

**COUNTY OF RIVERSIDE
DEPARTMENT OF FACILITIES MANAGEMENT
Real Estate Division**

**GENERAL CONSTRUCTION SPECIFICATIONS
FOR LEASED FACILITIES**

A. INTENT

1. It is the intent of these instructions to convey to the Lessor and his bidders the construction requirements for obtaining a complete and usable facility under lease agreement. These instructions apply to all new construction (build-to-suit), alterations and repair and/or renovation in facilities leased to the County of Riverside.
2. All references to the County in this or any other specification means the Director of Facilities Management or his designee.
3. All work in accordance with these specifications or any other specifications and plans must be coordinated with the Director of Facilities Management or his designee. Specifications contained on or with specific plans for construction may contain more stringent provisions than the minimum requirements stated herein. The more stringent requirements shall govern.
4. When fully justified, Lessor may request waiver of any portion of these specifications. Such requests must be submitted in writing to the Department of Facilities Management with full justification. All specifications will be enforced unless specifically waived by the Department of Facilities Management in writing.

B. COMPLIANCE WITH LOCAL REGULATIONS

1. In the absence of such codes, ordinances or regulations, the Lessor's contractor shall use the latest edition of the "Uniform Building Code". However, when such local, County or State requirements contain more stringent provisions than the minimum requirements stated herein, the more stringent requirements shall govern.
2. The Lessor shall, without additional expense to the County, be responsible for obtaining and paying for any necessary construction fees, licenses and permits required for privately owned buildings. Lessor shall comply with any applicable Federal, State and Municipal laws, codes, and regulations in connection with the prosecution of the work, and shall take proper safety and health precautions to protect work, the workers, the public, and the property of others.
3. All work in accordance with these specifications must be done in strict compliance with the Americans with Disabilities Act of 1990 and any regulations issued pursuant thereto.

C. **DRAWINGS**

1. A site plan, clearly indicating employee, visitor and open parking spaces, shall be prepared. Floor plans, elevations, mechanical and electrical drawings shall be prepared, preferably at one eighth inch (1/8") scale.
2. The Department of Facilities Management shall be provided four (4) complete sets of the aforementioned drawings and specifications for review and approval.
3. Prior to start of construction, two (2) complete approved sets of construction plans and specifications shall be provided to the Department of Facilities Management. These sets shall be signed to indicate approval by Information Technology and the user department. One set will be returned to Lessor for construction, the second set shall be retained by Department of Facilities Management.
4. Any changes or deviation from the approved plans and specifications will not be accepted without prior written approval from the Department of Facilities Management.

D. **CONSTRUCTION**

1. A pre-construction conference with Lessor, contractor and County shall be conducted at a mutually agreed-upon site for reviewing and defining the construction requirements.
2. Inspections by the Department of Facilities Management will be conducted at random times during the course of construction. The successful bidder shall maintain, on the job site, a complete set of approved final drawings and specifications marked up to show any changes and as-built conditions. Normally, three (3) unscheduled and one (1) final inspection will be conducted. At the final inspection, a punch list will be developed, and any deficiencies noted will be corrected prior to County's acceptance of the facility.

E. **SPECIFICATIONS**

1. The Lessor shall be responsible, in all cases, for the proper design and coordination of architectural, structural, plumbing, electrical, heating, ventilation, air conditioning, site elements, etc., of the proposed facility. Accessibility for physically handicapped is required, unless specifically waived in writing by the Department of Facilities Management.
2. Lessor shall verify the accuracy of all dimensions, and he shall be responsible for correcting and recording any discrepancies.

(SITE REQUIREMENTS)

A. SITE

1. The Lessor shall be responsible for determining site conditions, including sub-surface soil conditions, adequate public utilities and load-bearing characteristics, the installation of retaining walls, demolition, relocation of utilities, and other site improvements.

B. GRADING

1. The finish grades and contours shall be correlated with street and sidewalk grades established by the local municipality. Floors, driveways, etc., shall be adjusted by the Lessor's architect as necessary, to insure property clearances, surface drainage, slope gradients, storm and sanitary sewer gradients and connections. All paved areas shall be graded as necessary to provide positive drainage of surface runoff water away from the buildings.

C. DRAINAGE

1. Walks, parking areas, driveways and maneuvering areas shall be provided with positive natural drainage whenever possible. The floor of the building and adjacent grades may be raised sufficiently to provide natural drainage.

D. RETAINING WALLS

1. The determination of the location and extent of retaining walls required is the responsibility of the Lessor.

E. LANDSCAPING

1. Suitable regionally appropriate, water conserving, low-maintenance planting shall be provided. Preservation of existing vegetation and the providing of additional landscaping shall meet local environmental requirements.

F. CLEANUP

1. Upon completion of the facility and prior to move-in and acceptance for lease by the County, the Lessor shall clean, seal and wax floors, clean windows, fixtures and finishes, interior and exterior, and remove surplus materials and debris from the site.

(ARCHITECTURAL REQUIREMENTS)

A. FLOORS

1. Floor elevations shall be at least eight inches above finished exterior grade whenever possible. When floor slab is below grade, it shall be waterproof.

2. Floors shall be designed in accordance with uniform, concentrated and special loads given in the "Uniform Building Code", chapter 23.
3. Carpet – One hundred percent (100%) continuous filament nylon or olefin with static control; minimum yarn weight - 28 oz. Require statement of pile weight from vendor or manufacturer. Minimum five (5) year warranty excluding the use of protective chair pads against ten percent (10%) surface wears when properly maintained. Four inch (4") rubber cove base shall be used for base in all carpeted areas. Colors/patterns must be approved by the Department of Facilities Management.
4. Carpet tiles may be used. Pile weight 28 oz. static control 2.0 K.V. or less. Color shall meet County color standards.
5. Non-carpeted floors - rest rooms, coffee rooms, etc., shall have sheet vinyl covering, including base. Vinyl tile may be used in other non-carpeted areas. Vinyl shall be commercial grade with colors and patterns full depth. Colors/patterns of sheet vinyl and vinyl tile must be approved by the Department of Facilities Management.

