SECTION 16580 - LIGHTING OCCUPANCY SENSORS

1.0 GENERAL

1.1 DRAWINGS AND GENERAL PROVISIONS OF CONTRACT, INCLUDING GENERAL AND SUPPLEMENTARY CONDITIONS AND DIVISION-1 SPECIFICATION SECTIONS, APPLY TO WORK OF THIS SECTION.

1.2 DIVISION-16 BASIC ELECTRICAL MATERIALS AND METHODS SECTIONS APPLY TO WORK OF THIS SECTION.

1.3 SUBMITTALS: SUBMIT THE PRODUCER'S STANDARD DESCRIPTIVE DATA SHEETS FOR EACH TYPE OF PRODUCT BEING PROVIDED. MARK THE DATA SHEET FOR THE PRODUCT BEING PROVIDED WITH AN IDENTIFYING MARK OR ARROW. PROVIDE THE FOLLOWING:

A. DUAL TECHNOLOGY DETECTORS – ALL TYPES
B. ULTRASONIC DETECTOR.
C. WALL MOUNTED SENSOR SWITCHES, DIGITAL TIMER SWITCHES, ETC.
D. POWER RELAY.
E. FLOOR PLAN SHOWING LOCATION OF ALL DETECTORS. VERIFY COVERAGE IN ALL AREAS WITH DETECTORS.

1.4 SUBSTITUTIONS - PRIOR APPROVAL REQUIRED.

1.5 ALL COMPONENTS SHALL MEET CALIFORNIA BUILDING CODE, (TITLE 24) REQUIREMENTS, SHALL BE UL LISTED AND OFFER A FIVE YEAR WARRANTY.

1.6 THE OBJECTIVE IS TO ENSURE PROPER INSTALLATION OF THE OCCUPANCY SENSOR BASED LIGHTING CONTROL SYSTEM SO THAT THE LIGHT IS TURNED OFF AUTOMATICALLY AFTER REASONABLE TIME DELAY WHEN A ROOM OR AREA IS VACATED BY THE LAST PERSON TO OCCUPY SAID ROOM OR AREA.

1.7 THE CONTRACTOR SHALL WARRANT ALL EQUIPMENT FURNISHED IN ACCORDANCE TO THIS SPECIFICATION TO BE UNDAMAGED, FREE OF DEFECTS IN MATERIALS AND WORKMANSHIP, AND IN CONFORMANCE WITH THE SPECIFICATIONS. THE SUPPLIERS OBLIGATION SHALL INCLUDE REPAIR OR REPLACEMENT, AND TESTING WITHOUT CHARGE TO THE OWNER, ALL OR ANY PARTS OF EQUIPMENT WHICH ARE FOUND TO BE DAMAGED, DEFECTIVE OR NON-CONFORMING AND RETURNED TO THE SUPPLIER. WARRANTY ON SHALL COMMENCE UPON THE OWNER'S ACCEPTANCE OF THE PROJECT. WARRANTY ON LABOR SHALL BE FOR A MINIMUM PERIOD OF ONE YEAR.

1.8 THE CONTRACTOR SHALL PROVIDE, AT THE OWNER'S FACILITY, THE TRAINING NECESSARY TO FAMILIARIZE THE OWNER'S PERSONNEL WITH THE OPERATION, USE, ADJUSTMENT, AND PROBLEM SOLVING DIAGNOSIS OF THE OCCUPANCY SENSING DEVICES AND SYSTEMS.

2.0 PRODUCTS

2.1 ACCEPTABLE PRODUCERS: WATTSTOPPER OR APPROVED EQUAL.

2.2 GENERAL: SEE ELECTRICAL DRAWINGS AND CONTROL DIAGRAMS FOR NUMBER AND TYPES OF SENSORS REQUIRED. SENSORS SHALL COMPLY WITH CURRENT APPLICABLE CODES AND STANDARDS OF THE UNDERWRITERS LABORATORIES, INC. AND SHALL BE

LISTED, APPROVED AND LABELED FOR THE APPLICATION. BUILD, TEST AND SHIP THE TOTAL SYSTEM COMPONENTS BY THE SAME PRODUCER, PROVIDING A SINGLE SOURCE OF RESPONSIBILITY.

