The Enclosed Document Is Provided For Your Convenience.

Please Email ALL Questions:

MailTo:ContractAdministration@TampaGov.net

Please Let Us Know If You Plan To Bid

City of Tampa
Contract Administration Department
306 E. Jackson St. #280A4N
Tampa, FL 33602
(813)274-8456

CITY OF
TAMPA, FLORIDA

NOTICE TO BIDDERS, INSTRUCTIONS TO BIDDERS
PROPOSAL, BID BOND, FORM OF NOTICE OF AWARD,
AGREEMENT, PERFORMANCE BOND AND
SPECIFICATIONS

FOR

Contract 14-C-00046

TAMPA THEATRE ELECTRICAL IMPROVEMENTS

City of Tampa
CONTRACT ADMINISTRATION DEPARTMENT
TAMPA MUNICIPAL OFFICE BUILDING
306 E. JACKSON STREET - 4TH FLOOR NORTH
TAMPA, FLORIDA 33602

APRIL 2015

CITY OF TAMPA

Bob Buckhorn, Mayor **CONTRACT ADMINISTRATION DEPARTMENT**

David L. Vaughn, AIA, Director

ADDENDUM NO. 1

DATE: April 28, 2015

Contract 14-C-00046; Tampa Theatre Electrical Improvements

Bidders on the above referenced project are hereby notified that the following addendum is made to the Contract Documents. BIDS TO BE SUBMITTED SHALL CONFORM TO THIS NOTICE.

Item 1: The Bid Date for the above referenced project is hereby changed to May 19, 2015.

Item 2: A pre-bid meeting will be held May 5 at 2:00 PM, on site at 711 North Franklin Street, Tampa, FL 33602, followed by a walk-through. Attendees are to meet in the lobby. No additional site visits are planned.

All other provisions of the Contract Documents and Specifications not in conflict with this Addendum shall remain in full force and effect. Questions are to be e-mailed to Contract Administration@tampagov.net.

Jim Greiner

Jim Greiner, P.E., Contract Management Supervisor

CITY OF TAMPA
CONTRACT ADMINISTRATION DEPARTMENT
306 E. Jackson Street 280A4N
Tampa, FL 33602

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BID NOTICE MEMO

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Bids will be received no later than 1:30 p.m. on the indicated Date(s) for the following Project(s):

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CONTRACT NO.: 14-C-00046; Tampa Theatre Electrical Improvements

BID DATE: May 19, 2015 ESTIMATE: $940,000 SCOPE: The project comprises upgrading of the existing house and performance stage lighting, upgrading of electrical service, replacement of the existing emergency generator and installation of temporary stage connections and all associated work required for a complete project in accordance with the contract. PRE-BID CONFERENCE: Tuesday, May 5, 2015, 2:00 p.m., on site at 711 North Franklin Street, Tampa, FL 33602. Attendance is not mandatory, but recommended.

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Bids will be opened in the 4th Floor Conference Room, Tampa Municipal Office Building, 306 E. Jackson Street, Tampa, Florida 33602. Pre-Bid Conference is held at the same location unless otherwise indicated. Plans and Specifications and Addenda for this work may be examined at, and downloaded from, www.demandstar.com. Backup files are available at http://www.tampagov.net/contract-administration/programs/construction-project-bidding. Subcontracting opportunities may exist for City certified Small Local Business Enterprises (SLBEs). A copy of the current SLBE directory may be obtained at www.Tampagov.net. Phone (813) 274-8456 for assistance. Email Technical Questions to: contractadministration@tampagov.net .

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NOTICE TO BIDDERS
CITY OF TAMPA, FLORIDA
Contract 14-C-00046; Tampa Theatre Electrical Improvements

Sealed Proposals will be received by the City of Tampa no later than 1:30 P.M., May 19, 2015, in the 4th Floor Conference Room, Tampa Municipal Office Building, 306 E. Jackson Street, Tampa, Florida, there to be publicly opened and read aloud.

The proposed work is to include, but not be limited to, upgrading of the existing house and performance stage lighting, upgrading of electrical service, replacement of the existing emergency generator and installation of temporary stage connections with all associated work required for a complete project in accordance with the Contract Documents.

