
**SAN FRANCISCO UNIFIED SCHOOL DISTRICT
FACILITIES DESIGN AND CONSTRUCTION**

ADDENDUM NO. 1

PROJECT: Lighting System Repairs And Upgrades **DATE:** June 1, 2016
At George Washington High School Auditorium
SFUSD Project Number: 11798

OWNER: San Francisco Unified School District **DSA FILE NO.:** N/A
135 Van Ness Avenue **DSA APP. NO.:** N/A
San Francisco, CA 94102

Notice is hereby given to all prospective bidders that plans and specifications on the subject project are modified as hereinafter set forth. This Addendum shall be attached to and form a part of the plans and specifications. All bidders must acknowledge receipt of this addendum on the Bid Form. In case of difference with previous addenda or communications, this addendum takes precedence.

It is the responsibility of all bidders to notify all subcontractors from whom they request bids and from whom they accept bids of all changes contained in this addendum.

PROJECT MANUAL

1. Item No. PM-1

Reference: Section 00200 – Instruction to Bidders

Description: In Item 26, Bidder's Qualifications, add the following sentence at the end of the paragraph:

"In order to be qualified to bid on this project, the Bidder should have at least a minimum of one-year experience dealing with theatrical lighting systems, and at least 2-3 similar projects involving repairs, upgrades and replacement of lights and dimming systems in a school auditorium or theater environment. Such experience should be noted in Section 00450 – Statement of Bidder's Qualification."

2. Item No. PM-2

Reference: Section 00400 – Bid Form

Description: Use attached revised Bid Form, dated June 1, 2016 as part of bid package. This Bid Form includes a Bid Allowance.

3. Item No. PM-2

Reference: Section 00800 – Special Conditions

Description: In Part 1.2, revise date of Final Completion to state: OCTOBER 2, 2016.

4. Item No. PM-3

Reference: Section 16571 – Lighting Control Equipment Dimming - Incandescent

Description: Insert this Section 16571 in the Project Manual as part of Division 16 Electrical specifications.

DRAWINGS

1. Item No. AD1-1

Reference: DRAWING SY102, AUDITORIUM STAGE AND SUPPORT AREAS

Description: Additional notes added on drawing sheet pertaining to wall duplex power receptacles as clouded, dated June 1, 2016.

END OF ADDENDUM ITEMS

ATTACHMENTS:

Project Manual:

Section 00400 – Bid Form, revised dated June 1, 2016, 2 pages

Section 16571 – Lighting Control Equipment Dimming – Incandescent,
26 pages, dated June 1, 2016

Drawings:

SY102, Auditorium Stage and Support Areas, revised June 1, 2016

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SECTION 00400

BID FORM

Contractor: _____

Bid Opening Date: _____

To the San Francisco Unified School District, Facilities, Design and Construction Department, Reception Desk, 135 Van Ness Avenue, San Francisco, CA 94102. Receptionist will date/time stamp each bid upon receipt at main lobby reception desk. Bid for:

**Project: LIGHTING SYSTEM REPAIRS AND UPGRADES
AT GEORGE WASHINGTON HIGH SCHOOL AUDITORIUM
SFUSD PROJECT NO. 11798**

The undersigned hereby declares that he has fully investigated the existing conditions at the Project site and carefully examined all of the Contract Documents as prepared by San Francisco Unified School District and Guttman and Blaevoet Consulting Engineers, dated May 20, 2016.

The undersigned has examined all Bidding Documents and the site for the above Project and agrees to furnish and pay for all labor, material, equipment, plant, appurtenances, services, sales, consumer and use taxes required by law, and including utilities and transportation required to complete this Project according to all the requirements of the Contract Documents, including all addenda, at and for the price(s) stated below regardless of any increase in wage scales or material prices. The Contractor in submitting its bid guarantees the following prices for Ninety (90) calendar days.

TOTAL BASE BID (Base Bid + Allowance)

_____ Dollars \$ _____
Price in Words Price in Figures

BASE BID AMOUNT (cost of the repairs and upgrades of the auditorium lighting and dimming system, that also includes, but is not limited to, General Conditions, overhead, labor, labor burden, materials, profit, taxes, delivery, transportation, equipment, rental, bonds, insurance, license fees, and supervision)

_____ Dollars \$ _____
Price in Words Price in Figures

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BID ALLOWANCE

1. Repair and replacement of existing duplex power wall receptacles (deemed non-functional) in Auditorium shown in Sheet SY102, Addendum no. 1, dated 6-1-2016.. Include this Bid Allowance amount in Total Base Bid amount above.

EIGHT THOUSAND DOLLARS

\$ 8,000.00

Acknowledge receipt of Addenda Nos. _____

(Company)

(Signature of Bidder)

(Contractor License Number)

(Printed Name)

(License Expiration date)

(Title of Bidder)

(San Francisco Business Tax Certificate Number)

(Business Address)

If a Corporation, incorporated
In the State of:

(Telephone Number)

(Fax number)

By _____
(Officer)

(Printed name)

(Title)

END OF SECTION 00400

SECTION 16571

LIGHTING CONTROL EQUIPMENT DIMMING – INCANDESCENT

PART 1 – GENERAL

1.1 OVERVIEW

- A. The dimmer racks shall be fully digital, designed specifically for entertainment and architectural lighting, and shall consist of 24 or 48 dimmer module spaces. Dimmer rack systems shall be ETL and cETL marked devices.
- B. Rack setup and preset data shall, as standard, be fully user programmable on a per rack or system wide basis. The dimmer rack shall report rack status to a remote personal computer or control console and, as an option, report dimmer status information.
- C. The dimming system is replacing an old outdated EDI rack, which is similar in foot print, style and operation as the new dimming system as specified herein. The work for the new dimming system shall be to remove and replace the entire system which feeds stage lights and also house lights in the theater. The contractor shall tag all lines, circuits, connections, etc. prior to disconnect and removal. Also each circuit shall be tested prior to disconnect to prove the system is functional, prior to cut over. All circuits and dimming channels which do not appear to be functional shall be noted and brought to the attention of the design team and project manager prior to disconnect. Each circuit, mains, breakers, etc. shall be matched one to one for the new dimming control system. Custom panels, adapters, metal work, wire extensions, cable clamps, patching, connecting shall be included in the replacement as a turnkey installation. All new circuits shall be tested and shown operational, and combined with all other work as called out in the scope schedule within the project drawings. This is a working theater and time is of the essence in the demo and replacement of the dimming system. A new house light controller is to be placed at the rear/entry of the theater as shown on the plans and connected to the dimming system via CAT5 type cable. Additionally a new stage remote panel shall be provided to replace the current stage controller as shown on the floor plans and project drawings. The existing lighting board in the Romeo / Juliet position is to remain and have new cabling pulled to interface to the DMX512 integral controller.