B. WALLS

1. Interior walls - all interior partition construction shall comply with applicable Federal, State, County and City codes. The types of interior partitions to be used must be approved by the Department of Facilities Management. Systems furniture may be used.
2. Toilet room walls adjacent to occupied spaces shall be sound insulating double-wall construction and filled with sound-absorbing materials.
3. Exterior walls - Exterior walls constructed of wood or steel stud shall be insulated to R-11 specifications.

C. ROOF AND INSULATION

1. Roof construction and insulation shall be appropriate to the overall design of the building and prevailing weather conditions. Light colored materials are encouraged.
2. All roof designs shall include a minimum one-half inch ($\frac{1}{2}$ ") to one foot (1') slopes for positive drainage.
3. Roofs on existing buildings shall be subject to (a) an inspection by a licensed roofing contractor, (b) County's review of roofing contractor's findings and (c) proof of corrective action.

D. TIMBER AND WOOD

1. All lumber used structurally shall be stress-graded with the stamp of the Lumber

Association indicated on each piece showing the stress grade.

E. **CEILING CONSTRUCTION**

1. All ceilings shall be placed at nine feet (9'0") above finish floor level, unless otherwise specified.
2. A suspended acoustical ceiling system with integrated lighting shall be installed in all occupied areas.
3. Rest rooms and coffee rooms shall have solid ceilings (drywall, etc.).

F. **WINDOWS**

1. Windows shall generally be limited to the lobby area and offices.
2. Glazing that extends below thirty-two inches (32") above the floor shall be protected with a horizontal railing or similar safety barrier. Individual windows may be metal or wood of commercial quality. All window openings shall be properly flashed to prevent moisture intrusion.
3. Low energy and reflective glazing shall be used in high heat gain areas.

G. **DOORS**

1. Exterior doors - all wood doors will be solid core. Exterior doors will be weather-stripped and have stops. Exterior doors to be not less than thirty-six (36") wide. Appropriate metal doors are acceptable.
2. Exterior doors shall have automatic closers.

H. **CABINET WORK**

1. Cabinet work shall conform to the standards as defined in the Woodwork Institute of California, Manual of Millwork, (reference "WIC #102", standard cabinet design).
2. Acceptable cabinet work quality is laminated plastic covered deluxe (D) grade, or wood factory finished deluxe (D) grade, except utility (U) grade in utility storage areas.
3. Countertops and splashes shall be laminated plastic, custom grade, self-edge trim. Minimum four inch (4") high splashes where abutting vertical wall surfaces.
4. Cabinet work to be complete with knobs, pulls, hinges, catches, etc.
5. Colors/patterns of laminated plastic and finishes of casework must be approved by the Department of Facilities Management.

I. **HARDWARE**

1. Hardware will be of good commercial quality grade and type. Automatic door closers shall be provided on public and employee entrance doors, toilet room doors, and coffee room doors. Public entrance and glazed partition lobby doors shall be equipped with push bars with integral PUSH AND PULL signs. Toilet and coffee room doors will have push plates and door pulls. When public entrance, lobby, toilet or coffee room doors are wood or metal with enameled finish, kickplates shall be provided. At buildings where only one (1) toilet is provided, the door closer will be omitted and the door fitted with a privacy lockset. Door locks will be operable by a master key system. Panic hardware must be installed where required by code. Simplex cipher locks (or equal) may be used in lieu of keyed locks when approved by the Department of Facilities Management.
2. Exterior doors with hinges exposed to the public (out- swinging doors) will be equipped with door butts that have "fast" pins to prevent removal or tampering.
3. All doors to be provided with adequate hardware. Interior door locksets to be provided only where indicated on plans. Interior doors to be provided with doorstops.
4. Double doors (pair) - shall be avoided on exterior openings wherever possible. When pair is required by design, use removable mullion, unless specifically approved otherwise.
5. Exterior doors - all exterior doors must have a deadbolt lock, except where panic hardware is required.
6. Door lock keying - Simplex or equal may be substituted for keyed locks when approved by the County.
 - a. All keyed locks shall be equipped with six (6) pin keyways.
 - b. Three (3) keys shall be furnished for each lock.
 - c. All locks shall be keyed as specified by County, except that all locks within the following individual groups shall be keyed alike:
 - (1) Mechanical equipment rooms.
 - (2) Janitor's closets.
 - (3) Employee entrances (interior & exterior).
 - (4) Bulletin boards.
 - (5) Electrical panel boxes.
 - d. A master key system shall be provided and three (3) master keys shall be

furnished, unless otherwise specified.

- e. Keying - locks will incorporate a security system to assure that keys used during construction will not open doors after County occupancy. The key side of all locks will be on the public side.

J. **TOILET ENCLOSURES AND ACCESSORIES**

Facilities must comply with all existing codes.

1. All toilet and urinal enclosures shall be secured to the floor and ceiling.
2. Doors shall be installed in men's and women's restrooms. Entrance doors to toilet enclosures shall be fitted with specific locking devices. Toilet enclosures for non ADA stalls shall be 34" wide, or more, on all new construction
3. Each toilet compartment shall be provided with a metal coat hook and double roll toilet paper holder, suitable for dispensing rolled tissue.
4. Install one single-fold paper towel or roll towel dispensing cabinet for each multiple of two (2) lavatories or less in all rest rooms. Towel dispensers shall be designed to dispense paper towels.
5. Each pair of lavatories in all rest rooms shall be provided with soap dispensers.
6. Each lavatory in all rest rooms shall be provided with a 24" x 30" wall-mounted mirror. Provide a stainless steel shelf at each mirror.
7. Women's rest rooms shall be provided with feminine napkin dispenser. Women's toilet compartments shall be provided with one (1) feminine napkin disposal container.
8. Trash bins shall be provided in rest rooms.
9. Both men's and women's toilets shall be designed and constructed to accommodate the physically handicapped. One water closet compartment shall be sized to meet handicapped requirements, provided with out swinging door and grab bars. The toilet fixtures, lavatory, mirrors, etc., shall be located at the correct height for handicapped.

