant systems shall be designed in a manner that is compatible with the Base Building systems.

1. Summer cooling season:

a. Outside dry bulb = 89°F
b. Outside wet bulb = 66°F
c. Inside dry bulb = 74°F
d. Inside humidity not controlled

2. Winter heating season:

a. Outside dry bulb = 31ºF
b. Inside dry bulb = 72°F (+/- 3°F)
c. Inside humidity not controlled

3. Minimum ventilation of 15 CFM/person (2013 UBC); not less than 0.15 CFM/ft²

C. Vibration in walls and floors shall not be perceivable to the touch in any occupied space. The maximum NC level shall be as follows:

1. General office areas NC 35

2. Conference rooms NC 30

1.3 ZONING

A. All areas of a Tenant Suite shall be zoned as required to maintain uniform temperatures in a space due to variable heat gain from outdoor exposure, variation in people density, etc. Each zone shall have its own temperature sensor and air terminal unit with controller. The following zoning criteria is to be followed:

1. Perimeter and interior spaces shall be separately zoned.

2. Spaces with different solar exposures shall be separately zoned.

3. Temperature sensors shall not be installed in open areas with dual exposures; unless corner open area is separately zoned.

4. All enclosed corner rooms shall be separately zoned.

5. Rooms shall be grouped onto the same zone only if room use type functions are similar.

1.4 DIRECT DIGITAL CONTROLS

A. DDC controllers and software shall be by Automated Logics Corporation and be compatible with ALC's WebCTRL building automation system; no exceptions.

B. BMS contractor shall provide means to identify for each floor area or each Tenant Suite on multi-Tenant floors, by air terminal unit ID, the worst case zone in need of mechanical heating and the worst case zone in need of mechanical cooling; for the purpose of identifying rogue zones. This information is to be displayed on a BMS graphic page.

C. BMS Graphic pages are to be based on Tenant Improvement CAD drawings.

D. BMS contractor shall exclude from HVAC program logic all program logic strings that are not actively utilized by the equipment that they reference. As an example; a cooling-only VAV air terminal unit will not have any reference to mechanical heating control logic.

E. Provide a detailed written Sequence of Operation for each piece of equipment/system controlled, or monitored, by the Base Building BMS.

1. Sequences of Operation shall not be a copy of the Tenant Improvement Construction Documents. Sequences of Operation shall be the contractor's interpretation of the sequences noted in the Tenant Improvement Construction Documents and these Tenant Construction Standards.

2. The Sequences of Operation are to be linked to respective BMS graphic pages; such that an Operator may open and review the approved Sequences of Operation from the respective BMS graphics page.

3. Capability shall be created for zone set points to be globally altered based on (3) levels of Demand Response criteria.

    a. Zones shall have ability to be individually taken out of global set point change scheme by Operator at the BMS front-end station.

    b. This Demand Response set-point change shall not impact zones that are considered critical.

4. Tenant supplemental equipment and systems are to have stand-alone controls and not be integrated into the Base Building BMS.

1.5 SUBMITTALS

A. Prior to commencing work, the HVAC sub-contractor shall assist Tenant's Contractor in submitting to Landlord required documentation including the following.

1. Landlord approved construction documents.

2. Construction permit.

3. Any City and Fire Department variations granted for Project.

B. Contractor shall review equipment and material submittals prepared by suppliers, verify compliance with these Tenant Construction Standards, mark copies as acceptable, and submit to Architect. After Architect's approval, submit two (2) sets of approved documents to Landlord.

C. Project Closeout Submittals. Prior to Landlord final inspection and acceptance of construction, Contractor is required to provide the following documentation to Landlord:

1. Two (2) complete sets of operating, maintenance and installation manuals.

   a. Each set of documentation is to be inserted into a 3-ring binder(s), include a table of contents, and be arranged in a logical fashion with tabs.

2. One (1) set of complete, reproducible as-built (and CD with latest CAD version) drawings including control and wiring diagrams. Drawings shall contain key map of floor with Tenant location and summary of CFM and GPM used from Base Building systems.

3. Two (2) bound air and water balance reports approved and stamped by the Mechanical Engineer of Record. Balance reports shall include:

   a. Each air terminal unit identification address for reference.

   b. Detailed readings for each air outlet of each air terminal unit balanced; including design and actual readings (both minimum and maximum).

   c. The size and flow coefficient of each air terminal unit.

   d. Supply and return water temperatures and flow rates.

   e. Where applicable, heating hot water flow and discharge air temperature at maximum heating.

   f. Floor plan of space balanced showing air terminal unit and outlet locations.

4. All equipment including, but not limited to, heat pumps, VAV boxes, exhaust fans, etc. shall be labeled consistent with existing label system.

5. Also see Closeout requirements at the end of this section.

PART 2 - PRODUCTS

2.0 MATERIALS

A. Ductwork:

1. General: Ductwork shall be galvanized sheet metal in accordance with latest edition of the SMACNA duct manual and ASHRAE guide. All taps into overhead primary-air duct loop for air terminal units shall be conical or at a 45° angle to duct.

2. No flexible duct is allowed upstream of air terminal units. Duct sizing for duct from taps of mains to VAV air terminal units shall be as follows:

   a. For runs less than five (5) equivalent feet in length, primary-air ducts to air terminal unit inlet shall be the air terminal unit inlet size.

b. For longer runs, primary-air ducts shall be sized at no more than 0.25 inch per 100 feet friction rate. Where primary-air duct supply to air terminal unit is larger than unit inlet, provide sheet metal transition with taper at inlet with maximum 15 degree angles, minimum 18 inches long.

c. All round duct shall be seamless spiral.

d. Seal transverse and longitudinal joints of ductwork to comply with SMACNA Duct Standards. There shall be no hissing sound emitting from the ductwork.

1) Seal duct upstream of VAV air terminal units for medium pressure (4" wc); Class A.

2) Seal duct downstream of VAV air terminal units for low pressure (2" wc); Class A.

3) Seal Heat Pump supply & return duct for low pressure (2" wc); Class A.

4) Seal exhaust/return-air duct, maximum 2000 ft/min, for low pressure (2" wc); Class B.

e. Seal duct joints using hard cost PS-S tape or DT tape and HD-20 adhesive as recommended by manufacturer.

3. Flexible Ducts: Thermaflex or Genflex flexible sound absorbing ducts with outer plastic liner, R-4 insulation, helical support wire and scrim cloth inner liner. Liner shall be black.

a. Flexible ducts shall be UL Class I air ducts, comply with UL-181, NFPA 90A and 90B, and be approved by the City of Oakland. Maximum flexible duct length shall not exceed 5'0" with no more than one long radius 90 degree elbows allowed.

b. Flexible duct may be used at end of runs only.

c. Flexible duct clamps are to be adjustable screw type stainless steel straps approved for use with flexible duct work.

4. Kitchen Hood Exhaust Ducts: Grease ducts serving a Type I hood shall be No. 16 gauge steel or No. 18 gage stainless steel as required by duct size in accordance with Oakland and California Mechanical codes.

a. Continuously weld longitudinal joints.

b. Weld all transverse joints and reinforcing angles.

c. Do not cross-break bottom panels of duct.

B. Air Terminal Units:

1. Single Duct, pressure independent Variable Air Volume Terminal Units:

a. Manufacturer:

1) Titus Model DESV or approved equal.

b. Casing: Minimum 22 gage galvanized steel, internally lined with 1" thick dual density glass fiber insulation that complies with UL 181, NFPA 90A, and ASTM G21 and G22.

1) Casing Air Leakage: Not more than 2% at 3" W.G. static pressure.

2) Air terminal units shall have manufacturer's ∆P flow curves clearly labelled and permanently installed at each air terminal unit.

c. Damper: Heavy gage steel with shaft rotating in Delrin or bronze oilite self-lubricating bearings.

1) Shaft shall be clearly and permanently marked on end to indicate damper position.

2) Damper shall have mechanical stops to prevent over-stroking, and synthetic seal to limit close-off air leakage to maximum of 5 CFM at 3" wc static pressure.

d. Air terminal units shall be capable of normal operation at minimum of 0.5" wc static pressure.

e. Due to Base Building capacity and systems, use or reuse of installed building VAV air terminal units must be coordinated with the Landlord.

f. Provide a minimum of 5 feet acoustically lined (1" duct liner) plenum downstream of all VAV air terminal units.

g. Air outlet balancing shall be through volume dampers located at the upstream end of the flexible round duct connection to the air outlet or duct/plenum tap or at spin-ins at air terminal unit supply-air plenum. Where dampers are inaccessible, such as at drywall ceilings, gain Landlord's approval to use remote operated balance damper control devices.

h. Air terminal units shall have engraved ID tag mechanically fastened near the BMS controller.

2. Actuators and Controls: Provide digital electronic actuators, flow analyzers and controls as required.

a. Units shall be field adjustable.

b. Temperature sensors shall have communications port for field service, no temperature display and be compatible with the existing control system.

3. Communication wiring to be routed to match existing. All new VAV terminal unit installations require a connection to an existing or new LAN trunk as well as a control power circuit. Field verify existing conditions and design to meet Tenant requirements.

4. Provide Demand Control Ventilation and associated CO2 sensors in compliance with CEC Title 24 section 120.1(c) 3. See floor plans for rooms needing Demand Control Ventilation. The CO2 sensors shall be compatible with the BMS controls. The CO2 levels shall be monitored in the Conference rooms or similar densely occupied rooms with occupant density of 40 sf/person or below. When the CO2 reading exceed 600 ppm

(adj) first the VAV box minimum shall be increased incrementally in steps until the maximum airflow setting is reached for the box. If the CO2 alarm is still present, an alarm shall be sent to the BMS. Once the CO2 level drops below 600ppm, the control sequence shall resume normal temperature control functions for the room.

5. All perimeter zone air terminal units shall have hydronic reheat coils. Reheat coils shall be made of seamless copper tube with aluminum fins mechanically bonded to coils, integrally factory mounted as part of the air terminal unit, be rated for required working pressure at floor on which they are installed, and have a minimum of two (2) rows.

    a. Install to meet manufacturer's recommendations.

C. Air Outlets:

1. Supply Air: New air outlets shall be 24" by 24" perforated face ceiling diffusers with integral dampers.

    a. Provide round to square transitions if round duct is used.

    b. Manufacturer:

        1) Titus Model PMC or approved equal for narrow tee ceiling system.

    c. In open interior offices, supply air shall be distributed evenly using no more than approximately 250 CFM per outlet.

2. New linear slot diffusers shall be Titus Model FL or approved equal.

3. Return Air: New return air outlets shall be 24" by 24" perforated face ceiling grille with 22" by 22" neck.

    a. Manufacturers:

        1) Titus Model PAR or approved equal for narrow tee ceiling system.

    b. New and reused perforated face grilles shall be provided with flex duct.

    c. Interior of diffuser to be black.

    d. For return air through full height (slab-to-slab) partitions; transfer ducts shall be provided to ensure return air paths remain open from each space to the main return air. Return-air grilles and transfer ducts cannot be obstructed by other ducts, piping, conduits, hangers, etc.

        1) Acoustical partitions: Provide lined transfer ducts or boots.

        2) Rated corridors: Extend return air duct over corridor without openings so no fire/smoke dampers are required.

        3) Velocity through un-ducted plenum return/transfer elements shall not exceed 400 FPM.

4. Kitchen Air: New supply, return and exhaust air outlets located within kitchen area shall be constructed of aluminum of same types as noted above.

D. Duct Specialties:

1. Flexible duct connections are to be 16 oz. airtight Vent-Glas, by Vent-Fabrics, Inc., non-combustible fabric with fire retardant neoprene outside coating.

    a. Flexible duct connections shall be installed where ductwork connects to rotating, vibrating, or noise producing equipment such as a water source heat pump, supply fan, or exhaust fan; to produce an airtight and waterproof seal. Provide rolled form sheet metal collar on each end of flexible connection. Flexible fabric shall have minimum of 2” metal to metal slack and not contain ACM. Flexible fabric shall be minimum of 4” length and maximum of 10” length.

    b. Attach to duct by lock seam.

2. Turning vanes are to be Double thickness, air foil type.

3. Duct access doors:

    a. Shall be installed at automatic dampers, on linkage side, and at Fire/Smoke dampers.

    b. Duct access doors shall be finished such that there are no sharp edges at the duct.

4. Concealed Damper Regulators are to be Ventlock Model 677 with miter gears and rod attachment, as required.

E. Dampers:

1. Damper shaft end(s) shall be clearly and permanently marked to indicate damper position.

    a. Felt pen does not meet requirement of permanent marking.

2. Balancing Dampers shall be as follows:

    a. Provide single or multi-blade balancing dampers constructed per SMACNA/ASHRAE recommendations.

    b. Provide hand locking quadrant and install where required for proper operation. Provide ribbon at each damper for easy identification.

3. Fire Dampers to be UL listed and California Fire Marshal approved and shall comply with the latest UL and Fire Marshal testing criteria.

    a. For supply Air, Fire Damper shall be Ruskin or approved equal.

    c. For Return Air, Fire Damper shall be Ruskin or approved equal.

4. Combination Fire/Smoke Dampers (FSD) are to be as follows:

a. California Fire Marshal approved, UL listed per UL 555 and UL 555S leakage Class I and 350°F elevated temperature rating.

b. Heavy 13 gauge equivalent frame construction.

c. Low pressure drop airfoil blades.

d. Firestat.

e. Damper electric actuator, power open – fail close type, heavy duty, low noise and non-stall type.

f. Manufacturers:

1) Ruskin or approved equal.

g. FSD shall be installed with remote position indicating contacts wired to report back to Life Safety Panel.

F. Water Source Heat Pumps and Air-conditioning Units:

1. Manufacturer

a. Trane: DXHF, 2-stage, R-410A.

b. Liebert Mini-Mate2, to be used only for computer room supplemental cooling.

c. Or Landlord approved model with EER at 15 or greater.

2. Units shall be, 277/480V and have ECM fan motor(s).

3. Units shall include pleated MERV 13 rated air filters with a minimum 2” deep filter rack.

4. Factory assembled packages to be completely piped, wired and charged with refrigerant requiring only power, control, and piping connections.

5. Heat Pumps shall be of extended range model for 45 - 90 degrees F entering condenser water.

6. Provide slow-closing automatic condenser water isolation valve interlocked to the unit’s compressor(s) to close when compressor(s) is off.