PART 2 – EQUIPMENT AND COMPONENTS

2.1 MECHANICAL

- A. The dimmer rack shall be a freestanding, dead front switchboard, substantially framed and enclosed with 16-gauge formed steel panels. All rack components shall be properly treated, primed and finished in fine texture, scratch resistant, coating.

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- B. The 48 module dimmer rack shall not exceed 80" H x 24.5" W x 23.6" D. Racks shall be designed to allow for adjacent mounting and for bolting to the floor. The 24 module dimmer rack shall not exceed 57"H x 24.5"W x 23.6"D. Rack doors shall not increase the total rack depth by more than 1.0", and will not increase the rack footprint.
- C. The dimmer rack shall be designed to allow for easy insertion and removal of all modules without the use of tools. Optional dimmer row tie down bars shall be available to mechanically block each row of six dimmer modules into the rack and require the use of a tool. Dimmer supports shall be provided for precise alignment of dimmer modules into power and signal connector blocks.
- D. Rack spaces shall be mechanically keyed such that modules of greater current capacity cannot be accepted for that space. Racks that allow modules of higher wattage to plug into the same space shall not be acceptable.
- E. Multiple low-noise fans shall be provided to allow redundancy in case of fan failure. The fans shall maintain the temperature of all components at proper operating levels with dimmers at any load, providing the ambient temperature of the dimmer room does not exceed 95 degrees Fahrenheit (35 degrees Celsius). Air shall flow over the surfaces of the heat generating components using a combination of convection and fan assisted airflow. Each rack shall be outfitted with a lockable door that does not impede airflow in any manner.
- F. Fans shall be gradually controlled between off and full speed in order to minimize fan noise under all operating conditions. In the event of a rack over temperature condition, a warning shall be displayed on the rack LCD display and remote personal computer (via web browser) and control console (via web browser). If the temperature rises 5 degrees C over the warning threshold, the dimmer rack shall shut down automatically. The system shall also provide low temperature shutdown below 33 degrees Fahrenheit (1 degrees Celsius) to prevent condensation damage to system electronics.
- G. Load terminations shall be clearly marked with the dimmer rack circuit number. Signal terminations shall be by plug-in screw terminals or insulation displacement to facilitate contracting and servicing and shall be clearly labeled. Rear access shall not be required for rack installation and termination.
- H. Module numbering shall be clearly marked via a numbering strip on the front of the dimmer module tray. Standard number strips shall be available in two channel module configurations. Custom lamacoid number strips may be used on custom installations.

2.2 ELECTRICAL

- A. Dimmer racks shall operate at 90 to 264VAC 3-phase, 4 wire + ground or 90 to 264VAC, 1 phase, 2 wire + ground, 47 - 63 Hz at a maximum of 800A per phase. 2400A per phase bussing across adjacent multiple racks shall be possible.

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- B. Load circuit wiring terminals for line, neutral, and ground terminals shall accept up to a #6 AWG wire. An optional terminal adapter accepting up to #2 AWG wire shall be available. The fault current protection of the rack shall be 50,000 AIC. Provisions shall be made for optional amp trap devices to provide 100,000 AIC fault current protection if required.
- C. Dimmer racks shall be available with side or bottom power feeds to meet a wide range of installation requirements.

2.3 RACK ELECTRONICS, PHYSICAL.

- A. The main dimmer control electronics shall be housed in a Rack Processor Module (RPM). The dimmer control electronics shall be completely digital without employing any digital to analog demultiplexing schemes or analog ramping circuits.
- B. All rack setup and preset data shall be stored in a non-volatile manner and may be transferred to a replacement Rack Processor Module without losing data.
- C. Each Rack Processor Module shall have a back-lit LCD display with a six key (minimum) keypad for rack setup, preset control, testing, rack status, error and diagnostics. Bi-Color LED's shall indicate "Network Connection", "DMX512 Port A", "DMX512 Port B", "Processor OK", "Module Event", "Panic", "Over temperature" "Phase A", "Phase B", "Phase C", "Active Processor".
- D. An optional backup Rack Processor Module shall provide full redundant tracking processor functions. The Backup RPM shall track all setup, preset and other commands at all times without any operator action. The Backup RPM shall take over all communications and dimming control upon automatic activation.
- E. All rack setup and preset data shall be electronically transferable between the main Rack Processor Module and the backup RPM in case of the replacement of either of the modules. Rack set up data shall be stored in non-volatile memory.
- F. The Rack Processor Module shall provide signal connections in conjunction with optional power supply units. The RPM shall provide the only point for contractor connection of signal cables and PANIC activation. The contractor connections shall be made with two-part plug in screw terminals (dedicated connector per input) or crimped RJ45 connectors for ease of installation. The RPM shall feature an integrated Ethernet switch to permit the cross connection of up to 4 dimmer racks in a single dimmer room. RPM to RPM Ethernet connections shall be made with pre-made RJ45 patch cables.
- G. All DMX512 & RS485 communication ports and remote contact input connections shall be optically isolated from all processor electronics by a minimum of 2,500V RMS isolation.

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- H. The Rack Processor Module shall have the provision to select any of a maximum of 96 dimmer outputs to be activated by the PANIC function. The PANIC function shall be activated or de-activated by one or more local or remote contact closures.