K. **PAINTING**

1. All exterior painted surfaces shall be given a minimum of two (2) coats. Colors must be approved by the Department of Facilities Management.
2. Interior surfaces and trim shall be given two (2) coats minimum. One hundred percent (100%) coverage required. Prefinished acoustical ceiling shall not be painted. Finish coat shall be in accordance with colors as prescribed by County and shall match color chips.

3. Paint colors must be approved by the Department of Facilities Management.
4. All interior painted surfaces shall receive two (2) coats of semi-gloss enamel.
5. Wall coverings other than painted surfaces (i.e., wood paneling, vinyl material, etc.) shall be permitted. Location and colors must be approved by the Department of Facilities Management.
6. Parking strips four inches (4") wide of highway traffic paint are to be provided.
7. Street number - Minimum six inches (6") high number - by Lessor.

L. **WINDOW TREATMENT**

1. Minimum treatment - Vertical blinds or other as specified by the Department of Facilities Management.

M. **SIGNS**

1. Identification sign to be installed on exterior of building. Sign will be specifically identified by the Department of Facilities Management. Placement and specific size of letters will be determined according to layout and location of structure. Letters will be black injection molded plastic, Helvetica in style.
2. Interior signs to be black phenolic material laminated with white letters. Signs will be specifically identified by the Department of Facilities Management.
3. Lettering on entrance doors will be specifically identified by the Department of Facilities Management.

N. **ASBESTOS & LEAD BASED PAINT**

1. All buildings constructed prior to 1978 will have asbestos and lead based paint check to ascertain that no friable asbestos or flaking lead based paint is in evidence. A copy of the report is to be filed with the Department of Facilities Management.

O. **PLUMBING FIXTURES AND FITTINGS**

1. All rest room lavatories shall have self-closing faucets.
2. All toilets and urinals shall be equipped with flush valves.
3. Refrigerated water fountains - provide refrigerated water fountains at location indicated.
4. "Water-Saver" toilets will not be acceptable.

5. Provide hot water in rest rooms and break rooms.
6. Health Clinics-provide hot water in examination rooms, labs, rest rooms and break rooms.
7. All work in accordance with these specifications must be done in strict compliance with the Americans with Disabilities Act of 1990, the California Title 24 section which implements it, and any regulations issued pursuant thereto.

P. **FIRE PROTECTION**

1. Provide all necessary fire extinguishers as required by local fire regulations.
2. Provide sprinkler inspection and test prior to occupancy.
3. Provide all other necessary protective devices and equipment as required by local fire regulations.
4. Building alarms and fire monitoring equipment shall not be installed in the telephone/data room without written permission of the IT Department.

Q. **ELEVATORS**

1. Provide documentation of inspection and routine maintenance prior to and during occupancy.

R. **WATER STATIONS**

1. Provide electric water cooler with bottle filling capability and drinking fountains throughout facility at locations to be specified by County. ELKAY EZH@) Bottle Filling Station with Bi-Level Filtered LZ Cooler Models LZSTL8WS & LZSTLDDWS.

SPACE CONDITIONING)
(Heating, Ventilation and Air Conditioning)

A. **GENERAL REQUIREMENTS**

1. Space conditioning shall be considered the year-round control of temperature, humidity, air circulation, ventilation and air cleaning to the degree required to assure satisfactory and efficient use of the space for occupants and equipment. Follow good accepted practices as reflected in the latest issue of the American Society of Heating, Refrigeration and Air Conditioning Engineer's Guide (ASHRAE).

B. **VENTILATION**

1. Ventilation for air-conditioning system - Provide ventilation makeup air in the amount of 10% of total air requirement for cooling or two (2) air changes per

hour, whichever is greatest, plus all exhaust air requirements.

2. Prior to construction of office space over 5,000 square feet, existing systems over ten (10) years of age shall be inspected by a licensed HVAC company and a statement of condition detailing the reliability and efficiency of the systems shall be provided.

C. **EXHAUST SYSTEMS**

1. Exhaust toilet areas - the exhaust fan shall be connected to the light switch or interconnected with the air conditioning time clock.
2. Air shall not be directly exhausted, except in the following instances:
 - a. Air used to make up exhaust for toilet rooms.
 - b. Air exhausted specifically for cooking, food preparation or removal of excessive heat generated by vending or various other machines.
 - c. When specified for coffee rooms.

D. **SPACE TEMPERATURE CONTROLS**

1. Central control system for the various areas or provide a thermostat for each heating and/or air-conditioning system. Use separate slide lever adjustments for heating and cooling with lock covers.
2. All systems shall be controlled by seven (7) day, twenty-four (24) hour time clocks set to the Department of Facilities Management requirements.
3. Thermostats controlling space conditions during occupied hours shall be adjustable from sixty eight degrees (68°) to eighty degrees (80°) with the normal set at seventy degrees (70°) for heating and seventy-six degrees (76°) for cooling.
4. Simultaneous heating and cooling will not be acceptable.
5. Lessor shall comply with existing codes.
6. Heat-generated equipment shall be of adequate capacity to heat the building under design conditions.
7. All gas furnaces shall be approved by the American Gas Association.
8. All electric components shall be UL-approved and comply with the California Electric Code.
9. Electric strip heating is not acceptable.

E. **AIR FILTERS**

1. All recirculated and outside air shall pass through filters before entering air-handling units.
2. Filters shall be replaceable types and changed a minimum of four (4) times a year.
3. A location map showing filter locations shall be provided to County.