7. Unit shall include a sound insulating liner around entire unit with 2 layers of 1.5” thick Rigid Fiber board plus 2# vinyl sectional panels for access.

8. Ratings: UL Listed, ARI certified, to meet current Title 24 energy regulations and fire code regulations.

9. Sound Power Levels: Selected to conform to ASHRAE guidelines for office occupancy.

10. Thermostat: Stand-alone programmable thermostat.

11. Pressure rating shall be as required by location. Minimum 1.5 times the system working pressure.

12. Provide secondary drain pan with connection routed to conspicuous location. Pipe primary drain to nearest condensate drain riser, coordinate routing with Landlord. Provide condensate pump for primary drain and condensate overflow switch kit as part of manufacturer's package when location of unit does not allow proper drainage to Risers.

13. Coordinate pump location with Chief Engineer or designee.

14. Overflow secondary drain shall be white with escutcheon where it penetrates ceiling.

15. Condensate pump discharge shall include a check valve.

16. Condensate pump discharge pipe/tubing shall be copper. Plastic pipe/tubing is not allowed; except for a small length of clear vinyl tubing installed at pump discharge transition and secured with stainless steel hose clamps.

17. Condensate pump discharge pipe/tubing shall be installed neatly, maintain consistent slope, and have dedicated supports.

18. Condensate pipe/tubing shall be labeled.

19. Condensate drains shall be trapped per equipment manufacturer’s instructions, have wide radius fittings, and wye clean-out fittings at change of direction.

20. Unit(s) shall be installed to meet or exceed all manufacturer’s access requirements.

21. Supplemental air conditioning units shall have engraved ID tag mechanically fastened near the unit’s control panel.

G. Base Building Wireless Leak Detection System:

1. Data Closets – All Tenants with water-cooled air conditioning systems within their space are to furnish and install a building standard leak detection sensor (s) that is connected to the buildings leak detection system AND provide manual shut-off valves to be able to stop the water flow to their individual system (s). The shut-off valves are to be easily accessible without a ladder.

H. Fans: Ceiling exhaust fans shall have an ECM motor and an electronic volume regulator.

1. Sound power levels shall be selected to conform to ASHRAE guidelines for office occupancy.

2. Cook, Greenheck, Penn-Zephyr; or Landlord approved equal.

I. Larger Fans: Centrifugal fan with an aluminum non-sparking backward incline centrifugal wheel.

1. Fan wheel shall be statically and dynamically balanced.

2. Fan shall have an AMCA label and be UL listed.

3. Fan and motor bearings shall be permanently lubricated; when installed outside.

4. Open end of fan housing shall be protected by galvanized bird screen.

5. Intake duct shall be installed on supply fans such that rain water will not enter the fan; when installed outside.

6. Fans shall have adequate seismic base and vibration isolation.

7. Grease exhaust fans shall have a scroll connection and means to keep grease from dirtying the roof; including a filter medium to soak up grease.

J. Kitchen hood exhaust system to be UL listed for grease removal. Provide drain connection with grease trap and vented roof curb.

1. Kitchen hood shall be made of stainless steel.

K. Walk-in refrigeration boxes shall have water cooled condensing units.

L. Pipe and Pipe Fittings: Piping shall conform to ASTM and be free of defects. Pipe and pipe fittings shall be manufactured domestically.

1. For Condenser and Heating Hot Water Use: Type “L” hard drawn copper pipe with silver brazed joints.

a. 95/5 or other lead-free solder and wrought copper may be used for making final connections to the VAV reheat coils and heat pumps.

2. For Condensate Drain Pipe Use: Copper type M or type L, ASTM B88, wrought copper wide radius fittings, soldered joints.

3. Press-fit fittings, such as “Shark-bite”, and crimped O-ring type fittings are not allowed.

4. Use of mechanical/saddle tees and T-drill collaring, or similar, are not allowed; only pre-manufactured tees are allowed.

M. Pressure vessels: All pressure vessels, including expansion tanks, shall be ASME rated and stamped.

N. Valve and Piping Specialties:

1. All valves shall be domestically manufactured.

2. Valves and valve construction shall be suitable for the pressure, temperature, and fluid quality of the service in which they are to be used. The use of gate valves is not permitted.

3. Manufacturers:

a. Apollo

b. Milwaukee

c. Or Landlord approved equal

4. Valves ½ inch through 3 inches diameter are to be full port ball valve with threaded connections. Greater than 3 inches diameter are to be full port ball valve or butterfly valve, lug type with infinite throttling and memory stop handle.

5. Valves used for venting and draining applications shall have ¾ inch hose bib fitting with male threads and brass cap installed on open end of valve.

6. Manual balance valves ½" through 2-1/2" diameter are to be ball valve type Circuit Setters, threaded with integral union and capped ports. 3" diameter and above are to be plug valves.

7. Balance valves shall not function as isolation valves. Isolation valve shall be installed to isolate balance valve from system.

8. Flow control devices and Coil kits shall be manufactured by FDI or Nexus Valve; and be automatically self-adjusting.

    a. Ball valve end of flow control devices shall be FPT.

9. Flow rating shall be stamped on flow control device.

10. Flow control device shall not function as isolation valve. Isolation valve shall be installed to isolate Flow Control device from system.

11. For Temperature and Pressure Test Station use Peterson Engineering Company, ¼ inch or ½ inch MPT "Pete's Plug" with solid brass fitting cap for pressure rating required. Utilize extended length Pete's Plug fittings when piping is insulated.

12. Strainers are to be wye type Base Building standard pattern with blow-off hose valve and hose adapter with cap chained to fitting; for temperature and pressure rating as required.

13. Valves installed 10 feet and higher above finished floor shall have chain operator.

14. Tenant's contractor shall provide and install ¾ inch NPT air vents, with full port isolation valve, at the high point of all piping as required to eliminate air or to manually vent the piping while draining. Provide manual air vent valves in the piping connections to each HHW coil and each CHW coil; both supply and return.

    a. Air vents are to be automatic or manual and rated for application; as approved by Landlord.

    b. Air vents shall have soft tempered copper tube pigtail to direct discharge of vent.

15. Dielectric Nipples and Unions: Isolate ferrous from non-ferrous materials in piping systems and equipment connections

a. EPCO Model FX dielectric union or approved equal, rated for minimum 210 °F temperature.

b. Or brass pipe nipple with minimum length of 6”.

16. Thermometers and wells are to be Weksler Model 5AA, 5” or Building Standard diameter, with dry well and appropriate temperature scale according to application. (Pressure rating as required.)

    a. Thermometer wells shall be dry type and have thermo conductive paste installed.

17. Pressure gauges are to be Weksler EA14 or equal, 4-1/2" or Building Standard diameter; with the typical operating pressure as the scale mid-point. (Pressure rating as required.)

    a. Pressure gauges shall be installed at inlet & discharge of any pump or pressure regulating/reducing device.

    b. Pressure gauges shall have isolation petcock.

18. Air Vents are to be Lunkenheimer #1778 - 3/8" or Building Standard manual. (Pressure rating as required.

19. Strainers are to be Muessco, Armstrong "Y” or Building Standard pattern with blow-off hose valve and hose adapter. (Pressure rating as required.)

O. Valve Identification and Schedule

1. Valves shall be tagged with stamped brass tag that identifies valve as recorded in valve schedule consistent with existing Building valve numbering. Tags shall be attached to valve bodies with brass chain.

2. Upper portion of tag shall identify Service type:

    a. HHWS for mechanical heating hot water supply

    b. HHWR for mechanical heating hot water return

    c. CWS for mechanical closed loop condenser water supply

    d. CWR for mechanical closed loop condenser water return

3. Lower portion of tag shall provide unique valve ID:

    a. Floor # - Valve ID # (#01, #02, #03, etc.)

4. Valve schedule shall be consistent with existing building valve schedule and include the following:

a. Valve tag ID

b. Service type

c. Valve size

d. Valve location (e.g. ceiling of Room #)

e. Valve serves (e.g. sink for kitchenette Room #)

5. Drain valves and angle stop valves are not required to be tagged or included in valve schedule.

P. Pipe and Ductwork Insulation:

1. General: Comply with State Code of Regulations, current Title 24 or code energy regulations.

2. Manufacturers:

a. Owens-Corning Fiberglass
b. Knauf
c. Manville
d. Certain-Teed

3. Ductwork Insulation: Glass fiber, flexible, non-combustible blanket with vapor barrier jacket bonded to aluminized foil.

4. Ductwork Liner: Glass fiber liner, flexible, non-combustible blanket with permacote coating, ASTM G21 and G22.

5. Pipe: Fiberglass, rigid and pre-molded, non-combustible, with all-service jacket with self-sealing longitudinal laps and butt strips.

6. Exterior pipe requiring insulation shall have aluminum jacketed lagging on straight runs of pipe and all pipe fittings.

7. All insulated piping, excluding insulated condensate piping, shall include properly sized pipe insulation protection shields at piping supports.

8. Pipe insulation protection shields shall be waterproofed hydrous calcium silicate insulation impregnated with silicon solution, incased in a 360 degree, 18 gauge galvanized sheet metal shield.

9. Select to conform to ASHRAE guidelines for office occupancy noise criteria.

10. Products shall not contain any asbestos.

Q. Equipment and Piping Identification:

1. Equipment shall have Black with white lettering engraved equipment identification, as approved by Landlord, mechanically fastened to Equipment.

2. Pipe labels shall be installed in parallel with piping.

    a. Self-Adhesive Markers: W. H. Brady Co. or Seton; or Landlord approved substitute.

    b. Flow arrows to wrap entire circumference of bare pipe, or piping insulation lagging if applicable, and shall be installed at each end of label.

    c. Pipe labels to be installed every 30 feet on straight runs, at each side of wall and ceiling/floor penetrations, at each branch line, and within 1' of each valve and control device.

R. Direct Digital Controls

1. Software and hardware manufacturer: Automated Logic Corporation (no exceptions). To be compatible with ALC's WebCTRL Building Automation System.

2. Approved vendors:

    a. Sunbelt Controls:
        - 4511 Willow Road
        - Suite 4
        - Pleasanton, CA 94588
        - (888) 786-2332

    b. All DDC Building Management System (BMS) work to be performed by Sunbelt Controls to match operations and graphic interface of existing Base Building HVAC controls.

3. Zone temperature sensors:

    a. Zone temperature sensor shall be an element contained within a ventilated cover, suitable for wall mounting, with insulated base.

        1) Use ALC "ZS Plus" (part #ZSPL-ALC) for typical zone temperature sensor applications.

        2) Use ALC "ZS Plus" (part #ZSPL-C-ALC) for zone temperature sensor applications that include CO^2 monitoring.

4. Control Valve & Actuator:

    a. Ball valve type with stainless steel ball and stem; pressure and temperature rated for application.

    b. Minimum 50 PSIG close-off and operating differential pressure rating.

    c. Have capability to provide status feedback to BMS.

d. Manufacturer: Belimo or Landlord approved equal.

e. Identification:

3) Zone sensors shall have pTouch label identifying associated air terminal unit.

4) Controllers shall have input & output cabling labeled to identify function and associated device.

5. Air terminal unit, or other dedicated specific equipment controllers, shall be labeled with associated air terminal unit or equipment identification.

6. Higher level controllers shall be labeled with specific controller ID.

7. Cabinets & boxes shall have mechanically fastened black tag with white lettering engraved equipment identification; as approved by Landlord.

S. Variable Frequency Drives shall be the ACH550 series manufactured by ABB.

1. VFD installations shall be field verified and started-up by a factory authorized service technician.

2. VFDs installed outdoors shall be manufactured for a NEMA 4 rating.

T. Motors provided under this section shall be premium efficiency inverter duty rated; including factory installed motors. Motors and accessories shall be UL listed and comply with NEMA standards.

1. Motor service factors shall be minimum of 1.15

2. Motors larger than ½ HP shall be rated for 460 VAC

3. Air terminal unit fan motors shall be rated for 277 VAC

4. 1/2 HP and smaller motors shall be rated for 277 VAC; or 120 VAC

U. Grease Precipitator:

1. Tenant shall furnish and install a grease precipitator for all Type I (grease laden) exhaust.

2. Grease precipitator shall have carbon filter module included.

3. Exhaust shall be ducted to discharge outside of the Building structure; and not impact the quality of air that is drawn into the Building structure.

4. Tenant shall operate and maintain grease precipitator per manufacturer’s recommendations and the requirements of the Authority Having Jurisdiction

PART 3 – EXECUTION

3.0 DEMOLITION (pre-leased spaces)

A. Clean existing materials and equipment that are to be reused. Report damage or defects to the Building Management. Metals with scrap value: brass, copper, & aluminum shall be provided to Landlord.

B. Seal-off duct and equipment openings to prevent dust from collecting.

C. Repair any damaged piping insulation on piping to remain.

D. Disconnect and remove all abandoned equipment, piping, duct work, and controls back to source.

E. Holes in floors and ceilings left from demolition shall be properly patched and fire proofed; as approved by Landlord.

F. Properly recover any refrigerant in equipment; prior to demolition.

3.1 INSTALLATION

A. Tenant’s Contractor shall provide “Base Building Systems Shutdown” request document to Building Management, in accordance with established Building procedures, at least 72 hours prior to major impacts to the existing HVAC systems. Only Building Engineering staff shall open/close Base Building system isolation valves; including riser stub-outs for Tenant’s use. All costs for shutdowns requested by Tenant, or necessitated by Tenant's Alterations, by Building personnel shall be at the Tenant's cost.

B. Hot Work process: Hot work is any work that involves an open flame and/or creates hot metal debris. The Tenant’s Contractor is responsible for managing the Hot work process and providing Hot work permit documentation to the Building Engineering Team; upon request. Tenant’s Contractor shall provide a copy of their Hot work permit form for Landlord’s approval at beginning of Project; prior to engaging in Hot work.

1. Hot work cannot occur simultaneously with a Fire Protection system impairment on the same floor.

2. Tenant’s Contractor shall be issuer of Hot work permits and manager of Hot work process.

3. Hot work permits:

a. Shall not last longer than one work shift and shall not apply to more than one floor simultaneously.

b. Shall be issued just before Hot work activity starts.

c. Shall not be self-issued by sub-contractors.

d. Shall be issued to each Trade engaged in Hot work.