2.4 RACK ELECTRONICS, CONTROL AND COMMUNICATIONS.

- A. The control electronics shall provide the following control and communication inputs as standard:
 - 1. An Ethernet control input. This input can support a connection to a Strand ShowNet system. Each Ethernet control input can generate Reporting messages for the dimmer rack. This input shall also allow for local connection to a personal computer, providing setup, playback, dimming reporting features, and the ability to load rack-operating software.
 - 2. Two optically isolated DMX512 control inputs. The first input shall accept DMX512 only. The second DMX512 input may be configured to accept DMX512, or Strand Lighting's Vision.net architectural protocol.
 - 3. Optically isolated contact inputs, for external switching interfaces (24V 100ma). These closures are dedicated for:
 - a. PANIC ON Momentary Turns Panic On
 - b. PANIC OFF Momentary Turns Panic Off.
 - c. FIRE ALARM Maintained Turns Panic On, no Override.

2.5 RACK ELECTRONICS, FEATURES.

- A. The rack electronics shall provide two levels of operator interface:
 - 1. A local standard interface that includes 6 menu keys and a bitmapped backlit LCD display (minimum 16 character x 2 line) to access standard system menus.
 - 2. A networked customizable Web based interface that includes status displays, configuration and maintenance utilities, integrated on-line help system, and alert emails. Support for wireless PDA's shall allow query and control functions.
- B. The dimmer control electronics shall have 16 bit (minimum) fade processing and a dimmer update rate better than 16 ms (60 Hz) or 20 ms (50 Hz). Dimmers set to the same level shall output within +/-0.5V of each other, regardless of phase or input voltage, providing the desired level is less than the phase input voltage less the dimmer insertion voltage.

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- C. The dimmer output levels shall be regulated for incoming line voltage variations. The regulation shall adjust for both RMS voltage and frequency changes of the incoming AC wave form. Regulation shall maintain the desired output voltage +/- .5V volt for the entire operation range (90 - 264 VAC). The regulation shall compensate for variations of the AC waveform on a dimmer-by-dimmer basis. There shall be no interaction between dimmers in the system or any other equipment. The output shall be regulated to the user programmable maximum voltage level on a dimmer-by-dimmer basis. The processor response time to incoming line changes shall take no more than 16 ms (60 Hz) or 20 ms (50 Hz). Dimming systems that do not respond to line voltage and frequency variations shall not be acceptable.
- D. The control electronics shall allow the maximum output levels of individual dimmers to be adjusted, e.g. to compensate for load circuit voltage loss. The selected dimmer curve shall regulate so that the curve is proportional to the programmed maximum voltage.
- E. The RPM shall also have the capability to support dimmers of different types and sizes that may be mixed throughout the rack. Individual dimmers may be dimmed or switched (non-dim). The individual phase control or switching of positive and negative line voltage half cycles shall not be acceptable, as the net resultant DC line current may damage or degrade line supply transformers.
- F. As a standard, dimmer rack status reporting shall report the following conditions/data:
1. Rack input line voltage per phase.
 2. DMX512 Port A input fail.
 3. DMX512 Port B input fail.
 4. Phase failure (A, B and C).
 5. Rack temperature.
 6. Rack overtemp warning (100 degrees Fahrenheit.) (37 degrees Celsius).
 7. Rack overtemp shutdown (105 degrees Fahrenheit.) (40 degrees Celsius).
 8. h.) Rack under temp shutdown (32 degrees Fahrenheit) (0 degrees Celsius).
- G. IGBT dimmer modules shall be fully status reporting as a standard. Optional Dimmer Reporting Cards (DRC) can be factory installed into a standard SCR dimmer modules. All status reporting dimmers and shall report the following conditions/data:
1. Dimmer type in slot. (Dimmer dipswitch set at factory).

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2. Load (Wattage) per dimmer.
 3. Deviation from recorded dimmer load.
 4. No dimmer load.
 5. Excess DC on dimmer.
 6. Overload on dimmer.
 7. Power device failure (short circuit or open circuit).
 8. Circuit breaker open.
 9. Dimmer fault.
 10. Change in dimmer type fitted.
 11. RMS Phase current per rack phase.
 12. Dimmer module temperature (w/module shutdown on and over temperature condition).
 13. Forced on at dimmer module.
 14. Dimmer panic.
- H. The control electronics shall provide the following setup functions that shall be user programmable on a per rack or system wide basis:
1. DMX512 Port A patch.
 2. DMX512 Port B patch.
 3. Architectural controls for Vision.net control systems.
 4. Set rack and circuit ID's (CID).
 5. Dimmer reporting enable/disable. (By dimmer module).
 6. Set dimmer level (%).
 7. Set dimmer maximum voltage (12V - 260V in 1V steps).
 8. Set SCR dimmer maximum voltage (24V - 260V in 1V steps).
 9. Set dimmer minimum level (0 to 99%).
 10. Set dimmer curve.
 11. Set dimmer response time.

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12. Set control input priority logic.
 13. Set status reporting parameters.
 14. Program user curves.
- I. The DMX512 Port A and B patching shall support a rack start address and individual dimmer patch. The architectural patch shall define the rack circuit/room/room channel relationship for Vision.net control systems.
 - J. The control electronics shall provide a facility to disable the output of any individual dimmer by setting the level to 0. It shall also be possible to enable and disable dimmer status reporting on a per dimmer basis.
 - K. The control electronics shall contain Vision.net user programmable presets, a permanent blackout preset (preset 0) and a user-definable power up preset. It shall be possible to record individual preset crossfade times, including preset 0. The presets shall be user programmable as a snapshot of the current dimmer outputs resulting from all dimmer control sources according to selected control logic, on a per rack or system wide basis. Each preset may have an individual crossfade time between 0 seconds and 60 minutes.
 - L. The control electronics shall support a user assignable "control lost" Vision.net preset. Each rack shall, in the event of loss of control signal according to the selected port logic, maintain the last levels for a user programmable period ranging from 0 seconds to 60 minutes. After this time period it shall automatically fade to the "control lost" preset. Alternatively it shall be possible to program the rack to indefinitely hold the last dimmer levels. It shall be possible to continue control without an active control signal using any of the architectural presets. Time resolution to be a minimum of one second.
 - M. The processor shall provide an architectural Vision.net control system preset capability of 125 channels for each of 255 separate rooms with programmable fade times. Time resolution to be a minimum of one second.
 - N. The system shall provide the ability to set one or a group of dimmers to any level.
 - O. The control electronics shall provide the ability to set a library or user programmable 100-point curve (processor to apply a linear interpolation between the user points) to any individual dimmer. Library curves shall be:
 1. Square curve.
 2. S-curve.
 3. Linear power output curve.