F. **PIPING**

1. Piping in finished areas, such as lobbies and offices, shall be concealed. No water piping of any description shall be installed near electrical switchgear. Provide shutoff valves at all locations necessary to isolate separate zones of the system served.
2. All hot and chilled water piping shall be insulated.

G. **AIR DISTRIBUTION**

1. Ductwork shall be provided, as required, for proper air distribution with supply outlets spaced so as to avoid excessive throws and dead spots. In order to maintain sound privacy, door louvers will not be used to return air from offices. Sound-attenuating, acoustically lined transfer ducts or return air ducts must be used. All supply and return air ductwork shall be constructed and installed in accordance with ASHRAE Standards and shall comply with state and local building codes.
2. All air handling units, except unit heaters, must be provided with outside air intakes. Intakes shall be located to avoid the introduction of boiler flue gases or vehicle and condenser unit exhausts.
3. Diffusers shall be selected and spaced so that, at the occupied level, the movement of air will be uniform and not be less than ten (10) cubic feet per minute, nor more than fifty (50) cubic feet per minute when measured at four feet (4") above the floor. They shall be selected so that the throw from an air diffuser does not impinge on walls, columns, or the throws from other diffusers based on a terminal velocity of one hundred feet (100') per minute. Diffusers located in offices shall be of the fully adjustable air pattern type.

H. **BALANCING AND ADJUSTING**

1. Space conditioning equipment shall be balanced and adjusted by persons certified to perform such functions prior to occupancy.
2. Copy of air balance report shall be provided to the Department of Facilities Management.

I. **NOISE AND VIBRATION**

1. Particular care shall be exercised in the design, selection and installation of all mechanical equipment and components to attain reasonable noise levels in occupied space. In general, sound levels for various spaces shall be maintained in accordance with the recommendations of the ASHRAE Guide.

J. **OPERATING INSTRUCTIONS**

1. The Lessor shall provide simplified consolidated equipment and control diagrams with specific operating instructions posted on a readily accessible label on each utility system, such as furnaces, refrigeration equipment, air handling systems, and pumping systems. These instructions shall clearly indicate how to stop and start systems, what adjustments must or may be made by County personnel to assure proper operation, and what action shall be taken in emergencies.

(ELECTRICAL)

A. **GENERAL REQUIREMENTS**

1. All electrical work shall be designed and installed in accordance with the plan requirements.
2. Codes and ordinances - shall conform to standards of the National Electrical Code (NEC), O.S.H.A., serving public telephone company, State Fire Marshal and local ordinances.
3. Service equipment shall be located in separate electrical/mechanical room with proper working clearances and grounding. All breakers shall be clearly identified.

B. **INTERIOR LIGHTING**

1. Fluorescent lamps shall generally be 34 watt, 430-milli-amp, rapid-start, cool-white, including energy efficient ballasts.
2. The lighting shall be designed to maintain a uniform level of illumination of the minimum foot -candles designated. Lighting levels shall be based on working plan thirty inches (30") above floor, appropriate coefficient of utilization for the fixture and maintenance factor. Conform to Title 24, Division 9 for lighting requirements. Provide not less than ten foot-candles in halls, thirty foot-candles in rest rooms and fifty foot-candles in all other areas, unless specifically noted otherwise. (eighty foot-candles in drafting room areas).
3. Each working space, utility or storage room shall have at least one receptacle. Each office shall have a minimum of one (1) receptacle on each twelve feet (12') of wall space. See plans for additional and/or special outlets.
4. Provide twenty-four (24) hour lighting for security.

5. Emergency lighting - Shall be provided where required by applicable codes, or natural lighting will not provide sufficient lumens for emergency exiting of building.

C. **EXTERIOR LIGHTING**

1. Install sufficient lighting to provide a minimum of five (5) foot-candles of illumination at each building entrance, around the perimeter of the building, in the parking and maneuvering areas and on driveways.
2. All exterior lighting shall be high or low-pressure sodium as specified by the County. Fixtures shall be controlled by photocell, time clocks, or combinations of both.

(TELEPHONE AND COMMUNICATIONS)

(Updated November 10, 2008)

A. **GENERAL REQUIREMENTS**

1. All communications requirements shall conform to the standards of Riverside County Information Technology (RCIT) and the serving public telephone company as noted below.
2. The **RIVERSIDE COUNTY INFORMATION TECHNOLOGY (RCIT) COMMUNICATIONS BUREAU TELECOMMUNICATIONS ENGINEER** shall be consulted during the Programming, Conceptual Design, Design Development, and Construction Design stages to plan the design and provide input for the Telecommunications Infrastructure.

B. **TELECOMMUNICATIONS ROOM SPECIFICATIONS**

1. **Dedicated Use: Telecommunication Rooms must be dedicated to the telecommunications function and related support facilities.** Equipment not related to the support of the Telecommunication Room, such as piping, duct work, and distribution of building power, must not be located in, or pass through the room. The Telecommunication Room may not be shared with building or custodial services. Cleaning materials such as mops, buckets or solvents must not be located or stored in the Telecommunication Room. Building alarms, fire monitoring equipment and building automation equipment shall not be installed in the Telecommunication Room without written permission of the RCIT Communications Bureau Telecommunications Engineer. In the event the RCIT Communications Bureau Telecommunications Engineer grants such permission, all building alarms and fire-monitoring equipment shall be installed only in the location designated.
2. **Room Physical Specifications - the room must be completed a minimum of thirty (30) days prior to occupancy.** Large projects (more than 20,000 sq. ft.) will require the Telecommunication Room (s) to be completed a minimum of 45 days or as directed by RCIT Communication Bureau Telecommunications

Engineer prior to beneficial occupancy. All specifications for said room as outlined in this agreement shall be completed, including, but not limited to, installation of plywood, lighting, electrical circuits, HVAC, ceiling tiles, ground, floor tile and door with lock and three (3) sets of keys.