2.3 DUAL TECHNOLOGY SENSOR: WATT STOPPER DT-100 WITH CEILING CORNER MOUNTING BRACKET AND POWER PACK.

2.3.1 SENSOR SHALL CONTROL THE LIGHTING ZONE ONLY. IT WILL PROVIDE 100% COVERAGE OF THE AREA INSIDE THE ZONE, WHILE PROVIDING CUT-OFF CAPABILITY OUTSIDE OF THE ZONE WITHOUT SPILLAGE FOR THE TURN ON MODE.

2.3.2 SENSOR SHALL NOT FALSE TRIGGER LIGHTS ON WHEN MOTION OF OBJECTS OTHER THAN PEOPLE OCCUR IN A CONTROLLED AREA.

2.3.3 SENSOR SHALL NOT TURN LIGHTS OFF IN CONTROLLED AREA WHEN THE AREA IS OCCUPIED BY PEOPLE AND SMALL AMOUNTS OF MOTION OCCUR. DETECTION SHALL BE MAINTAINED WHEN A PERSON OF AVERAGE SIZE AND WEIGHT MOVES ONLY WITHIN OR UP TO A DISTANCE OF TWELVE INCHES EITHER IN A HORIZONTAL OR VERTICAL MANNER AT THE APPROXIMATE SPEED 12 INCHES PER SECOND. THESE ARE THE CONDITIONS THAT THE DT-100 MUST MEET IN ORDER THAT THE LIGHTS WILL NOT GO OFF WHEN A PERSON IS READING OR WRITING WHILE SEATED AT A DESK.

2.3.4 SENSOR SHALL HAVE AN ADDITIONAL ISOLATED RELAY WITH NORMALLY OPEN, NORMALLY CLOSED AND COMMON CONTACTS FOR USE WITH HVAC CONTROL, DATA LOGGING, AND OTHER CONTROL OPTIONS.

2.3.5 SENSOR SHALL BE SENSITIVE ENOUGH TO ALLOW CAPACITY FOR VERY SHORT TIME-DELAYS.

2.3.6 SENSOR SHALL BE CAPABLE OF PROVIDING MULTIPLE LOGIC OPTIONS FOR OCCUPANCY DETECTION UNDER VARYING CONDITIONS.

2.3.7 SENSORS SHALL COVER A MINIMUM OF 1500 SQUARE FEET WHEN MOUNTED AT 12'.

2.3.8 SENSOR SHALL HAVE A STANDARD 5 YEAR WARRANTY.

2.4 PASSIVE INFRARED WALL SWITCH: WATT STOPPER WI-120-4 FOR USE ON 120 VOLT CIRCUITS.

2.4.1 SENSOR SHALL BE COMPLETELY SELF CONTAINED CONTROL SYSTEM CAPABLE OF SWITCHING TWO LOADS AND REPLACES STANDARD TOGGLE SWITCH. POWER SUPPLY SHALL BE AN INTERNAL TRANSFORMER. SWITCHING MECHANISM SHALL BE A LATCHING AIR GAP RELAY, COMPATIBLE WITH ELECTRONIC BALLAST, COMPACT FLUORESCENT, AND INDUCTIVE LOADS. TRIAC AND OTHER HARMONIC GENERATING DEVICES SHALL NOT BE ALLOWED.

2.4.2 THE SENSORS SHALL BE CAPABLE OF DETECTING PRESENCE, IN THE CONTROL AREA, BY DETECTING CHANGES IN THE INFRARED ENERGY. SMALL MOVEMENTS SHALL BE DETECTED SUCH AS WHEN A PERSON IS WRITING WHILE SEATING AT A DESK.

2.4.3 THE DETECTOR SHALL UTILIZE A TEMPERATURE COMPENSATED DUAL ELEMENT SENSOR AND A MULTI ELEMENT FRESNEL LENS.

2.4.4 SENSOR SHALL HAVE A DAYLIGHT FILTER WHICH ENSURES THAT THE SENSOR IS INSENSITIVE TO SHORT WAVE LENGTH INFRARED WAVES SUCH AS THOSE EMITTED BY

THE SUN.

2.4.5 THE FRESNEL LENS SHALL BE POLY IR4 BASED MATERIAL TO OFFER SUPERIOR PERFORMANCE IN THE INFRARED WAVELENGTHS. LENS SHALL HAVE GROVES FACING IN TO AVOID DUST AND RESIDUE BUILD UP WHICH EFFECTS IR RECEPTION.