The Instructions to Bidders, Proposal, Form of Bid Bond, Agreement, Form of Public Construction Bond, Specifications, Plans and other Contract Documents are posted at DemandStar.com. Backup files may be downloaded from http://www.tampagov.net/contract-administration/programs/construction-project-bidding. One set may be available for reference at the office of the Contract Administration Department, Municipal Office Building, Fourth Floor North, City Hall Plaza, Tampa, Florida 33602.

Each Proposal must be submitted on the Proposal form included in the Specifications and must be accompanied by a certified check or cashier's check on a solvent bank or trust company in compliance with Section 255.051, Florida Statutes, made payable to the City of Tampa, in an amount of not less than five per cent of the total bid, or a Bid Bond, of like amount, on the form set forth in the Contract Documents, as a guarantee that, if the Proposal is accepted, the Bidder will execute the Proposed Contract and furnish a Public Construction Bond within twenty (20) days after receipt of Notice of Award of Contract.

The City of Tampa reserves the right to reject any or all Bids and to waive any informalities in the Bid and/or Bid Bond. Acceptance or rejection of Proposals will be made as soon as practicable after the Proposals are received, but the City reserves the right to hold Proposals for ninety (90) days from the date of Opening.

Bid Protest Procedures: Unless subsequently indicated otherwise, in a revised posting on the Department's web page for Construction Project Bidding, the City of Tampa intends to award the referenced project to the lowest bidder listed in the tabulation posted on or about the date of Bid Opening. A bidder aggrieved by this decision may file a protest not later than 4:30 P.M., five (5) business days from the first posting thereof, pursuant to City of Tampa Code Chapter 2, Article V, Division 3, Section 2-282, Procurement Protest Procedures. Protests not conforming therewith shall not be reviewed.

Communication with City Staff

Pursuant to City of Tampa Ordinance 2010-92, during the solicitation period, including any protest and/or appeal, NO CONTACT initiated by bidders or responders with City officers or employees, other than the individuals specified below is permitted:
Director of Contract Administration, David Vaughn
Contracts Management Supervisor, Jim Greiner
Contract Officer, Jody Gray
The City's Legal Department staff
The City's Contract Administration Department staff.
Technical Questions and Requests For Information should be directed to the Department via
ContractAdministration@tampagov.net

"A person or affiliate who has been placed on the convicted vendor list following a conviction for a public entity crime may not submit a bid on a contract to provide any goods or services to a public entity, may not submit a bid on a contract with a public entity for the construction or repair of a public building or public work, may not submit bids on leases of real property to a public entity, may not be awarded or perform work as a contractor, supplier, subcontractor, or consultant under a contract with any public entity, and may not transact business with any public entity in excess of the threshold amount provided in Section 287.017, for CATEGORY TWO for a period of 36 months from the date of being placed on the convicted vendor list." Refer to Section 287.133 Florida Statues.

In accordance with the City of Tampa's Equal Business Opportunity Ordinance, a Goal may have been established for subcontracting with Small Local Business Enterprises, SLBEs, certified by the City. Links to further information and a list of SLBEs are on the Department's Construction Project Bidding Web page. A link to the current complete directory of SLBEs is on the Minority Business Development Office Website.

INSTRUCTIONS TO BIDDERS
SECTION 1 - SPECIAL INSTRUCTIONS

I-1.01 GENERAL:

The proposed work is the Tampa Theatre Electrical Improvements in the City of Tampa, as required for a complete project, as shown on the plans and detailed in the specifications. The work is located on land owned or controlled by the City of Tampa.

I-1.02 FORM PREPARATION AND PRESENTATION OF PROPOSALS: Replace the second sentence with the following: Submission of the entire specification book is not required.

I-1.03 ADDENDA – Section I-2.03 is replaced with the following: No interpretation of the meaning of the Plans, Specifications, or other Contract Documents will be made to any Bidder orally.

Every request for such interpretation must be in writing, addressed to the City of Tampa, Contract Administration Department, 306 E. Jackson St., 4th Floor, Tampa, Florida 33602 and then emailed to ContractAdministration@tampagov.net. To be given consideration, such request must be received at least seven (7) days prior to the date fixed for the opening of the Proposals. Any and all such interpretations and any supplemental instructions will be in the form of written addenda which, if issued, will be posted on DemandStar.Com and on the Department's web page, with notice given to all prospective bidders at the respective fax numbers or e-mail addresses furnished, for such purposes. Failure of any Bidder to receive any such addenda shall not relieve said Bidder from any obligation under his Proposal as submitted. All addenda so issued shall become part of the Contract Documents.