It should be understood that the contractor will have to schedule various trades in sooner than the normal construction schedule to complete the Telecommunication Room (HVAC, Electrician, Painter, etc.) as required by the RCIT Communications Bureau Telecommunications Engineer.

- a. **Location:** The Telecommunication Room shall be as close to the geographic center of the occupied space as possible. **Maximum distance from the center of the Telecommunications Room to the farthest WAO location shall not exceed a radius of 175 feet** unless reviewed by RCIT Communications Bureau Telecommunications Engineer. If occupying more than one floor of a building, **a separate Telecommunications Room shall be required on each floor**, preferably stacked above one another. Provisions shall be made available for easy access into the Telecommunication Room for telephone and data wiring and shall be dedicated for telephone and data use only. Telecommunications Rooms should not be planned next to elevators, restrooms, electrical rooms, air shafts, mechanical rooms, and outside walls. If occupying more than one building, each building will require Telecommunications Rooms that meet the above requirements.
- b. **Minimum Room Sizes:** The Telecommunication Room shall conform to the following dimensions and shall not be narrower than 12 feet:

<u>Leased Premises – sq. ft.</u>	<u>Room Size</u>
5,000 sq. ft. or less	12' x 9'
5,000 – 10,000 sq. ft.	12' x 12'
10,000 – 30,000 sq. ft.*	12' x 14'
30,000 sq. ft. or larger**	12' x 14'

* May require more than one room

** Will require more than one room.

- c. **Plywood Wall Lining:** All walls will be lined with AC grade or better, void-free, 4'x8' sheets of 3/4" plywood. Plywood sheets shall be mounted vertically from ceiling height towards floor. Plywood must be painted on all sides with at least one coat of primer and two coats of white fire resistant paint. The plywood should be installed with the grade "C" surface facing the wall.
- d. **Doors:** The door will be a minimum of three (3) feet wide and 80 inches tall and be located as near as possible to a room corner. The door shall be equipped with a lock. Where practical, the door should open outward to provide additional usable space.

- e. **Air Conditioning:** The environmental control systems for the Telecommunication Room should be able to maintain a room temperature between 18°C and 24°C (64°F and 75°F) at all times (24 hours per day, 365 days per year). All building supplied HCAC inlets to the Telecommunications Room shall be controlled using a Variable Air Valve (VAV) with its own thermostat to prohibit heating the Telecommunications Room. The VAV will be installed in such a fashion to introduce conditioned air if the primary split A/C unit fails to cool the room. It will serve two purposes:

1. Provide ventilation air to the room, cooling only.
2. Serve as an additional backup.

If a building's HVAC system cannot ensure continuous operation (including weekends and holidays), provide a standalone HVAC unit with independent controls for the Telecommunication Room. If an emergency power source is available in the building, connect the HVAC system that serves the Telecommunication Room to the emergency power source. Sensors and controls must be located in the Telecommunication Room, ideally placed 5 feet AFF (thermostat location will be specified on the Telecommunication room drawing provided by RCIT Communications Bureau Telecommunications Engineer). If an in-room air conditioner is installed, the air conditioner will be hard wired to the thermostat and the location must be approved by RCIT Communications Bureau Telecommunications Engineer before Installation. If remote-monitoring equipment is available, this room should have its own independent sensor. Average heat load for equipment is approximately 150 BTU/SQ Ft of Telecommunication Room space (specific heat load will be provided for each room).

- f. If **fire sprinklers** are located in the Telecommunications Room, the sprinkler shall have a high temperature standard response full circle head with a heavy-duty cover. Sprinkler lines located inside the TR shall not be "charged" under normal conditions. Coordinate placement of the sprinklers with RCIT Communications Bureau Telecommunications Engineer. Sprinkler heads must be a minimum of 10 ft. AFF.
- g. **Room Lighting:** Lighting to provide a minimum of 500 lux (50 foot candles) measured 3 ft. AFF. Coordinate placement of light fixtures with RCIT Communications Bureau Telecommunications Engineer to avoid interference with low voltage equipment. Light fixtures must be a minimum of 10 ft. AFF. Use white paint on the walls and ceiling to enhance room lighting. Power for the lighting should not come from the power panel located inside the Telecommunications Room.
- h. **Emergency Lighting:** Emergency lighting within the Telecommunication Room shall be provided to ensure that the loss of power to normal lights will not hamper an emergency exit from the room.
- i. **Floors:** The floor shall be capable of supporting a minimum load bearing

of one hundred (100) pounds per square foot and maximum concentration loading of 2,000 lbs. per foot. Standard VCT floor covering shall be installed unless otherwise specified.

- j. **Ceiling:** If a ceiling will be installed in the Telecommunication Room it must be installed at a **minimum of 10' AFF**. Ceiling protrusions (e.g. sprinkler heads) must be placed to assure a minimum clear height of 10 feet that is clear of obstructions, to provide space over the equipment frames for cables and suspended cable trays. Ceiling finish must minimize dust and be light colored to enhance the room lighting. A hard ceiling shall not be allowed in the Telecommunications Room.