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- P. User selectable curves shall be:
1. Non-dim (switched) with a programmable trigger level 0 - 99%.
 2. Electronic ballast fluorescent curve with a kick-start voltage and user programmable top set and bottom cut-off point.
 3. Magnetic ballast fluorescent curve with user programmable top set and bottom cut-off point.
 4. Five user defined programmable curves, programmed with up to 100 steps. The processor is to apply a linear interpolation between the user points.
- Q. Each dimmer shall have one of three user programmable response (rack will fade to the new target level in the defined response time) in order to optimize lamp filament life and speed of operation:
1. Fast (30 ms).
 2. Normal (100 ms).
 3. Slow (300 ms).
- R. The system processor shall provide a number of user programmable control logic schemes, regulating the logical relationship between dimmer control sources. It shall be possible to set the way in which various control inputs interact with each other to create priorities between all control inputs.
- S. It shall be possible to load new rack operating software via the Ethernet connection to the dimmer rack. There shall be no requirement to turn power to the rack off during the loading of rack software, and in addition the Panic facility and Redundant Tracking Backup (RTB) processors shall be fully operational during software loading to the active processor. It shall be possible to load new rack operating software into the processor, regardless of the state of the program storage.

2.6 DIMMER MODULES. (MATCH 1 TO 1 WITH EXISTING SYSTEM AND DIMMER MODULE COUNTS)

- A. The dimmer modules shall be designed using advanced, state-of-the-art components specifically for entertainment lighting. IGBT dimmer modules for 120 volt applications shall be available in dual 20 amp and single 50 amp configurations. SCR Dimmer modules for 120 volt applications shall be available in single 20 amp 3 wire fluorescent, dual 15 amp, dual 20 amp, single 50 amp and single 100 amp configurations. Modules of similar types shall be interchangeable allowing systems with both SCR and IGBT dimmers to be configured freely. Systems that do not permit the mixing of SCR and IGBT dimmers shall not be accepted.

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- B. The dimmer modules shall be designed using advanced, state-of-the-art components. The dimmer module shall be capable of "hot patching" cold, incandescent loads up to its full rated capacity without malfunction with the control signal at full ON.
- C. All single and dual dimmer modules shall be available with optional dimmer status reporting.
- D. The dimmer modules shall be fully plug-in and factory wired. Dimmer modules shall be of rugged and heavy-duty construction enclosed by a formed aluminum chassis. Power and signal pins shall be recessed in a self-aligning housing to avoid handling, storage, and insertion damage. A contoured handle shall be provided for ease of insertion and withdrawal. All chassis parts, except heat sinks, shall be properly treated, primed and finished in fine texture, scratch resistant, coating. Each module shall be labeled with the Philips Strand Lighting logo and rating. Modules constructed of molded plastic for structural support shall not be acceptable. Dimmer modules shall be ETL and cETL listed and CE marked devices.
- E. Dimmer modules shall be keyed so that dimmer modules of greater capacity shall not be interchangeable.
- F. Non-Dim modules shall be available to provide dedicated non-dim circuits not employing SSR devices. Dual modules shall be available providing non-dim/non-dim configurations. Each non-dim shall be provided with a primary circuit breaker of the appropriate rating. Non-dims shall be designed so they can be used for inductive loads.
- G. IGBT dual dimmer modules shall be available with current ratings of 20 amps. IGBT single dimmer modules shall be available with current ratings of 50 amps. Each module shall offer full dimmer status reporting to match all other modules in the C21 Advanced Technology product family. IGBT Dimmer modules shall be fully interchangeable with standard SCR dimmer modules of the same current rating and may be used in systems with standard SCR dimmers. They shall conform to the following specification:
 - 1. The insertion loss (voltage drop across the complete dimmer at full load current while producing a full output sine wave) shall be less than three volts RMS. Insertion loss at reduced dimmer loading shall not vary significantly from that produced with a full rated load. IGBT Dimmers with insertion loss greater than three volts RMS at full rated load shall not be acceptable.
 - 2. IGBT dimmers shall regulate dimmer output to within +/- 0.5 volts RMS of the assigned setting. Regulating response shall occur in the same power line cycle as the disturbance when the dimmer is in Reverse Phase Control (RPC) mode.

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3. IGBT dimmers shall not use zero cross detection to synchronize to the power line. Dimmer output voltage shall be unaffected by severely distorted or noisy power line waveforms.
4. IGBT dimmers shall automatically switch from Reverse Phase Control (RPC) mode to Forward Phase Control (FPC) mode when inductive loads are detected. In RPC mode the dimmer is on from the beginning of the half-cycle until the desired output voltage is reached. In FPC mode, the dimmer turns on within the half-cycle and stays on until the end of the half-cycle. Use of RPC mode, when load type and other conditions permit, reduces the level of lamp filament noise. IGBT dimmers may also be user set to FPC or RPC modes for LED luminaires.
5. LOW HARM mode shall reduce harmonic currents present on the feed neutral conductor by automatically switching the dimmers in the system to an optimum configuration of FPC and RPC operation. The reduction in neutral current shall be a minimum of 33% with a maximum of 100%, depending upon load sizes and their associated levels.
6. Each IGBT dimmer will detect operating conditions and take active measures to protect itself (and the load). Protective measures shall include, but are not limited to the following:
 - a. At power-up, each dimmer will detect excessive line voltages. When over-voltage is detected, the dimmer will not turn on its load. Dimmers shall withstand line voltages up to 230 VAC for an indefinite period and up to 280 VAC for fifteen minutes with no damage.
 - b. Each dimmer shall detect excessive heat sink operating temperatures and automatically reduce its own "fall time", which minimizes the production of heat.
 - c. Each dimmer shall detect load current in excess of its own rating. An overload will cause a dimmer to shut down.
- H. Each dimmer module shall contain circuit breakers, associated solid state switching modules, filters, power and control components.
- I. Standard dimmer electronics shall be completely solid state. They shall utilize two silicon controlled rectifiers in a back-to-back electrical configuration. The full load of the circuit is to be carried and controlled by the silicon controlled rectifiers.
- J. Each 120 volt dimmer shall be protected by a single pole fully magnetic circuit breaker of the appropriate current rating and 10,000 AIC surge rating mounted on the face plate of the dimmer module so that the trip current is not affected by ambient or rack temperature. The circuit breaker shall be rated for tungsten loads having an inrush rating of no less than 20 times normal current and shall disconnect the power to the dimmer module before damage can be done to the