I-1.04 SIGNATURE OF BIDDERS: Section I-2.07 is replaced with the following:

Proposals must be signed in ink by the Bidder with signature in full. When firm is a Bidder, the Proposal shall be signed in the name of the firm by one or more partners. When a corporation is a bidder the officer signing shall set out the corporate name in full beneath which he shall sign his name and give the title of his office. The Proposal shall also bear the seal of the corporation attested by its secretary.

If the bidder referred to in Section I-2.07 is a corporation, it must submit; upon request, a copy of its filed Articles of Incorporation. In addition, if the bidder was incorporated in another state, it must establish that it is authorized to do business in the State of Florida. If the bidder is using a fictitious name, it must submit upon request, proof of registration of such name with the Clerk of the Circuit Court of the Country where its principal place of business is. Failure to submit what is required is grounds to reject the bid of that bidder.

I-1.05 TIME FOR COMPLETION:

The work shall be arranged to be completed in accordance with a progress schedule approved by the Construction Engineer.

The time for completion of this project, referred in Article 4.01 of the Agreement, shall be 300 consecutive calendar days. The period for performance shall start from the date indicated in the Notice To Proceed.

I-1.06 LIQUIDATED DAMAGES:

The amount of liquidated damages, referred to in Article 4.06 of the Agreement, for completion of this project shall be $500.00 per calendar day.

I-1.07 BASIS OF AWARD OF CONTRACT:

The basis of award referred to in Item I-2.11 of Instructions to Bidders shall be the greatest amount of work, which can be accomplished within the funds available as budgeted. The award may be made on the basis of the total bid, base bid, alternates(s) if any, unit bids if any, or any combination thereof deemed to be in the best interest of the City.

INSTRUCTIONS TO BIDDERS
SECTION 1 - SPECIAL INSTRUCTIONS

Unless all bids are rejected, the award will be made within 90 days after opening proposals.

I-1.08 GROUND BREAKING CEREMONY:

Arrangement may be made by the City in coordination with the Contractor, for construction to commence with a Ground Breaking Ceremony. Details will be discussed at the pre-construction conference.

I-1.09 INSURANCE:

The insurance required for this project shall be as indicated on Pages beginning with INS-1. Before commencing work, the Contractor shall provide the evidence of the insurance required on a Certificate of Insurance accompanied by evidence of authority to bind the insurance company or companies such as agents license, power of attorney, or letter of authority.

I-1.10 EQUAL BUSINESS OPPORTUNITY PROGRAM / SLBE / REQUIREMENTS

In accordance with the City of Tampa's Equal Business Opportunity Program, no goal has been established for subcontracting with Small Local Business Enterprises, (SLBEs), certified by the City.

Bidders may explore other opportunities for subcontracting with SLBEs by consulting the current directory of all certified SLBEs posted on the Minority Business Development Office web page.

GOOD FAITH EFFORT COMPLIANCE PLAN REQUIRED - When a Goal has been established, the Bidder must submit, with its bid, completed to the fullest extent possible, a Good Faith Effort Compliance Plan using the form GFECP contained herein. Additional documentation is required whenever an SLBE subcontractor's low quote is not utilized. Supplemental information or documentation concerning the Bidder's Compliance Plan may be required prior to award as requested by the City.

DIVERSITY MANAGEMENT INITIATIVE, DMI, DATA REPORTING FORMS REQUIRED - Bidders must submit, with its bid, "DMI-Solicited" forms listing all subcontractors solicited and "DMI-Utilized" forms listing all subcontractors to be utilized. Supplemental forms, documentation, or information may be submitted at bid time or as requested by the City.

After an award, "DMI-Payments" forms are to be submitted with payment requests to report payments to subcontractors.

Bidders may visit the Minority Business Development Office's web page at TampaGov.net for other information about the SLBE program, FAQ's, and the latest SLBE directory of certified firms.