4. A copy of open Hot work permit(s) are to be posted in the area(s) of the Hot work.

5. Tenant's Contractor shall:

    a. Provide fully charged tagged fire extinguisher(s) in the work area(s).

    b. Provide basic training for employees engaged in Hot work activities.

    c. Check the work area for any smoldering materials following Hot work activities.

6. Tenant's Contractor shall provide dedicated fire watch "spotter" personal as required under the following conditions:

    a. Workers' field of vision is limited.

    b. Work is occurring high above the floor.

    c. When hot metal debris is falling to floor level below.

C. Duct Installation: Install ductwork and dampers according to SMACNA standards. Ductwork shall be routed as tight to structure as possible. Provide ribbon at each manual balancing damper for easy identification.

1. Provide supports and seismic bracing per latest SMACNA Manual "Guidelines for Seismic Restraints of Mechanical Systems".

2. Combination Fire/Smoke damper shall be installed as required by the Authority Having Jurisdiction.

3. Fire dampers and Fire/Smoke dampers shall be installed according to California State Fire Marshal and the Authority Having Jurisdiction and exactly as tested by UL to develop fire ratings.

    a. Provide minimum 18" by 12" access doors in ductwork and furring.

4. Internal linings, flex ducts and adhesives shall be labeled in accordance with UL 181 Standard for Safety.

5. Provide return air grilles to allow free passage of return air above ceiling to mechanical room or return air shaft.

    a. Strategically place return grilles to promote cross ventilation, even temperature distribution, and compensate for solar load.

6. Provide return air openings using acoustically lined (1" duct liner) transfer air boots with ends turned up (with Fire Dampers, Fire/Smoke dampers, if required) in Tenant demising partitions.

7. Open duct and equipment shall be sealed with plastic wrap to keep dust out, and kept sealed, by Tenant's Contractor during construction.

8. Install air system to conform to ASHRAE recommended noise criteria for private offices. Noise criteria shall be based upon finishes of actual furnishings in Tenant space (partition, floor, furniture type).

9. Maximum flexible duct length shall be 5’-0" and no more than one radius 90° elbow shall be allowed. Flexible duct is only permitted for end runs.

10. Extend make up air ducts for electrical rooms so that they are ducted to a return grill inside the tenant space.

11. Seal all duct gores.

12. Extend make up air duct from restrooms so that it is tied to interior VAV box and a return grill inside tenant space. Balance distribution of air so that it does not create an excessive negative pressure condition in public restrooms.

13. Kitchen Hood and Exhaust Duct:

    a. Installation shall be in accordance with latest versions of State California Mechanical Code, NFPA, and City of Oakland requirements.

    b. Provide access doors at each change in direction and at intervals to provide for adequate inspection and cleaning.

    c. Slope duct minimum 1/4" per foot down toward hood. For horizontal duct exceeding 75 feet in length, slope duct a minimum 1" per foot down toward hood or an approved grease reservoir.

    d. Duct from point of penetration of ceiling, wall or floor to outside air shall have a fire-rated enclosure to be provided by the General Contractor.

    e. Seal duct enclosure around duct and vent to outside through weather protected openings.

    f. Separate enclosure from duct by at least 3” and not more than 12”. Enclosure shall serve single grease exhaust system.

D. Piping Installation: Piping, joints, valves, piping specialties, pump casings, AC unit coils, etc. shall be suitable for the building pressure zone at floor on which they are installed.

1. Heating Hot Water and Condenser Water piping made from copper shall be brazed.

2. Piping shall not be installed within the vertical space above electrical distribution equipment and telecomm equipment. Do not locate piping above motor control centers or disconnect switches; and comply with NFPA 70 chapter 1 standards.

3. Piping that is subject to “sweating” shall be insulated.

4. Pipe fittings and couplings shall not be installed within 1 foot on either side, of electrical distribution system components such as bus duct, distribution boards, panel boards, Motor Control Centers, Variable Frequency Drives, etc. and telecomm equipment.

5. Contractor is to use Superstrut or Grinnell hangers and structural attachments. Install properly braced for seismic restraint and spaced as follows:

    a. ½" – ¾" for 5'-3/8" minimum rod size
    b. 1" – 1 ¼" for 6'-3/8" minimum rod size
    c. 1 ½" - 2" for 8'-3/8" minimum rod size
    d. 2 ½" - 3" for8'-1/2" minimum rod size

6. Use cadmium plated or galvanized hangers, attachments, rods, nuts, bolts, etc.

7. Do not burn or weld structural members without Landlord's approval.

8. Provide galvanized steel sleeves when pipes pass through fire rated partitions, walls, floors, concrete slabs. Sleeves shall be 2" larger than the pipe and extend 2" above floor slabs. Seal openings and gaps in piping as follows:

    a. On Non-rated Walls seal annular space with fiberglass.

    b. On Fire Walls use U.B.C. approved and U.L. listed fire/smoke sealants.

9. All piping concealed in inaccessible locations, such as pipe shafts, shall be brazed or welded.

10. Expansion tank shall have pressure gauge installed at inlet piping.

    a. Pressure gauges shall have isolation pet-cock

11. Piping shall not block service access, equipment components, or electrical clearances to equipment and shall not run under equipment or electrical junction boxes.

12. Flexible stainless steel hose kits shall be used on water-cooled AC units/heat pumps for vibration isolation. Hose kits are not allowed on air terminal unit coil connections.

13. Resiliently isolate any copper piping with pipe insulators to prevent steel to copper contact.

14. Provide manual air vents at all high points in Mechanical water piping.

15. Valves:

    a. Shall be installed such that handle can move freely between full open and full closed.

    b. Install valves with stem vertical and handle up wherever possible. If this is not possible notify Chief Engineer before installing valve.

    c. Valve handles shall not be field modified.

    d. Valves to have Building Standard identification tag installed.

16. Heat exchangers shall have analog thermometers installed at both inlet piping connections and both outlet piping connections.

17. Thermometers and pressure gauges shall be installed such that they can be read by personnel standing on the floor.

E. Coring requires approval of State of California licensed Structural Engineer. Scanning is required to locate core.

1. Scanning results in field, for proposed core locations, shall be verified by Landlord prior to coring.

2. Use of pneumatic hammer, impact electric, and hand or manual hammer type drill are not allowed when penetrating concrete or masonry.

3. Any coring planned in a 10’ wide circumference around the Base Building Core area shall be scanned using the X-ray method prior to coring.

4. Contractor shall have person below during all coring activities to catch the concrete plug and any slurry from the coring activity.

F. Duct and Piping Insulation:

1. Exposed fiberglass material is not allowed. All exposed fiberglass material shall be properly sealed with appropriate paint-on insulation sealant or foil tape.

2. Wrap unlined sheet metal supply and return air ducts with 1-1/2" thick duct wrap with reinforced foil facing, fiberglass RFK 75 insulation. Owens Corning, Mansville, or Certain Teed.

3. All piping and ducts shall be fully pressure tested before insulation is applied.

4. Continue Insulation and vapor barrier through penetrations.

5. Pipe insulation shall be sealed to maintain continuous vapor barrier.

6. Provide acoustical 1" lining 5’ minimum downstream of all AC units and 5' upstream and downstream of conference exhaust fans to conform to ASHRAE recommended noise criteria for room type.

7. Insulate condensate drain lines with 1" pre-molded fiberglass with ASJ.

8. Insulate condenser water lines that pass through computer rooms and other critical areas.

9. Insulate duct and pipes in accordance with Title 24 requirements.

10. Exterior insulated piping shall have aluminum jacketed lagging on straight runs of piping as well as fittings.

G. A. C. Unit and Heat Pump Installation: See Attachment #1 at the end of this section for details.

1. Equipment openings shall be sealed with plastic to keep dust out, and kept sealed, by Tenant's Contractor during construction. All duct openings shall be sealed with plastic to keep dust out, and kept sealed, by Tenant's Contractor during construction.

2. Units shall be installed above non-critical areas and be readily accessible. The design intent shall be that these units are installed in close-by corridors, near doorways; or other areas where access will not be impeded by furniture or walls.

3. Provide adequate access for filter removal, parts replacement, inspection of moving parts, and controls. For Units installed in ceilings; bottom access is acceptable upon Landlord approval.

4. Units shall be supported with vibration isolation hangers and shall be seismically braced. Also equipment vibration shall be isolated and not transfer to attached duct.

5. Contractor shall install new clean high-capacity pleated MERV 13 rated air filters just prior to Landlord's acceptance; following construction. Filters shall be 2 inches deep.

6. Pipe condensate drain line, with vent, to nearest condensate riser as directed by Chief Engineer. Do not trap pumped condensate lines.

7. Provide ducted return for all AC units for all server or equipment rooms.

8. All Supplemental HVAC and/or heat pump shall be metered separately for 24/7 metering.

H. Chemical Preparation of Piping:

1. Tenant's Contractor shall rinse and flush with clean water all new mechanical piping installed during the Tenant Improvement Construction.

2. Tenant's Contractor shall hire the Base Building Water Treatment service provider to chemically clean, passivate, and treat all new mechanical piping, including copper, installed during the Tenant Improvement Construction.

a. Tenant's Contractor shall provide accommodations in new piping to meet this requirement and provide means to circulate chemical agents through piping.

3. Mechanical water system riser isolation valves are to remain closed during the treatment process.

4. Tenant's Contractor shall contact Building Management to arrange for opening of riser isolation valves; following chemical treatment of new piping.

I. Access Panels:

1. Requirements: Provide and coordinate installation of access panels required for maintenance and inspection of all valves, dampers and equipment (including base building).

2. Provide access panels for all items of equipment.

3. Coordinate exact location and type of access door/panel with Chief Engineer.

4. Provide and install p-Touch type label, which contains HVAC equipment ID, at all HVAC access location above any ceiling tiles.

5. All equipment must be installed with the manufacturer's prescribed maintenance foot print. All access required for servicing equipment shall be provided for as part of the design and installation.

6. Cut openings for Duct access doors shall be finished such that all sharp edges have been removed.

J. HVAC Controls:

1. Tenant supplemental HVAC units shall not be integrated in to the Base Building BMS; and shall be controlled by stand-alone programmable thermostats.

2. VAV air terminal units shall be controlled by the Base Building BMS, to match existing.

   a. Do not locate interior zone thermostats in conference rooms, computer rooms or other rooms with unusual heat gain patterns unless these rooms are served by their own dedicated VAV air terminal unit.

   b. Locate thermostats 4'-0" above finished floor.

   c. Thermostats shall comply with current Title 24 requirements.

   d. Communication cabling (LAN Trunk) shall contain no T-Taps**.** All terminal unit communication lines will be connected in parallel (daisy chained) up to a maximum of 33 TECs per LAN trunk (3 LANS per FLNC per floor).

   e. When terminal units are added or relocated, communication trunk and control wiring will be rerouted to match existing installation (atop branch duct, back to medium pressure loop and back out to new branch). No spider webbing is allowed.

   f. Control Power to be fed from transformer panel at electrical closet. Limit of five (5) TECs per transformer. Match existing installation.

3. BMS TCP cabinets/panels shall be locking type; unless installed in a room with a locked door, such as a mechanical room or an electrical room.

4. BMS TCP cabinets/panels shall have plastic sleeve installed at inside of cabinet door to accept respective "As Built" control diagrams.

5. P-Touch, or equal labels, shall be installed at BMS controllers such that the utilized input & output terminations are labeled to identify service.

a. Installing a control diagram at the controller does not meet this labeling requirement.

6. BMS cables at controllers shall be installed and labeled such that the labels can be fully viewed without having to remove Panduit, or similar, covers.

   a. Installing a control diagram at the controller does not meet this labeling requirement.

7. Consult with the Chief Engineer for clarification. Failure to match building standard installation will result in rewiring at Contractor's expense.

8. Select control valves for VAV terminal units based upon maximum pressure drop available for branch piping at branch tees.

9. Duct smoke detectors shall be provided by Division 260000. Coordinate installation and connection with Life Safety System representative and Division 260000.

   a. AC units and heat pumps handling 2,000 cfm or more shall have a smoke detector in supply air duct. Upon smoke detection, smoke detector shall turn AC unit or heat pump off and annunciate at fire alarm panel.

   b. AC units and heat pumps handling less than 2,000 cfm shall be automatically shut off upon floor alarm. Restart sequence shall be automatic upon reset of alarm device.

   c. New fire/smoke dampers shall not interfere with Life/Safety Smoke Control System operation.

K. Inspection by Engineering Department: Contractor shall notify Landlord in writing at least one week in advance of substantial completion of construction.

1. A walk-through and punch list shall be scheduled for Chief Engineer to review installation for conformance with approved construction documents and Tenant Construction Standards prior to ceiling close.

3.2 LEAK TESTING

A. Duct leakage testing:

1. Test duct work for leaks. Leak test shall be documented and comply with SMACNA HVAC Air Duct Leakage Test Manual and be conducted in the presence of the Landlord.

2. Apply positive pressure to ducts intended to operate under a positive pressure; such as:

   a. Supply ducts from fans/duct risers to air terminal units

   b. Discharge ducts from exhaust fans

3. Provide report documenting pressure testing.

B. Pipe leakage testing:

1. Run test for 4 hours with no loss in pressure.
    a. Operating pressure at 100 psig and less; test to 150 psig.
    b. Operating pressure greater than 100 psig; test to 1.5 times operating pressure.
    c. Never exceed test pressure ASME B16.1 basis.
2. Provide report documenting pressure testing.

3.3 ADJUSTING AND BALANCING:

A. Testing, Adjusting, and Balancing shall be performed by an independent third party TAB contractor, contracted directly by the Tenant's Contractor, and shall be in accordance with AABC and NEBB Standards. It is not allowed for the TAB contractor to be employed by, or hired by, the HVAC/Mechanical sub-contractor.

1. All TAB work shall be completed prior to Commissioning functional testing and Tenant move-in.
2. TAB contractor shall bring equipment including hand tools, ladders, hardware; as needed to complete their scope of work.
3. TAB contractor to check in with the Chief Engineer or designee, on a daily basis, prior to commencing any work.
4. TAB contractor shall coordinate with HVAC Controls contractor to enter set points and balancing values into Base Building BMS.
5. TAB contractor to notify HVAC Controls contractor that values are entered and complete so that changes can be backed up and saved permanently.
6. All measurement devices shall have been calibrated within a period of 6 months and verified for accuracy prior to start of work.

B. After systems are complete and operating, TAB contractor shall submit to the Chief Building Engineer preliminary air and water balancing report indicating CFM and GPM at connections to the Base Building systems, and gross CFM and GPM at main duct branches, reheat coils, AC units, and Heat pumps.