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dimmer power components. The circuit breakers shall be rated for 100 percent switching duty applications and shall be UL, and cUL marked devices.

2.7 DIMMER MODULE POWER DEVICES.

- A. SSR power devices shall be encapsulated, epoxy filled high impact plastic cases with optically isolated firing circuits, control circuitry, and two silicon controlled rectifiers (SCR's). There shall be a minimum of 2,500 (4,000 in 50Hz systems) volts RMS of isolation between the AC line and the control lines of the SCR. The SCR shall be in an industry standard format that is easily field replaceable without removing any other electrical or electronic devices.

2.8 SCR POWER DEVICE FILTERING.

- A. Each SCR power device dimmer module shall have an integral inductive filter to reduce the rate of current rise time resulting from the SSR switching on. The filter shall limit objectionable harmonics, reduce lamp filament sing and limit the radio frequency interference on line and load conductors.
- B. Basic Rise dimmers shall have a rise time of not less than 350 microseconds measured at 90 degrees conduction angle from 10% to 90% of output wave form with dimmer operating at maximum load. Voltage rate of rise (slew rate) must not exceed 420 millivolts per microsecond in any point of the wave under full load conditions.
- C. Medium rise time dimmers shall have a rise time of not less than 500 (250 at 50Hz) microseconds measured at 90 degrees conduction angle from 10% to 90% of output wave form with dimmer operating at maximum load. Voltage rate of rise (slew rate) must not exceed 300 millivolts per microsecond in any point of the wave under full load conditions.
- D. Hi-Rise dimmers shall have a rise time of not less than 800 (400 at 50Hz) microseconds measured at 90 degrees conduction angle from 10% to 90% of output wave form with dimmer operating at maximum load. Voltage rate of rise (slew rate) must not exceed 210 millivolts per microsecond in any point of the wave under full load conditions.
- E. IGBT dimmers shall have a rise time of not less than 1000 microseconds measured at 90 degrees conduction angle from 10% to 90% of output wave form with dimmer operating at maximum load. Voltage rate of rise (slew rate) must not exceed 210 millivolts per microsecond in any point of the wave under full load conditions.

2.9 APPROVED MANUFACTURER AND PRODUCTS.

- A. Dimmer racks, modules and control electronics shall be Strand Lighting C21 Advanced Technology dimmer racks or approved equal.

AUXILIARY EQUIPMENT CONTROL AND STAGE MANAGER'S STATION

(1 REQUIRED)

A. MECHANICAL

1. The auxiliary control and stage manager's station (ACSMP) shall be a surface mounted cabinet free of visible fasteners and shall be of aesthetic appearance.
2. The cabinet shall have a hinged locking door cover to protect and secure internal components.
3. Terminal Strips and necessary electrical and electronic terminations will be included.

B. Components

1. Internal control components for the ACSMP will be factory assembled and tested.
2. The panel shall contain all necessary wiring and terminations for assembly of panel mount components, including internal power supply, plug strips, and cabling.
3. Provide one work light unit complete with Littlite RL 700 EIA rack mount with 2 gooseneck lights.
4. Provide one digital clock unit, Nationwide # IDC7005, 120/220vac.
5. Provide one Strand 301 series control console as specified below.
6. Provide one Strand Outlook series houselight control station as specified in below and in the House Light Control section.
7. Provide one Houselight Key Switch for Enable/Lockout function.
8. Provide one XLR receptacle station for DMX input control signal.

2.10 INSTALLATION

- A. Provide all necessary connections, components, interfaces and wiring from the stage to the dimming rack to place the auxiliary control into service.
- B. Provide all programming of the system per schools requirements to operate stage and house lighting

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2.11 APPROVED MANUFACTURERS PRODUCTS

- A. Provide Strand Auxiliary Control Panel 95995 consisting of :
1. Auxiliary control panel
 2. 301 back up console
 3. Operating lights
 4. Time Clock Panel
 5. Architectural Control Station
 6. DMX512 input XLR
 7. Station Key Lock

ARCHTECTURAL CONTROL SYSTEM STATIONS SYSTEM OVERVIEW.

- A. System shall be provided with a fully integrated digital lighting control system, utilizing digital communications between stations, and the control devices (dimmers, relays, and DMX-512 controlled equipment) in the system as required.

GENERAL.

- A. Capacities.
1. The lighting system shall be fully scalable to meet the needs of complexes of any size. Each complex can consist of up to 1000 areas.
 2. Each area shall support up to 255 rooms with a maximum of 127 control channels per room, which can be connected to an unlimited number of dimmers, relays, or DMX512 controlled equipment. The control connection between stations and to C21, A21 and R21 dimming systems shall be via standard Cat 5e cable using the Vision.net control protocol. For DMX512 applications an optional Vision.net to DMX512 module shall be available.
 3. Star wiring shall be supported using any number of available 4 port Vision.net data hubs.
 4. Large-scale systems consisting of multiple Vision.net networks may be linked using a Strand Lighting ShowNet Ethernet network.
 5. No central processor shall be required. Systems requiring a separate processor shall not be acceptable.