I-1.11 BID SECURITY:

Surety companies shall have a rating of not less than B+ Class VI as evaluated in the most recently circulated Best Key rating Guide Property-Liability.

INSTRUCTIONS TO BIDDERS
SECTION 1 - SPECIAL INSTRUCTIONS

I-1.12 PUBLIC CONSTRUCTION BOND:

The Bidder who is awarded the Contract will be required to furnish a Public Construction Bond upon the form provided herein, equal to 100 percent of the Contract price, such Bond to be issued and executed by (a) surety company(ies) acceptable to the City of Tampa and licensed to underwrite contracts in the State of Florida. After execution of the Agreement and before commencing work, the Contractor must provide the City a certified copy of the officially recorded Bond.

I-1.13 AGREEMENT
Section 2 – Powers of the City's Representatives
Add the following:
Article 2.05 CITY'S TERMINATION FOR CONVENIENCE:

The City may, at any time, terminate the Contract in whole or in part for the City's convenience and without cause. Termination by the City under this Paragraph shall be by a notice of termination delivered to the Contractor, specify the extent of termination and the effective date.

Upon receipt of a notice of termination, the Contractor shall immediately, in accordance with instructions from the City, proceed with performance of the following duties regardless of delay in determining or adjusting amounts due under this Paragraph:

(a) cease operations as specified in the notice;
(b) place no further orders and enter into no further subcontracts for materials, labor, services or facilities except as necessary to complete continued portions of the Contract;
(c) terminate all subcontracts and orders to the extent they relate to the Work terminated;
(d) proceed to complete the performance of Work not terminated; and
(e) take actions that may be necessary, or that the City may direct, for the protection and preservation of the terminated Work.

The amount to be paid to the Contract by the City because of the termination shall consist of:

(a) for costs related to work performed on the terminated portion of the Work prior to the effective date including termination costs relative to subcontracts that are properly chargeable to the terminated portion of the Work.
(b) the reasonable costs of settlement of the Work terminated, including accounting, legal, clerical and other expenses reasonable necessary for the preparation of termination settlement proposals and supporting data; additional costs of termination and settlement of subcontracts excluding amounts of such settlements; and storage, transportation, and other costs incurred which are reasonably necessary for the preservation, protection or disposition of the terminated Work; and
(c) a fair and reasonable profit on the completed Work unless the Contractor would have sustained a loss on the entire Contract had it been completed.

Allowance shall be made for payments previously made to the Contractor for the terminated portion of the Work, and claims which the City has against the Contractor under the Contract, and for the value of materials supplies, equipment or other items that are part of the costs of the Work to be disposed of by the Contractor.

I-1.14 Section 5 – subcontracts and Assignments, Article 5.01, Page A-7, Last Paragraph:
Change "…twenty-five (25) percent… "to fifty-one (51) percent…"

Section 10-Payments, Article .05 Partial Payments, 1st Paragraph, 1st Sentence:
Change "…fair value of the work done, and may apply for…" to "…fair value of the work done, and shall apply for…"

INSTRUCTIONS TO BIDDERS
SECTION 1 - SPECIAL INSTRUCTIONS

I-1.15 Contractors must utilize the U.S. Department of Homeland Security's E-Verify Systems to verify the employment eligibility of all persons employed during the term of the contract to perform employment duties within the State of Florida and all persons, including subcontractors, assigned by the contractor to perform work pursuant to the contract.

I-1.16 GENERAL PROVISIONS; G-2.02 Copies Furnished to Contractor: Replace the first paragraph with the following:

The Contractor shall acquire for its use copies of the plans and specifications as needed. The documents may be downloaded from the City's web site, at
http://www.tampagov.net/dept_contract_administration/programs_and_services/construction_project_bidding/index.asp

I-1.17 PAYMENT DISPUTE RESOLUTION

Any dispute pertaining to pay requests must be presented to the City pursuant to Executive Order 2003-1.

I-1.18 SCRUTINIZED COMPANIES.