C. ELECTRICAL REQUIREMENTS

- a. **Dedicated Power Feeder:** The Telecommunication Room will have its own dedicated power feeder terminated in an electrical panel located inside the room and flush mounted in the wall. **Location of this electrical sub-panel shall be closely coordinated with RCIT Communications Bureau Telecommunications Engineer to ensure it does not impact the overall design and use of the space within the room. Power required for other equipment in the room (e.g. fluorescent lighting, motors, air conditioning equipment) should be supplied by a separate feeder, conduit, and distribution panel.** If an emergency power source is available, connect the Telecommunication Room electrical sub-panel into it.
- b. **General Purpose Outlets:** Provide 110 Volt, 20 Amp duplex outlets installed at standard height on all walls of the Telecommunications Room; maximum spacing between outlets shall not exceed 12 feet.
- c. **Telephone System:** Install one (1) dedicated 208 VAC, 20 Amp circuits terminated into a single surface mounted 4S electrical box with a NEMA L6-20 outlet at a height of 18 inches AFF from the center. The circuit will have its own separate hot, neutral, and ground wire all the way back to the power distribution panel. The circuit will be clearly labeled on the cover plate and sub-panel.
- d. **Equipment Racks:** Install two (2) dedicated 20 Amp, 110 VAC circuit with isolated ground for each equipment rack (9'x12' room – 2 racks, 12'x12' room – 3 racks, 12'x14' room – 4 racks). Install one (1) dedicated 30 Amp, 208 VAC circuit with isolated ground for every two equipment rack. The breaker number shall be identified on each of these outlets. Terminate each circuit on double duplex outlets in a surface mounted 4S box in the vertical cable manager 23" above the floor. Equipment Rack locations, circuit locations and quantity will be specified in the room layout provided by the RCIT Communications Bureau Telecommunications Engineer.
- e. **Paging – A/V: If required, install** one dedicated 20 Amp, 110 VAC circuit with isolated ground. Terminate on a double duplex outlet in a 4S

box. The location of the outlet will be specified in the Telecommunications Room layout provided by the RCIT Communications Bureau Telecommunications Engineer.

- f. **Security:** Install one dedicated 20 Amp, 110 VAC circuit with isolated ground. Terminate on double duplex outlets in a 4S box. The location of the outlet(s) will be specified in the Telecommunications Room layout provided by the RCIT Communications Bureau Telecommunications Engineer.
- g. **Emergency Air Conditioner Outlet (To Support IT Telephone System):** Install one dedicated 208/220 VAC, 20 Amp circuit terminated on a single NEMA 6-20 receptacle. The location of the outlet will be specified in the Telecommunications Room layout provided by the RCIT Communications Bureau Telecommunications Engineer.
- h. **Grounding** – A Telecommunication Main Grounding Busbar (TMGB) shall be installed in the Telecommunications Room at the location specified in the room layout that will be provided by the RCIT Communications Bureau Telecommunications Engineer. **The Grounding Busbar must be CPI Chatsworth Products, part #13622-020.** The Busbar shall be insulated from its supporting structure by at least two inches of separation. Bond the Busbar to the building AC grounding electrode system. The minimum size of the bonding conductor should be #6 AWG and be sized to carry the maximum short time rating Amps of the building grounding electrode conductor. A supplemental bonding connection is required to be Exothermically Welded to the structural steel of the building and local AC Sub-Panel located inside the Telecommunications Room. Resistance should be no more than .1 ohms between the TMGB and the building main grounding source measured following the two-point bonding test method using an earth ground resistance tester. All grounding conductors shall be run in rigid conduit.

D. CONDUIT REQUIREMENTS

- 1. **Work Area Outlets (WAO):**
 - a. **General Specifications:** Each WAO shall consist of one 4 in. by 4 in. by 2.5 in. deep outlet box with a 2 in. by 4 in. reducing adapter installed.
 - b. **Height Requirements:** Each WAO shall be installed at the same height as the adjacent electrical outlet. The height of jacks for wall telephones shall conform to any ADA rules pertaining to handicapped use. This height is typically 44 inches AFF to the center of the outlet box.
 - c. **Conduits Specifications:**
 - (1) **Accessible Ceilings:** When there is an accessible ceiling such as suspended acoustical tile, provide a rigid 1-inch conduit (**flex not allowed**) stubbed into the ceiling space from the outlet box. Ceiling

must be accessible from the WAO location back to the Telecommunications Room. If the WAO location is at wall phone height (+44"), install an additional outlet box at standard floor height. Connect a rigid 1-inch conduit from the bottom of the wall height box to the top of the standard floor height box. Ream all conduit ends and fit with insulated bushings.

- (2) **Non-Accessible Ceilings:** When the ceiling is not accessible, provide a rigid 1 1/4-inch conduit (**flex not allowed**) run from the WAO location all the way to the Telecommunications Room or to the nearest accessible ceiling space. Runs cannot have more than the equivalent of two 90-degree bends without installing a pull box (pull box must be accessible upon completion of construction). **All conduits will have a pull string installed.** Where multiple outlets are installed, each location will have its own dedicated conduit run; no daisy chaining is allowed.
2. **System Furniture wall In-Feeds:** Wall in-feeds will be one rigid 1.25 in. conduit per 3 WAO locations of system furniture. The conduit shall be stubbed into the ceiling are from a 4 in. by 4 in by 2.5 in. deep outlet box. Ream all conduit ends and fit with insulated bushings. In-feed location will be accessible either by cutout or access panel in furniture or placed next to furniture where location will be accessible for service. Consult RCIT Communications Bureau Telecommunications Engineer for location, quantity, and size of in-feeds. Exact location will be verified with furniture vendor.
3. **System Furniture Floor Poke-Thru In-Feeds:** Poke-Thru locations requiring power/voice/data will require Wiremold P/N RC9FFTC Poke-Thru's EMT 1.25 in. conduit per 3 WAO locations of systems furniture. Color to be specified by Architect. The conduit shall be continuous and stubbed into the ceiling area of that floor being serviced with pull string installed. No more than two 90's will be allowed, J-Box for furniture supplier power whip connections to be anchored to the ceiling of the floor below with unistrut. J-Box must be with-in 6' of furniture whip connection. Ream all conduit ends and fit with insulated bushings. Consult RCIT Communications Bureau Telecommunications Engineer for location and quantity. Exact location will be verified with furniture vendor.
4. **System Furniture Power and Data Floor Boxes:** Floor Box Locations requiring power/voice/data will require Wiremold P/N RFB4-C1-1 Floor Box with EMT 1.25 in. conduit per 3 WAO locations of systems furniture for communications. Color to be specified by Architect. The conduit shall be continuous and stubbed into the ceiling area of that floor being serviced with pull string installed. No more than two 90's will be allowed. All boxes shall be configured for dual service which will require accessory items for separation of power and data. All boxes shall include (1) internal duplex receptacle for power, (1) Wiremold P/N RFB-2-SSRT for communications and (1) flanged cover P/N S28BBTCAL. Ream al conduit ends and fit with insulated bushings. Consult RCIT Communications Bureau Telecommunications Engineer for location, and quantity. Exact location will be verified by furniture vendor.