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6. Connections to BMS systems shall be supported through the use of:
 - a. Simple contact closures from the BMS system to a standard Vision.net AV interface card. Any number of cards may be used with 8 contact closure inputs per card. Each closure may be defined as a system room preset command, toggle command or Smart button command.
 - b. RS 232 serial interface modules shall also be available permitting simple ASCII text commands and acknowledgements between the BMS system and the Vision.net lighting control system. Commands may access any room or preset or through the use of Smart button commands multiple rooms and presets system wide.
- B. Interconnection.
 1. Each station shall be connected as an RS485 serial "daisy chain" using Belden 1583A Cat 5e cable.
 2. It shall be possible to change standard control stations at any location on the data network without requiring additional wiring or alterations to the wiring specification. Touchscreen stations shall require a separate power feed to operate the station electronics.
- C. Vision.net 4 Configuration Interface.
 1. The system shall support a digital communications link for station configuration and set up.
 2. An RS232 programming station shall be used for connecting a Windows PC operating Vision.net 4 Designer software to the Vision.net data network.
 3. A Windows PC can communicate either via an RS232 port or via the available network interface card.

VISION.NET 4 DESIGNER CONFIGURATION SOFTWARE.

- A. General.
 1. Vision.net 4 Designer software shall be a graphical set up and configuration programmed designed to operate under Windows XP (or later) operating systems.
 2. An astronomical clock shall be available on any system touchscreen capable of being programmed to any geographical location in the world. The clock shall be able to execute any number of daily, weekly or date specific events at fixed times, or offset relative to sunset and sunrise.

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3. Each system area shall support 127 control channels per room with up to 255 rooms per system. Any number of dimmers may be assigned to a room.
4. Each room shall be capable of having any combination or quantity of control stations.
5. It shall be possible to change stations at any location by replacing it with a different station type, and modifying the systems configuration file accordingly.
6. Each room shall have 32 presets available, regardless of the number of rooms or number of channels within each room. Presets shall be selected from control stations, or shall be "played back" automatically by time clock events. Each preset shall have its own programmable fade, delay and hold time and may be linked for sequential playback in a single sequence, or using system macros if a continuous loop is required.
7. Programmable delay, fade and hold times shall be available in the following increments; instant, 1 sec., 2 sec., 3 sec., 5 sec., 7 sec., 10 sec., 15 sec., 30 sec., 1 min., 5 min., 15 min., 60 min.
8. It shall be possible to allocate a name or label to every room, panel, station, preset and group in the system.
9. It shall be possible during system configuration to create macros using a "Smart" button. Smart buttons shall carry out a sequence of standard system commands. It shall be possible to program Smart buttons from any control station pushbutton, remote input or, automatically using the astronomical time clock. It shall be possible to assign any of the system commands to any station pushbutton, external device input, time clock event, or Macro step.
10. In cases where an area is to be divisible for separate or combined control, it shall be possible to combine the constituent rooms either manually or with automatic partition switches. Rooms are combined using a "Room Link" touchscreen button. Rooms that are not linked shall maintain their own presets, levels and channels. "Room Link" coordinates the selection of presets within the combined rooms from any control station within those rooms.
11. The following commands shall be programmable to any system button:
 - a. Preset.
 - b. Preset/Off.
 - c. Toggle.

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- d. Smart.
 - e. Raise.
 - f. Lower.
 - g. State / Mode.
 - h. Room Link.
 - i. Console button.
 - j. Share Button.
 - k. CK Show.
 - l. Set Clock.
 - m. Suspend Clock.
 - n. Toggle Master.
 - o. Screen Saver.
12. The system shall include an output simulation mode allowing the system designer to test all configurations prior to system installation.
13. Touchscreen configuration shall be supported with simple drag and drop tab, button, slider, sliders, and text entities.
14. Tabbed touchscreen pages may be created for:
- a. Buttons and Sliders.
 - b. PaletteOS Monitor.
 - c. Web Browser.
 - d. Real Time Clock.
15. Touchscreens may optionally be connected to a Strand Lighting ShowNet Ethernet network to connect to PaletteOS series control consoles or Network control devices. In this mode of operation, it shall be possible to view console pages that display information on Cues, Submasters, Macros, Lamp Check and Channels.

Vision.Net CONTROL STATIONS.

A. Mechanical.

1. The control station faceplates shall be free of visible fasteners and shall be of a pleasing aesthetic appearance.
2. Control stations shall be supplied standard with a white finish, optional custom colors shall be available on request.
3. On control stations with sliders, the sliders shall have 1.75" (45mm) travel with matching slider knobs.
4. Control station push buttons shall have matching button caps with long life programmable LED backlighting. The backlight intensity shall be fully adjustable to allow for ambient lighting conditions. Backlighting shall be user definable with a choice of Blue, Amber or White. Different backlighting colors may be programmed to indicate the state of each button.
5. Key caps shall be available with optional custom engraving.
6. Each station shall inputs for up to 8 photo cells or occupancy sensors or any combination of these devices. The function of the sensors shall be programmable using the system design software and may be updated at any time.

B. Operation.

1. All control stations shall have a unique address between 1 and 255 configured at the initial system start up.
2. A Vision.net control station may consist of sliders and button keypads with a maximum of 5 gangs per station.

C. Installation.

1. 2 gang and larger control stations require flush mounted masonry ("ears-in") back boxes, with a minimum depth of 3.5" (90mm). Back boxes must be grounded / earthed in accordance with local wiring practices to provide a discharge path to ground for static electricity.
2. Control stations shall be supplied complete with a sub-plate, which is screwed to the flush mounting back box with the screws provided. The sub-plate allows the control station to be hinged into position and secured with hexagonal setscrews on the bottom edge of the trim ring.

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3. Touchscreen stations shall be available with surface and flush mount enclosures designed to simplify station mounting.
4. Vision.net data line terminations shall be via a screw-terminal plug and socket to facilitate removing a control station while maintaining the continuity of the data network.

VISION.NET PUSHBUTTON STATIONS.

A. Specific Features.

1. All button stations shall be fully configurable.
2. Each button may be assigned any of the following functions:
 - a. Preset.
 - b. Preset/Off.
 - c. Toggle.
 - d. Smart.
 - e. Raise.
 - f. Lower.
 - g. State / Mode.
 - h. Room Link.
 - i. Console button.
 - j. Share Button.
 - k. CK Show.
 - l. Set Clock.
 - m. Suspend Clock.
 - n. Toggle Master.
 - o. Screen Saver.
3. Smart button commands including room combine, cross room commands and commands to Strand Lighting Palette OS controller consoles.
4. Each station shall store all active control information at all times. No central processor shall be required.