1. Quantities shall be marked on half size Construction Document drawings. At the Chief Building Engineer's request, TAB contractor may be required to submit other preliminary measurements.

C. Before final air and water balancing, Tenant's Contractor shall complete following tasks:

1. Complete water pressure testing for leakage.

2. Complete all "punch list" items.

3. Install dampers and other balancing devices.

4. Functional testing of Tenant HVAC equipment and systems. Tenant's Contractor to hire Landlord's preferred commissioning agent.

5. Verify combination fire/smoke and fire dampers to be open.

6. Clean ducts and install new air filters. Air filters to be high-capacity pleated MERV 13 rated; minimum of 2 inches deep.

7. Calibrate control system components.

D. Testing, Adjusting, and Balancing criteria:

1. Each air outlet: ±10% of outlet CFM design.

2. Each room with multiple outlets: ±10% of CFM design.

3. Each air system: ±10% of system CFM design.

4. Water systems:

   a. Provide flow readings at all coils with manual circuit-setters or automatic flow control devices.

   b. Manual balancing valves shall be permanently engraved after balance is complete so they can be restored to their correct positions if disturbed. Felt pen mark does not meet criteria.

5. Upon completion of balancing of new work and existing portions of system, provide to Chief Engineer a copy of handwritten test data to be used for final report. Copy is to be delivered to Chief Engineer prior to the TAB contractor leaving premises.

   a. TAB contractor is to review report with Chief Engineer and point out discrepancies found while conducting test and balance.

6. Upon satisfactory completion of balance and operation test, submit two sets of reports and one pdf copy to Landlord on final readings (bound 8-1/2" by 11" AABC format). Balance report is to include, but not be limited to:

   a. Air terminal unit identification address for reference.

   b. Detailed readings for each outlet for each air terminal unit balanced, including design and actual readings (both minimum and maximum).

   c. The size and flow coefficient of each air terminal unit.

   d. Floor plan(s) showing terminal unit and outlet locations.

3.4 SYSTEM AND EQUIPMENT FUNCTIONAL TESTING

A. Functional testing to be completed prior to Tenant occupancy.

1. Tenant shall contract with Landlord's preferred Commissioning Agent to complete HVAC equipment/system functional testing.

2. Adhere to current LEED CI, EA prerequisite, Fundamental Commissioning and Verification requirements.

3. Tenant's Contractor shall submit functional testing tasks lists, by equipment type, to Landlord for review and approval.

3.5 EQUIPMENT IDENTIFICATION

A. Identify air terminal units, AC units, water source Heat pumps, Exhaust fans, Pumps and other mechanical equipment by mechanical attachment of approved nameplates with respective functional identification names in accordance with existing established Base Building schedules and these Tenant Construction Standards.

1. Permanent ink markers are not allowed for identifying equipment. Permanent ink markings on equipment shall be removed before requesting Landlord acceptance.

2. Coordinate identification (tags and nomenclature) with the Chief Engineer.

3. Nameplate tags are to be black plastic tags with engraved white lettering. Tags are to be mechanically fastened to equipment. Lettering is to be a minimum of ½".

   a. On air terminal units the nameplate tags are to be located on unit next to BMS controller; or as the Chief Engineer approves.

4. All electrical power sources shall be identified at equipment, including BMS control panels, power disconnect switches.

   a. Label shall be mechanically fastened engraved nameplate or p-Touch style label; as approved by Landlord.

3.6 CONTROLS

A. Direct Digital Controls

1. Air Terminal Units

   a. Locate zone temperature sensors 4 feet above finished floor. Temperature sensors are to be installed such that they are not in the direct flow of air from a close-by supply-air register(s), or direct sun light.

   b. When terminal units are added or relocated, communication trunk and control wiring shall be rerouted to match existing installation. No spider-webbing of

communication cabling is allowed. BMS cabling in mechanical rooms or electrical rooms/closets shall be installed in EMT conduit.

c. Control Power to be fed from transformer panel at electrical closet or mechanical room; as approved by Landlord. Control power cabling in electrical rooms/closets and mechanical rooms shall be in EMT conduit. Do not overload control transformers. Match existing installation.

d. Brass tees shall be installed in ΔP tubing such that a manometer can be connected to the tubing with disturbing the connections to the controller. The open end of the tee shall have a soft plastic/rubber cap installed.

2. Programming

a. Control logic sequences for air terminal units shall match existing logic sequences. Custom sequences are not allowed without approval of Landlord.

b. At a minimum; each floor and/or each Tenant on each floor shall be configured as a separate Zone Group.

c. Configure alarms to match alarm responses prepared as part of the Base Building Core & Shell design.

d. Occupancy Scheduling:

i. Separate schedule shall be established by floor; when single floor Tenant.
ii. Separate schedules shall and be included in Tenant Master schedule; when multi-Floor Tenant.
iii. Separate schedules shall be established by Tenant; on multi-Tenant floors.

B. Integration

1. Upon completion of air and water balance; the BMS technician will conduct upload from all Controllers to the Main Control Module so that entered data is backed up and reloadable in case of power failure or memory loss.

2. The BMS technician will check communication to all equipment and verify proper application, operation and equipment designation number. BMS addresses for controllers are to match number assignment on the field and field labels; as well as “As Built” drawings.

3. A graphic interface shall be amended or developed showing area served by equipment on the floor in which it is located. Match design of existing BAS graphics.

a. Use architectural CAD drawing of Tenant Alteration as a background.

b. Floor graphic shall have a link back to the Main Directory Graphic.

c. Floor graphic shall have links to a graphic for each controller on the floor. All Controller links are to be labeled to match equipment designation number.

d. Floor graphics shall have links to sequences of operations for HVAC equipment on the floor.

e. Use contrasting colors to better depict demarcation lines for each area served on floor by Controllers.

f. Graphics interface to be completed and operational prior to commissioning functional testing and Tenant move-in.

g. Floor graphics shall include means for Operator to understand that a WSHP also conditions the specific zone; even though the WSHP is not controlled by the BMS.

4. Coordinate access to BMS front end and graphics installation with the Chief Engineer.

5. Add air terminal units to existing summary graphics screen with all currently listed operation parameters.

6. The BMS sub-contractor shall identify, by air-terminal unit ID, the worst case zone in need of mechanical heating and the worst case zone in need of mechanical cooling, for each zone group; at BMS floor graphic pages.

7. Tenant's Contractor shall exclude from program logic all program logic strings that are not actively utilized by the equipment that they reference.

C. Tenant HVAC after-hours override system

1. Tenant's Contractor shall create capability for Tenant to override HVAC to occupied mode during unoccupied schedules. Override condition shall only be activated during unoccupied times. Override condition will drive air terminal units in a zone group into occupied mode. Control system will automatically operate associated Base Building HVAC equipment.

a. Override condition shall last for period of 2 hours.

b. Tenant shall have ability to deactivate override condition (return to unoccupied mode) following 30 minutes of continuous operation of override condition. If Tenant occupant attempts to deactivate override condition in less than 30 minutes; override condition will remain active until there has been 30 minutes of continuous operation.

2. To enable/activate override condition:

a. Override via push button on BMS zone temperature sensor; or

b. Override via push buttons tied to BMS that are strategically located throughout Tenant Suite.

1) Strategically located push buttons shall be labeled to identify floor area served.

3. Override “zones” shall be broken out by Tenant on floor; as a zone group.

4. The BMS sub-contractor shall provide for tracking of override conditions

   a. BMS to provide date/time stamp when each override condition is activated.

   b. BMS to track means that activated and deactivated each override condition.

   c. BMS to provide date/time stamp when each override condition is deactivated.

   d. BMS shall track associated Base Building HVAC equipment VFD kWh data; for the purpose of Tenant bill-back for after-hours HVAC.

   e. BMS shall provide override condition report functionality, and Tenant’s Contractor shall demonstrate reporting ability; as required by Landlord.

D. Demand Response mode of Operation:

1. The BMS sub-contractor shall provide capability of global (excluding critical 24/7 areas) zone set point changes based on three (3) levels of Demand Response.

   a. Level I

      1) Decrease heating set point by 1ºF
      2) Increase cooling set point by 1ºF

   b. Level II

      1) Decrease heating set point by 2ºF
      2) Increase cooling set point by 2ºF

   c. Level III

      1) Decrease heating set point by 4ºF
      2) Increase cooling set point by 4ºF

2. The BMS sub-contractor shall provide capability to control supply-air set point such that a non-resetting supply-air set point will be established to avoid “bounce back” during Demand Response activities.

3. Start and stop of Demand Response mode shall be schedule based.

   a. Schedule shall be adjustable by the Operator.

4. Associated BMS graphic pages shall identify if Demand Response mode is active or inactive. If Demand Response mode is active; level of Demand Response mode shall be displayed.

5. Operator shall have capability to turn OFF ability for Demand Response mode on an individual zone basis.

6. A Sequence of Operation for Demand Response mode shall be submitted to Landlord for review and approval.

3.7 FIELD QUALITY CONTROL

A. Inspection by the Chief Engineer: Tenant's Contractor is to notify the Landlord at least one (1) week in advance of substantial completion of construction.

1. A walk-through and punch list inspection is to be scheduled with the Chief Engineer to review installation for conformance with approved Construction Documents and these Tenant Construction Standards.

3.8 CLOSE-OUT

A. Provide full-sized record drawings.

B. Provide AutoCAD record drawings.

C. Provide full-sized Contractor's final shop drawings.

D. Provide signed-off construction permits.

E. Provide approved equipment submittals.

F. Provide valve schedule.

G. Provide two (2) complete sets of equipment manufacturer Operating and Maintenance manuals including sequences of operation; organized into loose leaf binders and indexed.

H. Provide independent, certified air and water balance reports.

I. Provide Equipment start-up and commissioning/functional testing documentation.

J. Provide system/equipment sequences of operation.

K. Provide new pipe cleaning, passivation, and treatment report.

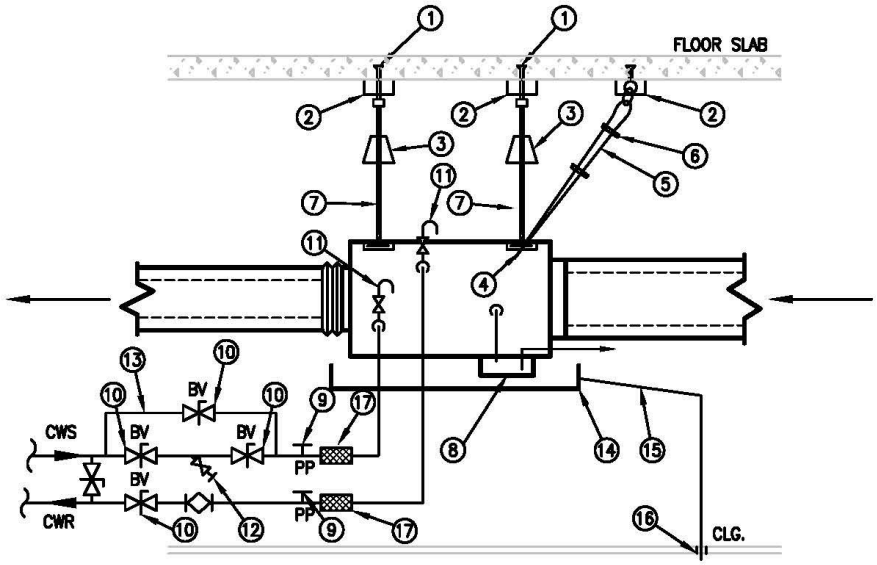
L. Provide pressure testing reports.

M. Provide any special inspection reports and documents.

N. Provide copies of any keys for equipment control panels, access doors, etc.

ATTACHMENTS

4.01 Example AC UNIT/HEAT PUMP INSTALLATION DETAIL



NOTE: ALL SUPPORT COMPONENT SIZES AND MINIMUM BOLT EMBEDMENT SHALL BE BY MANUFACTURERS INSTRUCTIONS OR CALCULATED BY A REGISTERED STRUCTURAL ENGINEER BASED ON UNIT WEIGHT.

1. HILTI KWIK-BOLT
2. UNISTRUT OR "L" ANGLE IRON
3. MASON VIBRATION ISOLATORS
4. "Z" SHAPED BRACKET
5. SEISMIC BRACE CABLE (TENSION CABLE ONLY TO REMOVE SLACK)(TYPICAL OF 4)
6. U-BOLT CLIPS
7. THREADED ROD (TYPICAL OF 4)
8. CONDENSATE PUMP
9. P.P. – PETE'S PLUG
10. B.V. – BALL VALVE
11. AIR VENTS AT SUPPLY AND RETURN HIGH POINTS
12. STRAINER WITH BLOWDOWN VALVE AND HOSE ADAPTER WITH CAP
13. FULL SIZE BY-PASS LINE
14. SECONDARY DRAIN PAN WITH MIN. 1½" DEPTH. SUPPORT INDEPENDENTLY FROM THE FLOOR DECK ABOVE.
15. MIN. ⅛" SLOPE
16. TERMINATE ½" BELOW CEILING IN NON CRITICAL OR COMMON AREAS. PROVIDE ESCUTCHEON. PAINT TIP WHITE. COORDINATE FINAL LOCATION WITH ARCHITECT. PROVIDE WHITE ESCUTCHEON AT ACOUSTICAL CEILING TILES AND PREP PIPE TO RECEIVE PAINT.
17. FLEXIBLE PIPE CONNECTION

Provide Title 24 required automatic shut off valve and interface with unit's compressor operation.

DETAIL I – AC UNIT INSTALLATION AND PIPING

END OF SECTION

ELECTRICAL

PART 1 - GENERAL

1.0 SUMMARY

A. Electrical work for Tenant; work shall depend upon actual alterations and improvements to be performed. However, a minimum scope of work for a typical Tenant shall include functions specified in this section.

1. Demolish and remove from premises, when occupying a pre-leased space, all equipment, wire and raceway that are not to be reused in the new design. Power wiring demolition shall be taken back to panel board and removed, including neutrals. Branch conduits shall be demolished back to closest reused j-box.

2. Extend existing and provide new branch circuit wiring with conduit and/or wiring, manufactured wiring system, or a combination of both.