5. **Hard Wall Office Floor Poke-Thru:** Poke-Thru locations requiring power/voice/data will require Wiremold P/N RC4ATC Poke-Thru's with the optional communications Adapter P/N Com 75 installed for Voice and Data conduits. Install two (2) EMT 0.75 in. conduits per location. The conduits shall be continuous and stubbed into the ceiling area of that floor being serviced with pull string installed. No more than two 90's will be allowed. Ream all conduit ends and fit with insulated bushings. Consult RCIT Communications Bureau Telecommunications Engineer for location, quantity, and size of in-feeds. Exact location will be verified with furniture vendor.
6. **Hard Wall Power and Data Floor Boxes:** Floor Box locations required power/voice/data will require Wiremold P/N RFB4-C1-1 Floor Box with (1) EMT 1.25 in. conduit for communications. Color to be specified by Architect. The conduit shall be continuous and stubbed into the ceiling area of that floor being serviced with pull string installed. No more than two 90's will be allowed. All boxes shall be configured for dual service which will require accessory items for separation of power and data. All boxes shall include (1) internal duplex receptacle for power, (1) Wiremold P/N RFB-2-SSRT for communications and (1) flanged cover P/N S38BBTCAL. Ream all conduit ends and fit with insulated bushings. Consult RCIT Communications Bureau Telecommunications Engineer for locations, and quantity. Exact location will be verified with furniture vendor.
7. **Backbone Pathways:**
 - a. **Telecommunications Rooms On the Same Floor:** When two or more Telecommunications Rooms exist on the same floor, provide two (2) rigid metallic trade size 4 conduits between the main Telecommunications Room and each secondary Telecommunications Room. Conduits are to be run in the most direct route possible with no more than the equivalent of two 90-degree sweeps without a pull box. The minimum size of a pull box shall be 24" W x 36" L x 12" D. Ream all conduit ends and fit with all local and national requirements. Location of conduits will be identified on drawings provided by the RCIT Communications Bureau Telecommunications Engineer and provided on a site-by-site basis. The bend radius of the conduit shall be 10 times the outside conduit diameter. **Install a pull string with minimum tensile strength of 30 lbs in each conduit.**
 - b. **Telecommunications Room On Different Floors:** When two or more Telecommunications Rooms exist on different floors, provide a minimum of two (2) rigid trade size 4 conduits between the main Telecommunications Room and each secondary Telecommunications Room. Conduits are to be run in the most direct route possible with no more than the equivalent of two 90-degree bends without a pull box. The minimum size of a pull box shall be 24" W x 36" L x 12" D. Ream all conduit ends and fit with insulated bushings. Conduits are to be bonded to ground in accordance with all local and national requirements. The bend radius of the conduit shall be 10 times the outside conduit diameter.

Install a pull string with minimum tensile strength of 30 lbs in each conduit. In multi-level buildings with **stacked Telecommunications Rooms**, sleeves shall be provided from the ceiling of the lowest level to the floor of the top level. Size, quantity, and location will be provided by the RCIT Communications Bureau Telecommunications Engineer.

- c. **MPOE:** If the MPOE (minimum point of entry) is not physically located in the Telecommunications Room it shall be necessary to install two (2) trade size 4 conduits from the MPOE to the Telecommunications Room. Conduits are to be run in the most direct route possible with no more than the equivalent of two 90 degree bends without a pull box. The minimum size of a pull box shall be 24" W x 36" L x 12" D. Ream all conduit ends and fit with insulated bushings. Conduits are to be bonded to ground in accordance with all local and national requirements. Location of conduits will be identified on drawings provided by the RCIT Communications Bureau Telecommunications Engineer and provided on a site-by site basis.
- d. **Telecommunications Rooms in Multiple Buildings on Same or Adjacent Properties:** The number of conduits will be determined by the **size and scope of each project. The items listed below are BASIC** requirements only as the scope of the project increases, some or all of the items listed below may undergo major changes:
- (1) Conduits shall be rigid and shall be four (4) trade size 4. A minimum of two (2) conduits will be installed from the primary Telecommunications Room and each building as defined by the RCIT Communications Bureau Telecommunications Engineer. Conduits shall be installed in the most direct route possible.
 - (2) Conduits shall be buried a minimum of 36 inches below finish grade.
 - (3) Conduits shall be encased in 2,000 PSI concrete where vehicle traffic occurs and encased in slurry everywhere else for the entire length.
 - (4) Tracer tape shall be installed the entire conduit length. Tracer tape shall be 12 inches wide, flat, and metallic and shall be installed 12 inches above concrete encasement. Tape shall be imprinted with the words "WARNING – FIBER OPTIC CABLE" spaced at a minimum of 24 inches on center.
 - (5) No more than the equivalent of two (2) 90-degree bends shall be installed without the addition of a pull box, vault, or maintenance hole, which size and requirements will be defined by the RCIT Communications Bureau Telecommunications Engineer.
 - (6) Conduit runs in excess of 500 feet shall have a pull box, vault, or

maintenance hole installed, which size and requirements will be defined by the RCIT Communications Bureau Telecommunications Engineer. All sweeps shall have a minimum bending-radius of 10 times the diameter of the conduit.