RS232 SERIAL INTERFACE PORT.

A. Specific Features.

1. The RS232 Serial Interface port allows a programming PC to connect to the Vision.net system for system configuration and operation.

DATA CABLE SPECIFICATION.

A. Specific Features.

1. Vision.net stations Belden 1583A Cat 5 cable.
2. DMX512 Belden 9829.

DOCUMENTATION.

A. Specific Features.

1. An Operations Manual and Installation Instructions are supplied with each system. Project installation & connection drawings shall be supplied as specified.

ENVIRONMENTAL SPECIFICATION.

A. Specific Features.

1. For all control stations and associated equipment, the following recommendations shall apply:
 - a. Ambient temperature extremes: 32° - 104° F (0° - 40° C).
 - b. Recommended ambient temperature: 64° - 77° F (18° - 25° C).
 - c. Relative humidity: 10% - 90% non-condensing.
 - d. General conditions: Office level cleanliness - Interior use only.

PART 3 – EXECUTION

3.1 TESTING AND DOCUMENTATION

- A. Provide a defined timeline for all close-out procedures and documentation to insure that all punch lists and field issues are identified, resolved, and properly completed and closed out. Coordinate with the General Conditions for each project.

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- B. The District reserves the right to have a representative present during all or a portion of the testing process. If the District selects to be present during testing, results will only be acceptable when conducted in the presence of the District.

3.2 ACCEPTANCE

- A. Prior to acceptance all the following conditions must be met:
 - 1. All required the Contractor shall make submittals and deficiencies or rejected submittals shall be corrected.
 - 2. All seismic bracing shall be in place.
 - 3. All specified station cabling with associated termination components, labeling and fire stopping shall be installed properly. Any component not installed shall be inventoried and provided to the District in the manufacturer's packaging; loose miscellaneous parts shall not be accepted.
 - 4. Terminal blocks shall be clean and free of trimmed or cut-off copper pairs, sheaths, armors, cable lubricants or any other disposables used in the installation of the station cables.
 - 5. Any deficiencies and punch list items shall be corrected.
 - 6. All as-built documentation shall be complete, reviewed and provided to the District.

3.3 DELIVERY AND INSTALLATION

- A. Project Management
 - 1. Bidders are required to supply a complete comprehensive Project Implementation Plan outlining the bidder's approach to the implementation of SFUSD new system.
 - 2. In the Project plan, the bidder will include a Project Organization Chart with the reporting relationships of Project Team Members and other key personnel.
 - 3. It is essential that the installation of the new system be as transparent as is technically possible to the user
 - 4. A Master Project Schedule must be included along with a work responsibility matrix identifying the tasks the bidder will perform and the tasks SFUSD is expected to perform to successfully install the new system.

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B. Training

1. The successful bidder will be required to conduct end-user training on SFUSD premises, tailored specifically to SFUSD particular requirements (e.g., console operator, message center operator, secretary and professional).
2. Training classes sizes will not exceed more than 10 station users at a time. Training to include as applicable: new telephone system, voice mail users, etc.
 - a. Bidder will also provide a more intensive training program and training materials for designated SFUSD personnel whom will be capable of training future employees.
 - b. For each product application being proposed, provide a detailed description of the training the bidder will provide.
 - c. Reference copies of the training materials and the user and system administrator guides should be included as part of the bidder's response to this RFP. These documents are to be kept on site.

C. Bidder Service

1. Maintenance and Warranty
 - a. The systems and all associated equipment in the bidder's proposal must be warranted by the bidder and by the manufacturer to be free of defects in equipment, software and workmanship for a period of one (1) year following system Cutover. and from the date of final acceptance by the consultant and SFUSD.
 - b. During the warranty period and any subsequent maintenance agreement, any defective components shall be repaired or replaced at no cost to SFUSD .
 - c. All system maintenance, programming changes, operational changes in software and programming during the warranty period and under any maintenance agreements shall be performed by the successful bidding organization using personnel employed full-time by the bidder and at no additional cost to SFUSD other than those charges stipulated to maintain the warranty.
 - d. As part of the response to this specification, the bidder must guarantee to continue to provide system maintenance for a period of not less than five years following the expiration of the original warranty period.

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- e. Bidders are to indicate the annual fixed maintenance rate for five years.
- D. System Testing Requirements
- 1. GENERAL
 - a. Test the completed installation , dimming circuits for continuity, operation, loading, f equipment. Test all dimming ports in the system 100%.
 - 2. Quality Control
 - a. Evidence of Experience and Qualifications:
 - b. Show that the installer who will perform the Work has a minimum of 10 years experience successfully installing systems of the same type and design as specified herein. Include the names, locations, and points of contact of at least ten similar installations of the same type and design as specified herein where the installer has installed such systems. Indicate the type of each system and certify that each system has performed satisfactorily in the manner intended for a period of not less than 12 months.
 - c. Show that the instructor, who will train/review with theatrical operating and maintenance personnel, has received a minimum of 24 hours of system training from a factory training center and at least one technical organization and 2 years experience in the installation of systems of the type specified. Submit training certification in equipment submittals, title section training and certifications.
 - 3. Burn-In Period - Acceptance
 - a. Acceptance shall consist of the following:
 - (1) Burn-in period.
 - (a) The system shall be accepted for start of warranty upon successful completion and testing of the consultant, Guttman and Blaevoet Engineers.
 - (b) Burn-In period shall be a 30 day time frame to allow the system to operate free of defects, grounds, programming faults, etc.
 - (c) The 30 day Burn-In shall begin the day of acceptance by consultant, Guttman and Blaevoet Engineers.