2.4.6 THE TIME DELAY RANGE SHALL BE ADJUSTABLE FROM 30 SECONDS TO 30 MINUTES AND SENSITIVITY ADJUSTMENT SHALL RANGE FROM OFF AT "0" TO MAXIMUM AT "10".

2.4.7 SENSOR SHALL COVER UP TO 1000 SQUARE FEET, WITH A FIELD OF VIEW OF 180 DEGREES.

2.4.8 SENSOR SHALL HAVE A STANDARD 5 YEAR WARRANTY.

2.5 ULTRASONIC OCCUPANCY SENSORS:

2.5.1 THE ULTRASONIC OCCUPANCY SENSORS SHALL BE CAPABLE OF DETECTING PRESENCE, IN THE FLOOR AREA TO BE CONTROLLED, BY DETECTING DOPPLER SHIFTS IN TRANSMITTED ULTRASOUND.

2.5.2 THE ULTRASONIC FREQUENCY SHALL BE 25 KHZ AT +/1 0.005%. THE SENSORS SHALL BE PRECISION CRYSTAL CONTROLLED AND SHALL NOT INTERFERE WITH EACH OTHER WHEN TOW OR MORE ARE PLACED IN THE SAME AREA. ULTRASONIC CIRCUIT SHALL BE SOLID STATE CRYSTAL CONTROLLED WITH ADVANCED SIGNAL PROCESSING.

2.5.3 SENSORS OF VARYING FREQUENCIES SHALL NOT BE ALLOWED SO AS TO PREVENT SENSORS FROM INTERFERING WITH EACH OTHER AND TO ASSURE COMPATIBILITY IN THE EVENT MORE SENSORS ARE ADDED OR UNITS ARE REPLACED.

2.5.4 DETECTION SHALL BE MAINTAINED WHEN A PERSON OF AVERAGE SIZE AND WEIGHT MOVES ONLY WITHIN OR A MAXIMUM DISTANCE OF TWELVE INCHES EITHER IN A HORIZONTAL OR VERTICAL MANNER AT THE APPROXIMATE SPEED OF 12 INCHES PER SECOND. THE SUM OF THIS DISTANCE, VOLUME AND SPEED REPRESENT THE AVERAGE CONDITION ULTRASONIC SENSORS MUST MEET IN ORDER FOR THE LIGHTS TO NOT GO OFF WHEN A PERSON IS READING OR WRITING WHILE SEATED AT A DESK.

2.5.5 EACH SENSOR SHALL BE FURNISHED WITH A CONVENIENT SHUNT PROVISION WHICH WILL ENABLE A CUSTODIAN OR BUILDING ENGINEER TO BY-PASS THE SENSOR IN THE EVENT OF FAILURE. THIS BY-PASS PROVISION PIN SHALL REMAIN IN THE SENSOR AND BE VISIBLE FROM THE FLOOR AS A CONSTANT REMINDER THAT THE AUTOMATIC FUNCTION HAS BEEN BY-PASSED.

2.5.6 THE SENSORS ARE TO BE CEILING MOUNTED AND NOT PROTRUDE MORE THAN 1.5 INCHES AND SHOULD BLEND AESTHETICALLY WITH THE CEILING.

2.5.7 SENSORS SHALL HAVE A MULTI-DIRECTIONAL TRANSMITTER WITH TEMPERATURE AND HUMIDITY RESISTANT, 25 KHZ TUNED ULTRASONIC RECEIVERS. ULTRASONIC RECEIVERS SHALL BE TEMPERATURE AND HUMIDITY RESISTANT WITH LESS THAN 6DB SHIFT IN THE HUMIDITY RANGE OF 10% TO 90% AND LESS THAN A 10 DB SHIFT IN THE TEMPERATURE RANGE OF -20 DEGREES TO 60 DEGREES C.

2.5.8 TIME DELAY RANGE SHALL BE ADJUSTABLE FROM 15 SECONDS TO 15 MINUTES. SET DELAY TO 10 MINUTES.

2.5.9 SENSITIVITY ADJUSTMENT SHALL RANGE FROM "0" TO MAXIMUM OF "10". SET TO "10".

2.5.10 SENSORS SHALL OPERATE ON 24 VOLTS DC POWER, CURRENT DRAW IS 16 MILLIAMPS.

2.5.11 SENSORS SHALL COVER 360 DEGREES UP TO 1000 SQUARE FEET FOR W-1000A, AND 2000 SQUARE FEET FOR W-2000A OF WALKING MOTION. VERIFY SQUARE FOOT REQUIRES OF EACH SPACE BEFORE PROVIDING SENSOR.