3. Keep panel board directories up to date during construction and complete a final update to the breaker panel circuit directories at end of Project to indicate what each breaker serves.

a. Write temporary updates in pencil.

b. The final updated breaker panel circuit directories shall include existing and new circuits.

c. Directories shall be typed or computer generated. Hand written directories are not acceptable.

d. Directories shall be specific to areas served. Description to be specific to the use of the room and also state the architectural room number.

4. Excessive power usage, such as welding and dehumidifying, is to be metered and charged to the construction project; coordinate with Landlord.

B. Related Sections:

1. Life safety system.

1.1 DEMOLITION

A. Clean existing materials and equipment that are to be reused. Immediately report any damage or defects to the Landlord.

B. Luminaires: Remove existing luminaries for cleaning. Use mild detergent to clean all exterior and interior surfaces, rinse with clean water and wipe dry. Replace lamps, drivers and broken electrical parts.

C. Disconnect and remove all abandoned conduit wiring and equipment. Floor monuments that are capped shall have associated conduits, pull boxes, and wiring at floor below removed back to source.

D. Disconnect and remove abandoned panel boards and J-boxes.

1.2 SYSTEM DESCRIPTION

A. Base Building Systems: Building is served by Pacific Gas and Electric Company underground utility power via sidewalk transformer vaults. The electrical distribution within the building consists of the following:

1. Three Main Switchboards 277/480 volt: two 4000A, one 2000A. Two 277/480 volt, 3-phase, 4-wire 1600A Tenant bus way risers. One 480 volt, 3-phase, 3-wire 3000A Mechanical bus way riser. One 480 volt, 3-phase, 3-wire 1200A Standby power bus way riser. One 277/480 volt, 3-phase, 4-wire 400A Emergency power riser.

B. Normal Power Distribution

1. Two 277/480 volt 3-phase, 4-wire 100A fused bus plugs per Office floor, one in each Electrical room.

2. Two 277/480 volt 3-phase, 4-wire 100A panels per Office floor, one in each Electrical room.

3. Two 45KVA step-down transformers per Office floor, one in each Electrical room.

4. Two 2-section 120/208 volt 3-phase, 4-wire panels per Office floor, one in each Electrical room.

C. Emergency Power Distribution:

1. A Base Building back-up power generator is provided to furnish the Base Building and Tenant Code required Fire/Life Safety systems with emergency power. The Base Building generator is nominally sized at 1250 kW. Tenant is not allowed to utilize the Base Building back-up power system for Stand-by power loads.

2. Emergency power 277/480V panel boards for 277V to power egress lighting and exit signs, 30kVA step-down transformers, and Emergency power 120/208V panel boards for 120V to power fire/life safety system components.

a. For floors P2 thru Ground level: utilize panel boards “1EHP1” (277/480V) & “1ELP1” (120/208V) inside the floor P1 “B” Electrical room.

b. For floors 2 thru 7: utilize panel boards “1EH4B” (277/480V) & “1EL4B” (120/208V) inside the floor 4 “B” Electrical room.

c. For floors 8 thru 14: utilize panel boards “1EH11B” (277/480V) & “1EL11B” (120/208V) inside the floor 11 “B” Electrical room.

d. For floors 15 thru 20: utilize panel boards “1EH19B” (277/480V) & “1EL19B” (120/208V) inside the floor 19 “B” Electrical room.

e. For floors 21 thru 25: utilize panel boards “1EH24B” (277/480V) & “1EL24B” (277/480V) inside the floor 23 “B” Electrical room.

3. Conduit risers and j-boxes have been installed as a pathway, in the Base Building "B" Electrical rooms, from Emergency power panel boards to floors served.

D. Design Criteria:

1. If Tenant needs more power than what the Base Building can provide, Tenant shall install necessary service equipment as required and coordinate all requirements with the Landlord and with PG&E.

2. Design and Drawings: Calculate electrical requirements and prepare new design drawings and Title 24, and/or other California or Oakland requirements, energy efficiency calculations based upon proposed Tenant layout. Use available power from Base Building system. Coordinate floor power distribution with Landlord.

    a. Provide a key map on each drawing. Include electrical load schedules and load summary.

    b. Obtain building permit for construction using design drawings.

3. Do not distribute power from one floor to feed loads on another (e.g.: Do not install a bus plug on the 7th floor to feed a new panel on the 6th floor).

    a. Power distribution shall be done from electrical closet and services to correspond with area of floor at which work is being completed.

4. Do not connect more than 8 general-purpose outlets on any 120-volt branch circuit.

5. Provide dedicated neutral for all 120-volt branch circuits feeding electronic equipment (computers, copiers, fax machines, printers, etc.).

6. Provide dedicated neutral for each 120-volt dedicated branch circuit.

7. Perform required core drilling during non-business hours. Contractor is to scan slabs and obtain authorization from Landlord prior to any core drilling.

    a. Coordinate with Chief Engineer.

    b. Any coring planned in a 10' wide circumference around the Base Building Core area shall be scanned using the X-ray method prior to coring.

    c. Contractor shall have person below during all coring activities to catch the concrete slug and any slurry from the coring activity.

8. Plenum rated cable may be used for telephone and data cabling only.

    a. Cable shall be installed as specified under Data Cabling section.

    b. Routing path shall be via corridors and other spaces permitting access to cable with minimum interference to Tenants during cabling re-work.

9. Provide wall mounted telephone and data outlets with corresponding outlet box and appropriately sized conduit stub-up or string into nearest accessible ceiling space.

10. Provide emergency lighting to maintain a minimum of 1 foot- candles. Verify capacity on Emergency power riser with Electrical Engineer of record prior to increasing the Emergency lighting load.

    a. Emergency power Night light fixtures shall be integrated with the Lutron lighting control system.

11. Verify transformer locations with Landlord prior to installation.

    a. Transformer size may require installation of Fire Smoke Dampers at electrical room ventilation ducts as well as supplemental cooling.

    b. Weight of transformer may require Structural Engineering coordination.

12. For 120/208 volt, 3-phase, 4 wire feeders serving branch circuit panel boards and computer distribution equipment, the neutral conductor shall have calculated ampacity of not less than 150% of phase conductor ampacity.

    a. Neutral conductor shall be considered current carrying conductor for purposes of determining NEC derating factors.

13. As required by Landlord, Energy Consumption Metering shall be provided. Installation shall be coordinated with Landlord and Chief Engineer.

14. Maximum design load for new 120/208 volt panel board: 125 amps.

15. Data Centers: Data Centers within Tenant's premises shall be metered such that energy usage data can be collected: 1) at a point upstream from any and all uninterruptible power supplies (UPS), and 2) for all IT equipment in the data center. Metering system shall meet the U.S. Environmental Protection Agency ENERGY STAR Portfolio Manager requirements for Data Center benchmarking. Metering system shall conform to Landlord's Design Criteria as specified in this document under Electrical Section 1.3.D.13. Data Center shall be defined as any demised space of more than 500 square feet that is dedicated to high-density computing functions (e.g., server racks) and may, but not necessarily, include a raised floor, dedicated supplemental cooling system, and one or more UPS.

16. All lamps shall be LED; no exceptions.

1.3 SUBMITTALS

A. Prior to commencing any work, electrical Contractor shall assist general Contractor in submitting to Landlord required documentation:

    1. Approved construction documents and construction permit.

B. Provide professional engineer, licensed in the State of California, stamped plans to Landlord for review and approval.

C. Electrical Contractor shall submit a written request and schedule for disruptions to building services no less than 72 hours in advance and a minimum of ten working days when shutdown affects other Tenants.

D. Contractor shall review all equipment and material submittals prepared by suppliers, verify compliance with Construction standards, mark copies as acceptable to him, and

submit to the Architect. After Architect's approval submit one copy to the Landlord and Engineering Department.

E. Project Closeout Submittals: Prior to Landlord final inspection and acceptance of construction, Contractor shall be required to provide following documentation to Landlord:

1. Two complete sets of operating and maintenance manuals, and one electronic as flash drive.

2. One set of complete, reproducible as-built drawings and CAD files. As-built drawings shall contain key map of floor with Tenant location and load summary of electrical power used from base building systems.

F. Short Circuit Coordination Study

1. Prepare, and submit to Landlord, a short circuit coordination study based on actual overcurrent protection devices proposed for use in the Tenant's construction. The study shall be prepared by a State of California licensed Electrical Engineer.

2. Coordination study shall be integrated into the Base Building Coordination study.

G. ARC Flash Hazard Study

1. Prepare, and submit to Landlord, an arc flash study for electrical service and distribution equipment to be provided and installed by Tenant during the Tenant's construction. The study shall be prepared by a State of California licensed Electrical Engineer.

2. The study shall be submitted with the electrical service and distribution equipment submittal and shall indicate the level of protective equipment and other hazard information as required by NFPA 70E; for each piece of electrical distribution equipment.

3. Tenant's Contractor shall provide and install Arc Flash Hazard warning stickers on each piece of electrical distribution equipment; as required by NFPA 70E.

4. Arc Flash Hazard study shall be integrated into the Base Building Arc Flash Hazard study.

PART 2 - PRODUCTS

2.0 MATERIALS

A. Conduit:

1. Electrical Metallic Tubing (EMT):

a. Description: ANSI C80.3; zinc-coated tubing with protective enamel coating on inside.

1) EMT shall not have smaller diameter than ¾"

b. Fittings and Conduit Bodies:

1) ANSI/NEMA FB 1.

2) Concrete-tight steel or malleable iron, or pressure-cast body with steel or malleable iron nuts.

3) Use compression type for 2 inch trade size and smaller, use compression or set-screw type for 2-1/2 inch trade size and larger.

2. Metal Conduit: Use in exposed dry and damp locations below switch height where conduit may be exposed to physical damage.

a. Rigid Steel Conduit: ANSI C80.1; threaded, hot-dipped galvanized, including threads, with protective coating on inside and outside.

b. Fittings and Conduit Bodies:

1) ANSI/NEMA FB 1.

2) Rigid Steel Conduit: Use threaded steel or malleable iron fittings.

3. Flexible Metal Conduit: Use for connections to lighting fixtures in accessible ceiling spaces, connections to equipment in dry systems and dry locations. Do not use under raised computer room floors.

a. Description: Zinc-coated, interlocked steel construction.

b. Fittings: ANSI/NEMA FB 1; steel or malleable iron clamp, or pressure cast screw-in type. Do not use die-cast, set-screw, or sheet metal screw-in type on flexible metal conduit.

c. Can be used for connections to lighting fixtures in suspended ceiling, Transformer final connections, connections to rotating equipment where vibration isolation is needed, and Bus way plug units. Use of flexible conduit shall be kept to a minimum; with 36 inches as the allowed maximum length.

4. Liquid Tight Flexible Metal Conduit: for same use as flexible metal conduit in dry, damp, or wet locations. .

a. Description: Galvanized interlocked steel construction with PVC jacket.

b. Fittings: ANSI/NEMA FB 1; steel or malleable iron, watertight type.

c. For use in dry concealed locations above suspended ceiling or within hollow partitions for lighting and receptacle branch circuits.

d. Not permitted for circuit home runs.

5. Metal clad (MC) cable:

a. For use in dry concealed locations above suspended ceilings and/or within hollow partitions.

b. Not permitted for circuit home runs.

B. Poke Through Service Fittings:

1. Manufacturer:

   a. Wiremold Walker Flush Poke Through Series.

   b. Hubble Flush Poke Through Series.

2. Description: Assembly comprising service fitting, poke through component, firestops and smoke barriers, and junction box for conduit termination.

3. Fire Rating: 2 Hours.

4. Flush Profile: No above floor pedestals permitted.

   a. Provide triple service capability, power, voice, and data (P/V/D).

   b. Provide complete assembled unit, including finish flange, in color as selected.

   c. Provide conduit adapter with closure plugs where required.

5. Landlord shall receive layout of proposed poke-through locations. Approval from Landlord must be granted prior to any coring work.

C. Fire stopping: Comply with local City and State requirements.

1. Description: U.L. Approved firestop material for cable and conduit penetrations.

2. Fire Rating: Re-establish rating of penetrated barrier.

3. Materials to be applied by trained installers in accordance with manufacturer's instructions.

D. Building Wire and Cable:

1. Description: Single and multi-conductor, insulated wire and cable.

2. Conductor: Copper.

3. Insulation Voltage Rating: 600 volts.

4. Minimum size: #12AWG for branch circuits and #14AWG for control wiring.

5. Stranding of conductors: #10AWG and smaller sizes shall be solid. Larger than #10AWG shall be stranded ASTM Class B.

6. Insulation: 600V, PVC insulation, nylon jacket, surface printed identification, listed as type THHN or THWN per UL standards.

7. Color coding: #8AWG and smaller shall be factory color coded the entire length. #6AWG and larger shall be factory colored coded the entire length or color coded by taping the entire length of exposed wire at all accessible locations such as j-boxes, panels, transformers, etc.

8. Wire size shall be uniform for the entire length of the circuit.

E. Wiring Connectors:

1. Spring Wire Connectors: Corrosion-resistant, live-action spring in insulated shell, rated 105-degrees C.

2. Compression Connectors and Lugs: Circumferential (non-indenter) type.

3. “Push-in” wire connectors are acceptable only for solid conductors; #10AWG or smaller.

F. Boxes:

1. Device, Luminaire and Equipment Supporting Boxes:

   a. Sheet Metal Outlet Box: ANSI/NEMA OS1, galvanized steel. Minimum 4-inch square and 1-1/2 inches deep; rated for weight of equipment supported; include 1/2-inch male fixture studs where required.

2. Pull and Junction Boxes: Sheet metal box, NEMA OS 1, screw cover, minimum 4-inch square and 1-1/2 inches deep galvanized steel or gray baked enamel finish.

G. Manufactured Wiring Systems:

1. Description: An integrated electrical branch wiring system for lighting that is pre-manufactured and supplied in accordance with NEC Article 604 and UL Standard #183.

2. Wires: #12 AWG copper with 600V, 90 degree C insulation in color-coding per NEC and these Tenant Construction Standards.

3. Integration: Capability of 5 wires, including #12 AWG copper ground wire, within flexible steel conduits with cable end heads and approved connectors keyed for proper interconnection.

4. Voltage: Select proper 120V or 277V system, as applicable, and ensure that system components are keyed to prevent back feeding and interconnection between different voltage systems.

5. Manufacturer:

   a. Lithonia RELOC wiring systems.

   b. Thomas Industries Electro/Connect.