- (7) All four inch conduits should have a minimum ¼-inch nylon pull rope. All four inch conduits over 400 feet should have a minimum 3/8-inch nylon pull rope. The size and requirements of pull boxes, vaults, or maintenance holes can only be determined by the scope of the project and will be defined by the RCIT Communications Bureau Telecommunications Engineer.
8. **Firewalls:** If any firewalls are present, conduit/sleeve access through the wall must be provided by the contractor. The ends of any conduit/sleeve penetrating a firewall will be sealed with the appropriate fire stop. Identification of the areas that must be sealed shall be identified by the contractor at the time of wiring. Size and location of the sleeves will be determined by the RCIT Communications Bureau Telecommunications Engineer. Sleeves should penetrate the wall a minimum of 3 inches. Ream each end of conduit and fit with insulated bushing.
9. **Primary Service Conduit Requirements (New Construction):**
- a. The number of all primary service conduits will be determined by the **size and scope of each project. The items listed below are BASIC** requirements only and as the scope of the job increases, some or all of the items listed below may undergo major changes:
 - (1) Entrance conduits shall be rigid and shall be four (4) trade size 4. **A minimum** of two (2) conduits will be installed into the Telecommunications Room. Conduits shall be installed in the most direct route possible.
 - (2) Conduits shall be buried a minimum of 36 inches below finish grade.
 - (3) Conduits shall be encased in slurry for sections identified by RCIT Communications Bureau Telecommunications Engineer as no traffic or low risk.
 - (4) Conduits shall be encased in 2,000 PSI concrete for sections not identified in section 5a3.
 - (5) Tracer tape shall be installed the entire conduit length. Tracer tape shall be 12 inches wide, flat, and metallic and shall be installed 12 inches above concrete encasement. Tape shall be imprinted with the words “WARNING – FIBER OPTIC CABLE” spaced at a minimum of 24 inches on center.
 - (6) No more than the equivalent of two (2) 90-degree sweeps shall be

installed without the addition of a pull box, vault, or maintenance hole, which size and requirements will be defined by the RCIT Communications Bureau Telecommunications Engineer.

- (7) Conduit runs in excess of 500 feet shall have a pull box, vault, or maintenance hole installed, which size and requirements will be defined by the RCIT Communications Bureau Telecommunications Engineer. All bends shall have a minimum-bending radius of 10 times the diameter of the conduit.
- (8) All four-inch conduits should have a minimum ¼-inch nylon pull rope. All four-inch conduits over 400 feet should have a minimum 3/8-inch nylon pull rope. The size and requirements of pull boxes, vaults, or maintenance holes can only be determined by the scope of the project and will be defined by the RCIT Communications Bureau Telecommunications Engineer.

E. **CABLE TRAYS:**

1. If the structural ceiling height is greater than 16' AFF or the occupied space is greater than 25,000 square feet, a cable tray system will be required to support the voice and data wiring. Consult with the RCIT Communications Bureau Telecommunications Engineer regarding possible installation and to assist in the design of the cable tray system. A structural Engineer will be required to design the cable tray system to code and manufacture specification and submit design to the RCIT Communications Bureau Telecommunications Engineer for approval.

**RCIT
System's Furniture
Telecommunications Standards
June 16, 2004**

1. Work Area Outlets

- 1.1. **Definition: Work Area Outlet (WAO)** – consists of a telecommunications faceplate and its component (s) – what telephones and PC's are plugged into at a user's desk location or work area.
- 1.2. Furniture communications outlet openings shall accommodate the installation of an industry-standard, single gang faceplate, with a minimum opening of 2 inches by 3 inches.
 - 1.2.1. Two (2) factor or field-installed threaded openings shall be provided for single gang faceplate mounting and shall accommodate a 10x22 screw.
- 1.3. Furniture communications outlet openings shall provide a minimum mounting depth of 44.5 mm (1.75 in).
- 1.4. Extender plates shall be provided for WAO's (Work Area Outlet's) within

furniture system – one for each workstation space, fax location, and printer location.

1.4.1. Extender plates shall be a minimum 7/8 inch deep.

2. Cabling Pathways

2.1 Furniture pathways shall have capacity for a minimum of (12) communications cables with an outside diameter of .25 inches and not exceed 40% of pathway capacity.

2.1.1. Remaining pathway capacity will be utilized to accommodate future moves, adds, and changes (MAC's).

2.1.2. This requirement applies to ALL areas of the furniture pathway INCLUDING corners, panel to panel pathways, etc.

2.1.3. Consideration will include space used in furniture for connecting hardware.

2.2 Furniture system shall completely conceal all communications cabling in all cabling pathways.

2.3 Entire communications cabling pathway shall contain a continuous and rigid support infrastructure within each panel.

2.4 When communications cabling pathways run parallel to electrical pathways:

2.4.1. A metallic barrier shall be provided (i.e. metallic divider, conduit, corrugated or solid) and shall be bonded to ground.

2.4.2. Electrical components shall not impede on communications cabling pathways so as to restrict in any way the fill requirements noted above.

2.5. The minimum size pathway shall not force the cable bend radius to be less than 25 mm (1 in) under conditions of maximum cable fill.

2.6. Metallic pathway edges shall utilize protective bushings.

2.7. All panels shall be equipped with at least one (1) of the following raceways and shall singularly conform to all of the above noted cabling pathway requirements:

2.7.1. Base Raceway

2.7.2. Top Raceway

3. Furniture In-Feeds

- 3.1. Furniture in-feeds shall have capacity for a minimum of (12) communications cables with an outside diameter of .25 inches and not exceed 40% of pathway capacity.
 - 3.1.1. Remaining pathway capacity will be utilized to accommodate future moves, adds, and changes (MAC's).
 - 3.1.2. Consideration will include space used in furniture for connecting hardware.
- 3.2. Furniture in-feeds shall have the ability to provide for separate entry points for power and communications cabling.
 - 3.2.1. Where entry points are closer than 6 inches, a physical / mechanical barrier shall be provided to separate cabling entry points.
- 3.3. Metallic in-feed edges shall utilize protective bushings.
- 3.4. One furniture in-feed shall be provided for every four (4) WAO's (Work Area Outlets).
- 3.5. Placement of furniture in-feeds shall be coordinated and verified by County IT.