2.5.12 ULTRASONIC OCCUPANCY SENSORS SHALL BE UL AND CSA LISTED PRODUCTS.

2.5.13 SENSOR SHALL HAVE A STANDARD 5 YEAR WARRANTY.

2.6 POWER AND SLAVE PACKS: SHALL BE A CONVENIENT SMALL DEVICE WEIGHING APPROXIMATELY EIGHT OUNCES WHICH CAN BE QUICKLY INSTALLED AND SHALL CONSIST OF A TRANSFORMER AND RELAY COMBINATION IN ONE PACKAGE.

2.6.1 POWER PACKS SHALL HAVE DRY CONTACTS CAPABLE OF SWITCHING 20 AMP BALLAST LOAD, 13 AMP INCANDESCENT, 1 HP @120VAC, 277VAC; 15 AMP BALLAST, 13 AMPS GENERAL, 1 HP @ 220-240 VAC.

2.6.2 POWER PACK SHALL PROVIDE 24VDC @ 100 MA OUTPUT CAPABLE OF CONTROLLING 4 PIR OR 3 ULTRASONIC SENSORS.

2.6.3 POWER PACKS SHALL BE CAPABLE OF PARALLEL WIRING WITHOUT REGARD TO AC PHASES ON PRIMARY.

2.6.4 SLAVE PACKS SHALL BE IDENTICAL IN PHYSICAL SIZE OF POWER PACKS AND CONTAIN NO TRANSFORMER POWER SUPPLY AND SHALL SWITCH EITHER 120VAC OR LOW VOLTAGE.

2.6.5 POWER PACK CAN BE USED AS STAND ALONE, LOW VOLTAGE SWITCH, OR CAN BE WIRED TO SENSOR FOR AUTO CONTROL.

2.6.6 POWER PACK SHALL BE UL AND CSA LISTED.

2.6.7 POWER PACK SHALL HAVE A 5 YEAR WARRANTY.

2.7 ENCLOSURE: NEMA I METAL ENCLOSURE, HINGED DOOR WITH LATCH AND WOOD BACKBOARD MOUNTED INSIDE OF CABINET FOR MOUNTING OF RELAYS AND TRANSFORMER. SIZE AS REQUIRED TO HOUSE EQUIPMENT.

3.0 EXECUTION

3.1 MOUNTING: THE SENSOR MOUNTS THROUGH A SINGLE 3/4" HOLE IN THE CEILING TILE. AN ADAPTER PLATE SHALL BE USED FOR MOUNTING TO A STANDARD FIXTURE RING AND JUNCTION BOX. RELAYS AND TRANSFORMER SHALL BE MOUNTED IN A NEMA I METAL ENCLOSURE.

3.2 CONTROLS: INSTALL AS INDICATED ON DRAWINGS.

3.3 IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY WITH THE SUPPLIERS ASSISTANCE TO LOCATE AND AIM SENSORY IN THE CORRECT LOCATION REQUIRED FOR COMPLETE AND PROPER VOLUMETRIC COVERAGE WITHIN THE RANGE OF COVERAGE(S) OF CONTROLLED AREAS. ROOMS SHALL HAVE NINETY (90) TO ONE HUNDRED (100) PERCENT COVERAGE TO COMPLETELY COVER THE CONTROLLED AREA TO ACCOMMODATE ALL OCCUPANCY HABITS OF SINGLE OR MULTIPLE OCCUPANTS AT

ANY LOCATION WITHIN THE ROOM(S). THE LOCATIONS AND QUANTITIES OF SENSORS SHOWN ON THE DRAWINGS ARE DIAGRAMMATIC AND INDICATE ONLY ROOMS WHICH ARE TO BE PROVIDED WITH SENSORS. **THE CONTRACTOR SHALL PROVIDE ADDITIONAL SENSORS IF REQUIRED TO PROPERLY AND COMPLETELY COVER THE RESPECTIVE ROOM**. PROPER JUDGEMENT MUST BE EXERCISED IN EXECUTING THE WORK SO AS TO ENSURE THE BEST POSSIBLE INSTALLATION IN THE AVAILABLE SPACE AND TO OVERCOME LOCAL DIFFICULTIES DUE TO SPACE LIMITATIONS OR INTERFERENCE OF STRUCTURAL COMPONENTS.

END OF SECTION