H. Wiring Devices: Smooth white plastic.

1. Wall Switches: Low voltage, momentary contact.

2. Wall Dimmers: Solid-state dimmer for LED lamps.

   a. Lutron Quantum

3. Receptacles: Duplex Convenience Receptacle, Type 5-15R, Specification Grade. Use same manufacturer and series for receptacles and wall switches.

4. Wall Plates: Use same manufacturer and series as for receptacles and switches.

5. Occupancy Sensors: Ultrasonic switch sensor, suitable for the space application and compatible with the electronic driver(s) they control. White finish.

6. Lutron Quantum Lighting Control System

    a. Controllers

    b. Ceiling Occupancy/Vacancy Sensors

    c. Daylight Sensors

    d. Provide all-wired system

I. Supporting Devices:

1. Support Channel: Galvanized or painted steel.

2. Hardware: Corrosion resistant.

J. Electrical Identification:

1. Nameplates: Engraved laminated plastic, white letters on a black background, mechanically fastened.

2. Identification naming convention shall follow established Base Building naming convention.

3. Wire and Cable Markers:

    a. Use color-coded wiring for branch circuits.

    b. Use plastic impregnated cloth or epoxy film markers, split sleeve or tubing type for feeders.

    c. Install wire markers on wiring at: receptacles & switches, j-boxes, pull cans, and sub-panels. Grounding conductors do not require wire markers.

4. Use colored phase tape to identify conduit systems. Apply phase tape on entire circumference of conduit at fittings, boxes, and both sides of a penetration.

    a. Fire Alarm – Red

5. All receptacle face plates shall have pTouch, or approved equal, label that identifies to source panel and conductor circuit ID(s). This includes receptacles in pre-manufactured furniture raceways.

K. Enclosed Switches:

1. Fusible Switch Assemblies: NEMA KS 1, Type HD or GD load interrupter enclosed knife switch with externally operable handle interlocked opening front cover with switch in ON position. Handle lockable in OFF position.

2. Non-fusible Switch Assemblies: NEMA KS 1, Type HD or GD load interrupter enclosed knife switch with externally operable handle interlocked opening front cover with switch in ON position. Handle lockable in OFF position.

3. Enclosures: NEMA KS 1, Type 1.

4. Shall have typical Base Building standard nameplate. Nameplate to identify switch designation, source circuit(s), voltage & amperage ratings, and load served. Fused switch assemblies nameplate shall also identify fuse type and amperage rating.

L. Dry Type Transformers:

1. Manufacturers:
   a. Eaton, or Landlord approved equal.

2. Dry Type Transformers: ANSI/NEMA ST 20; factory-assembled, air cooled dry type transformers; ratings as shown on the Drawings or as required for load served; designed for non-sinusoidal loads K-factor not less than thirteen (13). Derated standard transformers are not acceptable.

3. All new transformers shall have Fluke FLK-075-CLV infrared window.

4. Insulation: UL Class 185 degrees C, 115 degree C rise. Transformers rated above 112.5KVA shall be UL Class 150 degree C, 80 degree C rise or shall be located in fire-rated room.

5. Winding Taps, Transformers Less than 15 KVA: Two 5 percent below rated voltage, full capacity taps on primary winding.

6. Winding Taps, Transformers 15 KVA and Larger: ANSI/NEMA ST 20.

7. Sound Levels: ANSI/NEMA ST 20.

8. Ground core and coil assembly to enclosure by means of a visible flexible copper grounding strap. Transformer windings to be Copper or Aluminum.

9. Mounting: Transformers 75 KVA and less shall be suitable for wall, floor, or trapeze mounting; transformers larger than 75 KVA shall be suitable for floor or trapeze mounting.

10. Coil Conductors: Continuous windings with terminations brazed or welded.

11. Enclosure: ANSI/NEMA ST 20; Type 1. Provide lifting eyes or brackets.

12. Isolate core and coil from enclosure using vibration-absorbing mounts.

13. Transformer to be Energy Star rated.

14. Install sound/vibration dampening material when anchoring/supporting transformer.

15. Shall have typical Building standard nameplate. Nameplate to identify Transformer designation, source circuit(s), Primary & Secondary voltage ratings, kVA rating, and load served.

M. Panel boards:

1. Manufacturers:

   a. Eaton Pow-R-Line C Series, or Landlord approved equal.

2. Enclosure: NEMA PB-1; Type 1.

3. Cabinet Size: 6 inches deep; 20 inches wide.

4. Provide flush or surface cabinet front with concealed trim clamps, concealed hinge and flush lock all keyed alike. Finish in manufacturer's standard gray enamel.

5. Provide panel boards with copper, extending full height of panel. Provide copper ground bus in all panel boards. Provide neutral bus with terminals for each circuit in the panel, including future circuits.

6. Minimum Short Circuit Rating: Refer to Base Building ARC Flash Hazard & Coordination studies and provide a panelboard that exceeds the available fault current at that location.

7. Molded Case Circuit Breakers: Bolt-on type ambient-compensated thermal magnetic trip circuit breakers, with factory assembled common trip handle for multiple pole units. Provide circuit breakers UL listed as Type SWD for lighting circuits. Provide UL Class A ground fault interrupter circuit breakers where required.

8. Provide lugs with approved connectors for size of conductors feeding panel. Provide double lugs and extra gutter space for parallel feeder conductors.

9. Shall have typical Building standard nameplate. Nameplate to identify Panel board designation, source circuit(s), Voltage rating, and Amperage rating.

N. Sub-meters:

1. Tenant shall submit to Landlord sub-meter matrix that identifies each load captured by each DENT sub-meter.

2. Sub-meters shall have a local display.

3. Tenant’s Contractor shall furnish and install DENT Instruments sub-meters for electrical load sub metering.

   a. Whole sub-panel loads:

      1) Power Scout 12 HD with enclosure plus display.

b. Equipment loads:

1) Power Scout 3037 with ethernet & serial plus display.

4. Sub-meters shall be integrated with the Base Building sub-meter network. Integration to include tracking and reporting functions for the purpose of billing back the Tenant for actual consumption.

5. Installation shall be coordinated with Landlord and Chief Engineer.

6. Contractor shall utilize Twisted Pair Automation for start-up and commissioning of sub-meter equipment.

a. Contact: brian@twistedpairautomation.com

O. Enclosed Circuit Breakers:

1. Molded Case Circuit Breakers: NEMA AB 1.

2. Enclosure: NEMA AB 1, Type 1. Fabricate enclosure from steel, finish with manufacturer's standard enamel finish, gray color. Include provisions for padlocking.

P. Lighting Fixtures:

1. All fixtures shall have LED lamps.

2. Building Standard Down Light: Phillips Lightolier Calculite 4” square downlight 3500k, or Landlord approved equal.

3. Building Standard 2x4: Recessed 2x4 fixture, recessed direct/indirect Finelite HPR LED Angled 3500k, or Landlord approved equal.

4. Building Standard 2x2: Recessed 2x2 fixture, recessed direct/indirect, recessed direct/indirect Finelite HPR LED Angled 3500k, or Landlord approved equal.

5. Building Standard pendant light (for open ceilings)

a. Finelite HP4 direct/Indirect flush diffuser 3500k white, or Landlord approved equal.

b. Fluxwerx view radius 3500k white, or Landlord approved equal.

6. Building standard exit sign will be connected to the Emergency power distribution system: Recessed ceiling or top mounted edge lit emergency exit sign (or per Building specifications).

a. e.g. Lithonia Precise Collection, model LRP GMR 120/277.

1) Lighting source to be LED.

2) Brushed aluminum housing.

3) One or two sided depending on location and use.

4) Green lettering on mirror background (GMR).

5) Battery backup units not permitted. All exit signs to be connected to building Emergency lighting circuits.

Q. Lutron Quantum Lighting Control System

1. Description: The building is equipped with a low voltage cable link in each electrical closet for interface into the Base Building Lutron Quantum lighting control system.

2. The Tenant's lighting control system and software shall be compatible with the Lutron Quantum series lighting control system.

   a. Tenant shall provide and install any software upgrades required to support their Tenant construction.

3. Lighting control shall follow Base Building standards and sequences; as well as conform to State of California Title 24 energy requirements.

4. Task Tuning:

   a. Lighting system shall support task tuning of lights, via dimming, capable of setting an initial starting point of 80%, and shall be continuously adjustable down to 10%.

   b. Tenant shall have manual local override means to increase brightness to 100%.

5. Demand Response:

   a. Lighting system shall support the capability of manual and/or automated Demand Response load reduction; to be initiated from the Base Building Lighting Control front-end.

   b. Tenant's Contractor shall provide capability of global (excluding critical areas) lighting zone output set point changes based on (3) levels of Demand response.

   c. Start & Stop of Demand Response mode shall be schedule based.

   d. Schedule shall be adjustable by the Operator.

   e. Associated Lighting Control graphic pages shall identify if Demand Response mode is active or inactive. If Demand Response mode is active; level of Demand Response mode shall be displayed.

   f. Operator shall have capability to turn OFF ability for Demand Response mode on an individual zone basis.

   g. A Sequence of Operation for Demand Response mode shall be submitted to Landlord for review and approval.

6. Daylight Harvesting:

   a. Lighting system shall support daylight harvesting. The system shall allow a continuous reduction of lighting levels between 80% and 10% to maintain the specified foot-candles at work surfaces.

b. Daylight harvesting shall operate based upon a closed loop control scheme; or hybrid open/closed loop control scheme.

7. Sequence of Operation shall meet Tenant Construction Document requirements, California Title 24 energy code requirements; and these Tenant Construction Standards as a minimum. If there is conflict between the noted source requirements; the more stringent requirement shall prevail.

   a. Manual dimming: Wall switches may be used to dim the lights. Landlord shall be provided the ability to dim lights via Base Building lighting control system front-end computer. In daylight harvesting zones the act of manual dimming will lower the target light level.

   b. Top trimming: Lighting system shall have the ability to control all dimmable ballasts and drivers to reduced lighting levels.

   c. Occupancy timeout:

      1) Business Operating hours: Not to exceed 15 minutes.

      2) After hours: Not to exceed 5 minutes. ON shall be initiated by local manual override switch.

      3) Pathway lighting: Not less than 15 minutes.

      4) Transition timeout: At expiration of the occupancy timeout, lights may transition to 20% light level to warn the occupants, or turn OFF. The lights may remain at the transition level for 1 minute and then turn OFF.

   d. Open Office Lighting (not Pathway Lighting):

      1) Control sensors: Lighting shall be controlled by vacancy sensors; with Tenant option to utilize occupancy sensors in lieu of vacancy sensors.

      2) Manual switching: Local override switching, aligned with occupancy zones, may be used.

   e. Pathway Lighting:

      1) Business Operating Hours: Pathway lights shall turn ON according to an automatic schedule, which shall be adjustable, and will remain ON for the duration of the schedule.

      2) Non-Business Operating Hours: Pathway lights shall remain OFF except when an occupant is detected. If occupancy is detected in any occupancy zone the Pathway lights for all zones shall turn ON.

   f. Egress Lighting:

      1) Emergency lights shall turn ON/OFF according to typical lighting control sequences by application type, but must turn ON to full output during loss of normal power.

8. System access:

    a. Tenant Lighting Control system shall be fully integrated into the Base Building Lighting Control system.

    b. Floor zone graphics shall be provided and integrated with the Base Building Lighting Control system access. Graphics shall provide feedback status and control to Operator; and be based on Tenant Improvement CAD drawings.

9. Tenants' Contractor shall be responsible for proper commissioning of installed lighting controls prior to Tenant occupancy. Commissioning of the Tenant Construction lighting control system shall be completed by a technician certified by Lutron for Quantum.

    a. Tenant's Contractor shall include in their scope of work "fine tuning" of the installed lighting controls following commissioning. "Fine tuning" to occur no sooner than 30 days after Tenant move-in and no later than 60 days after Tenant move-in.

PART 3 - EXECUTION

3.0 PREPARATION

A. Examine panel boards and distribution equipment affected by Work for defective conditions and report such conditions to Landlord.

B. Provide temporary wiring and connections to maintain existing systems in service during construction.

C. Existing Telephone System: Maintain existing system in service until new system is accepted. Disable system only to make switchovers and connections. Notify Landlord and Telephone Utility Company at least 48 hours before partially or completely disabling system. Minimize outage duration. Make temporary connections to maintain service in areas adjacent to work area. Notify Landlord.

D. Panel boards: Clean exposed surfaces and check tightness of electrical connections. Provide filler plates for vacant positions. Provide typed circuit directory showing revised circuiting arrangement.

E. Clean existing materials and equipment that are to be reused. Report damage or defects to Landlord.

F. Luminaires: Remove existing luminaires for cleaning. Use mild detergent to clean all exterior and interior surfaces; rinse with clean water and wipe dry. Replace lamps, drivers, and broken electrical parts.

G. Disconnect and remove all abandoned boxes, conduit, wiring, and equipment. Floor monuments that are capped shall have associated conduits, pull boxes, and wiring at floor below removed back to source. Fire rating of floor shall be maintained.

3.1 INSTALLATION

A. Tenant's Contractor shall provide "Base Building Systems Shutdown" request document to Building Management, in accordance with established Building procedures, at least 72 hours prior to major impacts to the existing Electrical systems. Only Building Engineering staff is allowed to open/close Base Building system isolation switches/breakers; including bus way plugs for Tenant's use. All costs for shutdowns requested by Tenant, or necessitated by Tenant's Alteration, by Building personnel shall be at the Tenant's cost.

B. Tenant's Electrical contractor shall follow NFPA 70E requirements. It is the Landlord's preference that all electrical circuits and equipment are de-energized when potential electrical shock hazards exist.

C. Bus way plug installation:

1. Installing bus way plugs shall only be completed when bus way is de-energized.

2. Coordinate with Landlord.

3. Schedule activity for non-Business hours.

4. Detailed Method of Procedure script in Landlord's established format shall be provided to Landlord at least two (2) weeks in advance for review.

a. No shut-downs shall occur without Landlord approval.

b. Landlord will coordinate electrical shutdowns with other impacted Tenants.

c. Tenant's Contractor is responsible for any temporary modifications required to support other Tenant critical systems that will be without power. Systems such as, but not limited to:

1) Supplemental air conditioning.

2) Temporary power accommodations.