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- (d) The Burn-In period shall be 30 days of continuous use without system trouble, console alarm, open wiring, short circuits or ground conditions present.
 - (e) Should the system fail for any reason during the burn-in period, the contractor shall respond immediately upon notification by SFUSD personnel and correct said deficiencies.
 - (f) Upon correction and restoration, the "Burn-In" period shall be re-set to "0" and the 30 day count shall begin again.
 - (g) Warranty shall commence upon day 31 of successful "Burn-In" period.
- (2) Final Test
- (a) Before the installation shall be considered completed and acceptable by the awarding authority, a test on the system shall be performed as follows:
 - (b) The contractor's job foreman, in the presence of a representative of the manufacturer, a representative of SFUSD and shall operate every building phone/device to ensure proper operation and correct programming and dial annunciation at the control console.
 - (c) When the testing has been completed to the satisfaction of both the contractor's job foreman and the representatives of the manufacturer and SFUSD , a notarized letter co-signed by each attesting to the satisfactory completion of said testing shall be forwarded to SFUSD.
 - (d) The contractor shall leave the telecommunications system in proper working order, and, without additional expense to SFUSD, and shall replace any defective materials or equipment provided by him under this contract within one year (365 days) from the date of final acceptance by the consultant.

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- (3) As Built Drawings, Testing, and Maintenance Instructions
 - (a) A complete set of reproducible "as-built" drawings in AutoCAD R2015 format (disks and sheets) showing installed wiring, color coding, and wire tag notations for exact locations of all installed equipment, specific interconnections between all equipment, and internal wiring of the equipment shall be delivered to SFUSD upon completion of system acceptance.

- (4) Operating and Instruction Manuals
 - (a) Operating and instruction manuals shall be submitted prior to testing of the system. Four (4) complete sets of operating and instruction manuals shall be delivered to SFUSD upon completion.
 - (b) Provide necessary training and/or schooling to designated SFUSD personnel at no additional cost to SFUSD. Training shall be at SFUSD designated location, by factory trained personnel.

- (5) Testing Frequency Instructions
 - (a) Complete, accurate, step-by-step testing instructions giving recommended and required testing frequency of all equipment, methods for testing each individual piece of equipment, and a complete trouble-shooting manual explaining how to test the primary internal parts of each piece of equipment shall be delivered to SFUSD upon completion of the system.

- (6) Maintenance instructions shall be complete, easy to read, understandable, and shall provide the following information:
 - (a) Instruction on replacing any components of the system, including internal parts.
 - (b) Instructions on periodic cleaning and adjustment of equipment with a schedule of these functions
 - (c) A complete list of all equipment and components with information as to the address and phone number of both the manufacturer and local supplier of each item.

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- (d) User operating instructions, shall be provided. Furnish qty. as required.
 - (e) SFUSD shall be furnished with all programming disks for the installation as well as hard copy printouts. Provide necessary training and/or schooling to designated SFUSD personnel at no additional cost to SFUSD. Training shall be at SFUSD designated location, by factory trained personnel.
 - (f) Administrative staff of A SFUSD shall be thoroughly instructed in the use of system by authorized distributor.
 - (g) Staff of SFUSD as well as SFUSD maintenance staff shall be thoroughly instructed in the use of the System. Training shall include a minimum of six (1) hour sessions, to be scheduled at SFUSD 's designated time.
 - (h) Maintenance instruction shall be performed in the same manner as described above. Training shall include a minimum of six (1) hour sessions, to be scheduled at SFUSD designated time.
 - (i) A complete maintenance and warranty agreement must be included as part of the bidder's submittal, including all options available for extended coverage and full pricing details for each level of coverage.
 - (j) During the warranty period and any subsequent maintenance agreement, any defective components shall be repaired or replaced at no cost to SFUSD, including all required labor and transportation.
 - (k) All system maintenance during the warranty period and under any maintenance agreements shall be performed by the successful bidding organization using personnel employed full-time by the bidder and at no additional cost to SFUSD other than those charges stipulated to maintain the warranty.
- (7) As part of the response to this specification, the bidder must guarantee to continue to provide system maintenance for a period of not less than ten years following the expiration of the original warranty period.

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- (a) Bidders are to indicate the annual fixed maintenance rate for five years in their submittals.

- 4. Logistical Support
 - a. Bidder should identify the address of the bidder's local service centers and the number of service personnel trained on the proposed system.

- 5. Repair Response
 - a. The successful bidder may provide routine system monitoring to assure the continued operation of all system components.
 - b. As part of the response to this specification, bidder must include a description of the bidder's repair handling procedure from the time of trouble discovery through the time the trouble is cleared by an SFUSD representative.
 - c. SFUSD is guaranteed a response time of no more than four hours for all major system problems and a maximum of 24 hours response to other system problems.
 - d. During the warranty period, the bidder must supply no more than a 4-hour response to major problems, 24 hours a day, 7 days a week.
 - e. Bidders must describe their definitions of major and minor system problems in the product submittals.

END OF SECTION 16571



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GEORGE WASHINGTON HIGH SCHOOL
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REVISIONS	DATE	BY	DESCRIPTION

LIGHTING SYSTEM REPAIRS AND UPGRADES AT GEORGE WASHINGTON HIGH SCHOOL ADDITION

AUDITORIUM STAGE AND SUPPORT AREAS

SY102
 DATE: 04/15/11
 DRAWN BY: J. J. JAMES
 CHECKED BY: J. J. JAMES
 SCALE: AS SHOWN
 PROJECT NO.: 111738

SHEET NOTES

- 1. REMOVE EXISTING OR REPLACE EXISTING SECTION AND REWORK SECTION OF DRAIN SYSTEM. ADAPT AS NECESSARY TO ACCOMMODATE INSTALLATION OF NEW DRAINAGE SYSTEM.
- 2. CONDUIT SHALL BE CONSISTENT WITH (SEE SCHEDULE) SCHEDULE OF 1/2" APPROXIMATE. LOCATION OF EXISTING DUCTS AS SHOWN IN RECEPTACLE SCHEDULE. REPLACE WITH NEW DUCTS. DRAIN RECEPTACLES. COLOR TO MATCH EXISTING. RECEPTACLES TO BE LOCATED AS SHOWN TO PROJECT MANAGER TO BE FOUND FOR NEW DRAINAGE.