D. Conduit: install conduit in accordance with NECA "Standard of Installation".

1. Conduit Supports:

a. Arrange supports to prevent misalignment during wiring installation.

b. Support individual conduits using spring steel clips, coated steel or malleable iron straps, lay-in adjustable hangers, clevis hangers, and split hangers. Use spring steel clips attached to #10 hanger wires installed for the specific purpose of supporting conduits. Fasten wire at both ends. Limit use of spring-steel-clip-and-wire supports so that no conduits are supported solely by this method and so that no conduit run contains more than two consecutive supports of this type.

c. Group related conduits; support using conduit rack. Construct rack using steel channel.

d. Fasten conduit supports to building structure and surfaces.

e. Do not support conduit with wire or perforated pipe straps. Remove wire used for temporary supports.

f. Do not attach conduit to ceiling support wires or any other material/device not specifically designed to support conduits.

2. Arrange conduit to maintain headroom and present neat appearance.

3. Utilize flexible liquid tight for final motor connections; regardless of location.

4. Conduit Routing:

   a. Routing exposed conduit and conduit installed above accessible ceilings parallel and perpendicular to walls.

   b. Route conduits to not hinder access openings and access to devices/equipment.

   c. Route conduits parallel and at right angles to building grid lines.

5. Conduit Routing (within Tenant space below):

   a. All visible conduits shall be Electrical Metallic Tubing (EMT). Flexible Metal Conduit is not allowed.

   b. Layout of exposed conduit in the ceiling of Tenant space below must be provided in a drawing for Landlord review and approval.

   c. Landlord requires that conduit be installed at right angles to the exterior walls. Diagonal runs are not allowed. Conduit shall run as tight to the ceiling slab as possible, with bottom of conduit no lower than 4” from the ceiling slab.

   d. Paint conduit to match existing conditions in exposed areas.

6. Maintain 6 inches of clearance between conduit and piping.

7. Maintain 12 inches of clearance between conduit and surfaces with temperatures exceeding 104° F (40° C).

8. Cut conduit square using saw or pipe cutter; de-burr cut ends.

9. Bring conduit to shoulder of fittings; fasten securely.

10. Bends:

    a. Install no more than equivalent of four 90-degree bends between boxes. Use conduit bodies to make sharp changes in direction, as around beams.

    b. Metal Conduit Larger than 2 inch Trade Size: Use factory elbows or fabricate bends with hydraulic one-shot bender.

11. Provide suitable fittings to accommodate expansion and deflection where conduit crosses seismic, control and expansion joints.

12. Provide suitable pull line in each empty conduit.

13. Provide insulated equipment ground conductor in flexible conduit.

14. Termination of Conduit Stubs:

    a. Above Floor and in Ceiling Spaces: Use conduit bushing.

    b. Install conduit to preserve fire resistance rating of partitions and other elements, per NFPA.

    c. There shall be no “bare” conduit ends. Exposed conduit ends shall have plastic bushing(s) installed.

E. Service Fittings: Install all new products in accordance with the manufacturers' instructions.

1. Provide components, accessories, and adapters to correspond with existing floor distribution system.

F. Fire stopping: Comply with local City and State requirements.

1. Install fire stopping at fire rated wall and through slab penetrations.

2. Materials to be applied by trained technicians in accordance with the product manufacturer's written instructions.

3. Install backing materials to arrest liquid leakage.

4. Protect adjacent surfaces from damage by material installation.

5. Clean adjacent surfaces of fire stopping material.

G. Building Wire and Cable:

1. Utilize copper conductors.

2. Provide separate ground wire in all Power/Lighting conduits.

3. Install products in accordance with manufacturer’s instructions.

4. Pull all conductors into raceway at same time. Do not use mechanical means to pull conductors #8 AWG and smaller.

5. Use suitable wire pulling lubricant for building wire 4 AWG and larger.

6. Neatly train and lace wiring inside boxes, equipment, and panel boards. Individual conductors shall be marked with circuit number.

7. Properly prepare conductor surfaces before installing lugs and connectors.

8. Measure torque of bolted connections and compare torque measurements with manufacturer's recommended values. Mark bolts, with a permanent marker, that have been torqued to manufacturer’s requirements.

9. MC Cabling: Support per code.

10. Voice/Data and control cabling shall be plenum rated and properly supported to comply with NEC. Support means shall be by j-hooks, cable tray, ladder rack etc. Low voltage cabling shall not be tye-wrapped to close-by piping, conduit, and/or supports for devices/equipment.

11. Identify as noted in the Electrical Identification section.

H. Wiring Connectors:

1. Make splices, taps, and terminations to carry full ampacity of conductors with no perceptible temperature rise.

2. Use compression or mechanical connectors for copper conductor splices and taps, 6 AWG and larger. Use compression tool designed for the size and type of connector being compressed.

3. Use insulated spring wire connectors with plastic caps for copper conductor splices and taps, 8 AWG and smaller.

4. UL listed “Push-In” and compact splicing wire connectors are acceptable, but only for solid wire #10AWG and smaller.

I. Boxes:

1. Install electrical boxes as required for splices, taps, wire pulling, equipment connections and compliance with regulatory requirements.
2. Install electrical boxes to maintain headroom and to present neat mechanical appearance.
3. Install pull boxes and junction boxes above accessible ceilings and in unfinished areas only.
4. Inaccessible Ceiling Areas: Install outlet and junction boxes no more than 6 inches from ceiling access panel or from removable recessed luminaire.
5. Install boxes to preserve fire resistance rating of partitions and other elements; arrange boxes to meet regulatory requirements and use materials and methods per National Electric Code and NFPA. Where 3-gang or larger openings are required, re-establish rated construction around boxes.
6. Align adjacent wall-mounted outlet boxes for switches, thermostats, and similar devices with each other.
7. Use flush mounting outlet boxes in finished areas.
8. Do not use through-walls boxes or install flush mounting boxes back-to-back in walls; provide minimum 12 inch separation. Provide minimum 24 inches separation in acoustic and fire rated walls.
9. Secure flush mounting box to interior wall and partition studs. Accurately position to allow for surface finish thickness.
10. Use stamped steel bridges or bar hanger assemblies to fasten flush mounting outlet box between studs.
11. Install flush mounting box without damaging wall insulation or reducing its effectiveness.

12. Use adjustable steel channel fasteners for hung ceiling outlet box.
13. Do not fasten boxes to ceiling support wires.
14. Support sheet metal boxes independently of conduit.
15. Use gang box where more than one device is mounted together, including floor boxes. Do not use sectional box.
16. Use Plaster Rings for all concealed work; depth of rings shall be as required to reach finished surfaces.
17. Coordinate mounting heights and locations of outlets mounted above counters, benches and backsplashes per NEC and NFPA codes.
18. Coordinate trimming of openings for outlet boxes in partitions to achieve neat, closely-fitting openings.
19. Adjust flush-mounting outlets to make front flush with finished wall material.
20. Install knockout closure in unused box openings.
21. Boxes shall be labeled with circuits; on both sides of covers.

J. Wiring Devices:

1. Install products in accordance with manufacturer's instructions.
2. Install devices plumb, level, and rigidly in place.
3. Install switches with OFF position down, 2 inches to 24 inches from trim on the strike side of door or within 18” beyond door swing.
4. Use dedicated neutral conductor on dimmer circuits.
5. Install receptacles with grounding pole on top.
6. Connect wiring device grounding terminal to outlet box with bonding jumper. Self-grounding devices may also be used.
7. Install switched receptacles with top half switched.
8. Install decorative plates on switch, receptacle, and blank outlets in finished areas. Use multi-gang plates for multiple devices.
9. Connect wiring devices by wrapping conductor around screw terminal. Stab-in or quick connect devices are allowed only for solid conductors. Cover exposed energized material with 600V rated electrical tape.
10. Install protective rings on active flush cover service fittings.
11. Install isolated ground receptacle so that ground conductor is isolated from metallic raceway.
12. Inspect each wiring device for defects.
13. Operate each wall switch with circuit energized and verify proper operation.
14. Verify that each receptacle device is energized.

15. Test each receptacle device for proper polarity and integrity of ground connection.

16. Test each GFCI receptacle device for proper operation.

17. Adjust devices and wall plates to be flush and level.

18. Receptacles shall have p-Touch label installed on face plate to identify source circuit(s).

K. Supporting Devices:

1. Fasten hanger rods, conduit clamps, and outlet and junction boxes to building structure using expansion anchors and beam clamps.

2. Use toggle bolts or hollow wall fasteners in hollow masonry, plaster, or gypsum board partitions and walls; expansion anchors in solid masonry walls; self-drilling anchors or expansion anchor on concrete surfaces; sheet metal screws or spring steel bar retainer clips in sheet metal studs; and wood screws in wood construction.

3. Do not fasten supports to piping, ductwork, mechanical equipment, or conduit.

4. Do not use powder-actuated anchors without specific permission from Landlord.

5. Do not drill structural steel members without specific permission from Landlord.

6. Fabricate supports from steel channel, rigidly welded or bolted to present a neat appearance. Use hexagon head bolts with spring lock washers under all nuts.

7. Install surface-mounted cabinets and panel-boards with minimum of four anchors. Provide steel channel supports to stand cabinet one inch off wall.

8. Bridge studs top and bottom with channels to support flush-mounted cabinets and panel-boards in stud walls.

L. Electrical Identification

1. Degrease and clean surfaces to receive nameplates.

2. Install nameplates parallel to equipment lines. Label building electrical equipment to match existing.

3. Secure nameplates to equipment fronts using screws or rivets.

4. Embossed tape is only permitted for receptacle face plates and light switch cover plates.

5. Wire Identification:

a. Provide wire markers on each conductor in panel-board gutters, pull boxes, outlet and junction boxes, and at load connection. Identify with branch circuit or feeder number. Identify control wire with number as indicated on schematic and interconnection diagrams equipment manufacturer's shop drawings for control wiring. If more than one neutral conductor is present, mark each with related circuit numbers.

b. Color code all secondary branch circuit and feeder conductors as follows:

Conductor	120/208 Volt	277/480 Volt
Phase A	Black	Brown
Phase B	Red	Orange
Phase C	Blue	Yellow
Neutral	White	Grey
Ground	Green	Green
Isolated Ground	Green/yellow stripe	Green/yellow stripe
Switch leg	Phase color	Phase color

c. Use green color for any conductor intended solely for equipment grounding, unless it is bare.

d. Use wire with insulation of required color. For sizes of wire which may not be available in specified colors use self-adhesive wrap around, markers of solid colors to color code conductors.

e. Color code conductors at accessible locations.

f. Make color-coding for signal system such as life safety, intercommunication, etc., in accordance with programs or schedules prepared by the equipment manufacturer.

g. Use same color throughout a given system for any signal or control wires performing the same function.

6. Nameplate Engraving:

a. Panel boards: 3/4 inch lettering; identify equipment designation. 1/2 inch lettering; identify voltage & amperage ratings and source circuit(s).

b. Enclosed Switches and Motor Starters: 1/2 inch lettering; identify switch designation, source circuit(s), and load served.

c. Transformers: 3/4 inch lettering; identify equipment designation. 1/2 inch lettering; identify primary and secondary voltages, kVA rating, primary source circuit(s), secondary load, and secondary load location.

d. Equipment Disconnect Switches and VFD's: 1/2 inch lettering; identify load served (equipment ID), electrical source circuit(s), and voltage and amperage ratings.

1) For VFDs identify load motor HP rating in lieu of amperage rating.

e. Light Switches Not in Sight of Fixtures They Control: 3/16 inch; identify location of light fixtures controlled. It is acceptable to install p-touch type label on switch cover plate in lieu of engraved label.

f. Engraving on device plates with black enamel filled lettering is acceptable in lieu of separate nameplates.

7. All j-box covers and electrical box/gutter covers shall have label identifying source panel & conductor circuit IDs. Labels shall be installed on both sides of box cover.

8. All receptacle face plates shall have p-Touch, or approved equal, label identifying source panel & conductor circuit ID(s).

    a. Also for light switch style electrical disconnect switches.

9. Affix label to pull rope identifying termination point.

M. Enclosed Switches:

1. Install disconnect switches where indicated.

2. Install fuses in fusible disconnect switches.

3. Provide adhesive label on inside door of each switch indicating UL fuse class and size for replacement.

N. Dry Type Transformers:

1. Set transformer plumb and level.

2. Use flexible conduit for final connections to transformer case.

3. Mount transformers on vibration isolating pads suitable for isolating the transformer vibration from the building structure.

4. Provide seismic restraints as required.

5. Set taps on transformers to 118 to 122 volts for 120 volt nominal systems, and proportionately equivalent values for higher voltage systems.

O. Panel boards:

1. Install panel boards plumb. Install flush mounted panel-boards flush with wall finishes.

2. Height shall be 6’-6” (2.0m) to top of panel.

3. Provide filler plates for unused spaces in panel boards.

4. Provide typed circuit directory in plastic holder for each branch circuit panel board.

    a. Hand written directories are not acceptable.

    b. Spare breakers, installed without attached conductor(s), shall be identified as “SPARE” in the circuit directory.

    c. Spaces in panel board, without breaker(s) installed, shall be identified as “SPACE” in the circuit directory.

5. Out of each recessed panel-board, stub a one inch conduit into the accessible ceiling space above for each 3 spares or spaces in the panel-board.

P. Enclosed Circuit Breaker:

1. Install enclosed circuit breakers plumb.

2. Height shall be not more than 6 feet 7 inches to operating handle.

3. Inspect each circuit breaker visually.

4. Perform several mechanical ON-OFF operations on each circuit breaker.

5. Adjust trip settings so that circuit breakers coordinate with other overcurrent protective devices in circuit.

Q. Lighting Fixtures:

1. Install in accordance with manufacturer's instructions.

2. Verify ceiling construction; coordinate with luminaire trim and accessories.

3. Install suspended luminaires using pendants supported from swivel hangers. Provide pendant length required to suspend luminaire at indicated height.

4. Support luminaires larger than 2 x 4 foot size independent of ceiling framing.

5. Install surface mounted luminaires plumb and adjust to align with building lines and with each other. Secure to prohibit movement.

6. Suspended Grid Ceilings: Support 2x4 foot and smaller recessed luminaires in grid ceiling by installing #12 (minimum) hanger at each corner of the affected ceiling grid. Provide 2 additional hanger wires directly from the structure above to the fixture housing. Install appropriate seismic bracing.

7. Install recessed luminaires to permit removal from below.

8. Install recessed luminaires using accessories and fire stopping materials to meet regulatory requirements for fire rating.

9. Install clips to secure recessed grid-supported luminaires in place.

10. Install accessories furnished with each luminaire.

11. Make wiring connections to branch circuit using building wire with insulation suitable for temperature conditions within luminaire.

12. Bond products and metal accessories to branch circuit equipment grounding conductor.

13. Install specified lamps in each luminaire.

14. Aim and adjust luminaires as directed.

15. Adjust exit sign directional arrows as indicated.

16. Clean electrical parts to remove conductive and deleterious materials.

17. Remove dirt and debris from enclosure.

18. Clean photometric control surfaces as recommended by manufacturer.

19. Clean finishes and touch up damage.

20. Luminaires that are served by more than one (1) power source, or structured to fail to Emergency power upon loss of normal power, shall be identified and labeled in the driver pan and at the switch; so as to prevent electrical shock when servicing takes place.

R. LED Drivers:

1. Install in accordance with manufacturer's instructions.

2. For inaccessible luminaires; install LED drivers remotely as allowed by manufacturer.

3. To be compatible with the Base Building Lutron Quantum lighting control system.

S. Lamps:

1. Install in accordance with manufacturers' instructions.

2. Relamp any failed lamps at substantial completion.

T. Each Tenant shall have sub meters. Contact the Chief Engineer for proper meter configuration and wiring for integration with the Base Building sub-metering system.

U. Data Cabling:

1. All installations are to be conducted by a BICSI certified Contractor.

2. All Cabling is to be suspended by dedicated hangers manufactured to meet the specifications of the installation. Cabling is to be hung as tight to the overhead slab as possible so that it does not conflict with MEP/F installations and does not obstruct the access of building personnel via ceiling tiles. The use of existing hangers, i.e. electrical, plumbing, ceiling, etc. is prohibited. Field manufactured hangers are not acceptable.

3. All cabling runs are to be bundled neatly and run in parallel lines to the ceiling grid. Cabling is to have home runs with branches maintaining perpendicular zone distribution. Spider webbing (i.e. diagonal runs) of cable is not acceptable.

4. All cabling routed to poke through outlets will be hard piped when entering a space other than that of the Tenant's premises. Routing of conduit is to follow the building's parallel lines and run tight to the overhead slab to minimize the possibility of future conflict with MEP/F installations in other tenant's premises.

5. On multi-floor Tenant applications, all Tenant cabling is to be routed within the leased premises via a strategically placed cored and fire sealed penetration. The routing of cabling from floor to floor for the specific and dedicated use of a Tenant cannot be by means of the Base Building's telecommunications riser without specific written consent from Property Management and Lease Document.

6. The building's telecommunications infrastructure was installed following TIA/EIA-568-A Commercial Building Cabling Standards. Any and all modifications and/or additions to such system are to be submitted for Property Management's written approval and installed to maintain and follow said standard.

7. NOTE: It is not the intent of Property Management or the Engineering Department to dictate the type of equipment, system or cabling that are to be used. The type of system and equipment will be selected by the tenant to fit their needs. The cabling installation standards are set to make the identification and differentiation of cabling systems easier and to assure that they will not interfere with any other systems as installed. Should any questions arise with regard to cable installation in a tenant's premises, it is the responsibility of the tenant and/or Contractor to obtain clarification and approval from Property Management. Failure to comply with said standards may result in removal of substandard installation and reinstallation at the tenant and/or Contractor's expense.

V. Commissioning:

1. Collaborate and coordinate with the commissioning agent for commissioning of electrical systems. Commissioning responsibilities start at the beginning of design and continue through a post occupancy period. Successful commissioning requires a team effort and shall include participation by the design team's electrical system designers, installers, control system technicians, and equipment suppliers and Landlord.

2. All Lighting Control or other related systems shall have acceptance testing conducted by a Certified Lighting Controls Acceptance Test Technician (CLCATT) in compliance with California Title 24.

3. This facility has had an arc flash risk assessment completed. Contractor performing any electrical upgrades to the facility or adding electrical equipment need to ensure that all new equipment is added to the existing assessment and properly labeled as required.

3.2 FIELD QUALITY CONTROL

A. Inspection by the Chief Engineer: Tenant's Contractor is to notify the Landlord at least one week in advance of substantial completion of construction.

1. A walk-through and punch list inspection is to be scheduled for the Chief Engineer to review installation for conformance with approved construction documents and these Tenant Construction Standards.

3.3 CLOSE-OUT

A. Provide full sized record drawings.

1. Conduit run in the ceiling of the floor below shall be shown as a dashed line.

2. Conduit run on the indicated floor shall be shown as a solid line.

3. Panel schedule shall show breaker size, number of poles, and load summary.

4. Indicate outlets protected by feed through GFCI receptacles.

B. Provide AutoCAD record drawings.

C. Provide full-sized Contractor's shop drawings.

D. Provide signed-off construction permits.

E. Provide typed revised panel board schedules.

F. Provide approved equipment submittals.

G. Provide one (1) complete set of equipment manufacturer Operating and Maintenance manuals including any sequences of operation; organized into loose leaf 3-ring binders and indexed with tabs.

H. Provide Lighting Control system documentation.

1. System start-up and commissioning/functional testing documentation.

2. System sequences of operation, including schedules.

3. After occupancy fine tuning report.

I. Provide Short circuit coordination study.

J. Provide Arc flash hazard study.

K. Provide copies of any keys for panelboards, equipment control panels, access doors, etc.

END OF SECTION

LIFE SAFETY SYSTEM

Related Sections: Electrical

PART 1 - GENERAL

1.0 SUMMARY

A. Contact Landlord for Life Safety Representative's phone number.

1. Contract with Siemens Building Technology Division to: design, program, supervise connections, and assist in testing life safety components.

B. Related Sections:

1. Electrical including: conduit, wire, and identification.

1.1 SYSTEM DESCRIPTION

A. Base Building System:

1. Life Safety System: Siemens Building Technologies XLS fire/life-safety system.

2. System Components:

a. Fire Control Center (FCC/status command center) is located on Level 1.

b. Life safety terminal panel and power supply is located in electric room "A" on each floor.

c. Remote annunciator panel at Lobby Desk on Level 1.

B. Design Criteria:

1. Supply-air fans larger than 2000 cfm shall have duct-mounted smoke detectors installed in discharge duct and connected to the Life-Safety system for monitoring status and fan shutdown upon detection of smoke.

2. Provide detection devices, notification devices, and control devices as required by current NFPA standards, the State of California Fire Marshal, and the Authority Having Jurisdiction (AHJ).

3. Supplemental Fire detection and suppression systems shall be monitored by the Base Building Life-Safety system. Coordinate with other Trades as necessary.

4. Do not overload Life-Safety device loops. Identify devices (new and existing) in loops and provide load calculations.

5. When Tenant Improvements require an upgrade to the Base Building Life-Safety system, including the installation of additional power supplies, network modules, etc., these upgrades shall be provided and installed by the Tenant.

6. The Fire Alarm Control Panel shall be programmed to have disarm functionality; such that fire alarm system input devices and output devices can be disarmed in like groups by individual Tenant Suite and by floor. This grouping of devices is to include Tenant Improvement devices and respective Base Building devices.

7. Life-Safety system contractor shall conduct a field walk to verify existing system conditions prior to submitting a design for Landlord approval.

8. FSD position status shall be monitored by the Base Building Life Safety System.

1.2 SUBMITTALS

A. Submit full-sized Life-Safety system shop drawings to Landlord for review and comment prior to submitting for permit. Landlord's review does not release Tenant's Engineer & Contractor from the ultimate responsibility to provide a Code compliant fully functional system.

1. General Contractor will supply to life safety system contractor a floor plan or reflected ceiling plan showing all special use areas and other Tenant special requirements (example: access card entry doors, etc.), and Mechanical Drawings on CAD.

2. Life safety contractor to provide life safety and associated wiring diagrams including layout and location of alarm and signaling, devices, life safety power supplies and connections to existing life safety system to Landlord for review and comment prior to submitting for permit.

   a. Include layout and location of alarm and signaling and life safety module panels for power connections to life safety system.

   b. Show location and connection to other devices and equipment included in complete operation of life safety system.

   c. Show conduit runs, risers, wire counts, device wiring order, and end-of-line resistors.

   d. Drawings to be stamped by professional engineer licensed in California.

   e. Submit to Landlord for review and comment the specific text based identification messages that will display on the Fire Alarm Control Panel for each new addressable device.

3. Life safety contractor shall submit life safety drawings to General Contractor. General Contractor shall submit plans to Landlord for review and comment.

   a. Upon review & comment by Landlord and General Contractor, life safety contractor shall submit plans to the AHJ, unless otherwise directed.

   b. System certification by life safety contractor shall be issued to Landlord upon final testing and approval by the AHJ.

B. Project Submittals:

1. Provide evidence of Life Safety contractor approval of life safety system.

2. Submit the text based FACP event descriptors to Landlord for approval.

3. Provide Landlord with notification, punch list, and as-built drawings.

4. General Contractor shall coordinate testing with the AHJ, Landlord, and life safety contractor.

PART 2 - PRODUCTS

2.0 MATERIALS

A. Initiating devices shall be compatible with the Base Building Siemens XLS fire alarm system.

1. Smoke Detector: #FD0421 (head) and #DB-11 (base).

2. Duct Smoke Detector: #FD0421 (head) and FDBZ492-HR (housing).

B. Signaling devices shall be compatible with the Base Building Siemens XLS fire alarm system.

1. Alarm Speaker/Strobe: SE-MC-W (wall), SE-MC-CW (ceiling).

a. Wall mounted combination devices are to be used where possible.

2. Multi-candela strobe: ZR-MC-W (wall), ZR-MC-CW (ceiling).

3. Speaker: SE-W (wall), SE-CW (ceiling).

C. Auxiliary Devices

1. Door Release: Magnetic door holders are to be as specified in the Door Hardware schedule, but powered and controlled by life safety system. Comply with NFPA 72 for local smoke detection requirements for control of magnetic door holders.

2. Fire/Smoke Damper actuation: Provide a control relay at each FSD for control from the Life-Safety system; as required by NFPA 72.

3. Fire/Smoke Damper position indication: Provide position status indicator switches to indicate open and closed positions of the FSD; as required by the Authority Having Jurisdiction. These position status indicator switches shall report to the Base Building Fire Alarm Control Panel.

4. Fan status sensing via “tuned” current transducers, or as approved by the AHJ.

a. Current sensors are to have an adjustable trip setting; such that an unloaded energized motor, as with a broken fan belt, will indicate OFF status.

D. All life safety related wiring, including cabling, shall be installed in EMT conduit.

E. Wire and Cable:

1. Use #16 AWG minimum size conductors for fire alarm detection and notification.
2. Use #12 AWG for strobe signal circuit conductors.

PART 3 – EXECUTION

3.0 DEMOLITION

A. Existing Life Safety System: Make connections as directed by life safety contractor. Maintain existing system in service until new system is accepted.

1. Disable system only to make switchovers and connections.
2. Notify Landlord at least 48 hours before partially or completely disabling system.
3. Minimize outage duration. Make temporary connections to maintain service in areas adjacent to work area.
4. Provide fire watch when detection or signaling circuits are disabled.
5. System shall not be left in disabled state.
6. Demolition of all existing wiring and conduit shall be back to the source.

3.1 INSTALLATION – As per the Base Building Life Safety vendor's specifications and instructions; and in compliance with local codes:

A. Parallel branching, aka T-tapping, of notification wiring is not permitted.

B. Field connection to the Base Building system; make connections as directed by the Base Building Life-Safety system vendor.

1. Life-Safety Power Supply: Provide remote power supply adequate to power Life-Safety modules, detectors, door holders, Fire/Smoke dampers, relays, and alarm signaling devices. Power supply will operate strobe lights, according to acceptable voltage drop calculations as calculated by Life-Safety contractor according to NFPA 72 and the Authority Having Jurisdiction (AHJ).

2. Building Engineering staff shall be the only entity to alter day-to-day operational functionality of the fire alarm system. Tenant's Contractor shall not alter: off-site

monitoring, fire alarm output, or fire alarm input functions of the Base Building fire alarm system.

3. Contractor shall provide “Base Building Systems Shutdown” document, in accordance with established Building procedures, at least 72 hours prior to major impacts to the existing Base Building fire alarm system.

C. Initiating Devices: Install devices in accordance with manufacturer’s written instructions.

1. All fire alarm initiation devices shall have a 9mm or 12mm P-touch label installed that identifies the common system address of each device. The label shall be installed such that the device address can be seen while standing on the floor to view the device.

D. Notification Devices: Install devices in accordance with manufacturer’s written instructions.

1. Provide notification devices to meet audibility requirements; as required by the Authority Having Jurisdiction.

2. Provide strobes to meet ADA, UL, and AHJ requirements.

E. Install audible and visual signal devices as per Code above finished floor.

F. Auxiliary Devices: Install in accordance with respective device manufacturer’s written instructions.

1. Mount outlet box for electric door holder to withstand pulling force; as per Code.

2. Make conduit and wiring connections to door release devices, sprinkler flow switches, valve tamper switches, duct smoke detectors, and other devices as directed by the Base Building Life-Safety vendor.

G. Wire and Cable: Use #16 AWG minimum size conductors for fire alarm detection and #12 AWG for strobe signal circuit conductors.

1. Route conduit through corridors to maximum practical extent.
2. Signaling wiring shall be marked with same zone ID as shown on design drawings; at devices, power supplies, and control panels.

3.2 TESTING

A. All testing to be done outside of normal business hours.

B. Any Building Engineering, Security or maintenance costs related to Tenant's Life-Safety system is to be paid by Tenant at Landlord's prevailing rate for labor and materials.

C. Twenty-four hours (24), or the next business day, following the successful Authority Having Jurisdiction acceptance of the fire alarm system improvements; Life-Safety contractor shall provide:

1. A brief narrative of last minute changes required by the AHJ and corresponding Fire Alarm functionality.
2. A soft copy of the latest, complete, fire alarm system points' list.

3.3 CLOSE-OUT

A. Provide full-sized updated record drawings for each entire floor that Tenant Improvement work took place. Each floor drawing shall capture all new Tenant Improvement, existing, and Base Building devices installed on the specific floor.

B. Provide AutoCAD record drawings.

C. Signed-off construction permits.

D. Provide updated consolidated Fire Alarm system points list.

E. Updated points' list that includes all Fire Alarm system address points.

F. Final system certification.

END OF SECTION