For Contracts $1,000,000 and greater, if the City determines the Contractor submitted a false certification under Section 287.135(5) of the Florida Statutes, or if the Contractor has been placed on the Scrutinized Companies with Activities in the Sudan List or the Scrutinized Companies with Activities in the Iran Petroleum Energy Sector List, the City shall either terminate the Contract after it has given the Contractor notice and an opportunity to demonstrate the City's determination of false certification was in error pursuant to Section 287.135(5)(a) of the Florida Statutes, or maintain the Contract if the conditions of Section 287.135(4) of the Florida Statutes are met.

I-1.19 FLORIDA'S PUBLIC RECORDS LAW

4.33.3 The City of Tampa is a public agency subject to Chapter 119, Florida Statutes. In accordance with Florida Statutes, 119.0701, if applicable, Contractor shall comply with Florida's Public Records Law. Specifically, the Contractor shall:

1. Keep and maintain public records that ordinarily and necessarily would be required by the City in order to perform the service;

2. Provide the public with access to such public records on the same terms and conditions that the City would provide the records and at a cost that does not exceed that provided in Chapter 119, Florida Statutes, or as otherwise provided by law;

3. Ensure that public records that are exempt or that are confidential and exempt from public record requirements are not disclosed except as authorized by law;

4. Meet all requirements for retaining public records and transfer to the City, at no cost, all public records in possession of the contractor upon termination of the contract and destroy any duplicate public records that are exempt or confidential and exempt. All records stored electronically must be provided to the City in a format that is compatible with the information technology systems of the agency.

4.33.4 The failure of Contractor to comply with the provisions set forth in this Article shall constitute a Default and Breach of this award and the City shall enforce the Default in accordance with the provisions set forth in the DEFAULT/RE-AWARD section of this document.

SECTION 2
GENERAL INSTRUCTIONS

I-2.01 BIDDER'S RESPONSIBILITY

Before submitting Proposals, Bidders shall carefully examine the entire site of the proposed work and adjacent premises and the various means of approach and access to the site, and make all necessary investigations to inform themselves thoroughly as to the facilities necessary for delivering, placing and operating the necessary construction equipment, and for delivering and handling materials at the site, and inform themselves thoroughly as to all difficulties involved in the completion of all the work in accordance with the Contract Documents.

Bidders must examine the Plans, Specifications, and other Contract Documents and shall exercise their own judgment as to the nature and amount of the whole of the work to be done, and for the bid prices must assume all risk of variance, by whomsoever made, in any computation or statement of amounts or quantities necessary to complete the work in strict compliance with the Contract Documents.

Elevations of the ground are shown on the Plans and are believed to be reasonably correct, but are not guaranteed to be absolutely so and are presented only as an approximation. Bidders shall satisfy themselves as to the correctness of all elevations.

The City may have acquired, for its own use, certain information relating to the character of materials, earth formations, probable profiles of the ground, conditions below ground, and water surfaces to be encountered at the site of the proposed work. This information, if it exists, is on file at the offices of the Department of Public Works and Bidders will be permitted to see and examine this information for whatever value they consider it worth. However, this information is not guaranteed, and Bidders should satisfy themselves by making borings or test pits, or by such other methods as they may prefer, as to the character, location, and amounts of water, peat, clay, sand, quicksand, gravel, boulders, conglomerate, rock, gas or other material to be encountered or work to be performed.

Various underground and overhead structures and utilities are shown on the plans. The location and dimensions of such structures and utilities, where given, are believed to be reasonably correct, but do not purport to be absolutely so. These structures and utilities are plotted on the Plans for the information of the Bidders, but information so given is not to be construed as a representation or assurance that such structures will be found or encountered as plotted, or that such information is complete or accurate.

I-2.02 FORM, PREPARATION AND PRESENTATION OF PROPOSALS

Each Proposal shall be submitted upon the Proposal Form and in accordance with the instructions included herein. The Proposal Form must not be detached herefrom. All blank spaces for bid prices must be filled in, in both words and figures, with the unit or lump sum prices, or both, for which the Proposal is made. The computed total price for each unit price Contract Item shall be determined by multiplying the estimated quantity of the item, as set forth in the Proposal Form, by the corresponding unit price bid for such item. The resulting product shall be entered in the appropriate blank space under the column headed "Computed Total Price for Item". The lump sum price bid for each lump sum price Contract Item shall also be entered in the column headed "Computed Total Price for Item". If a Proposal contains any omissions, erasures, alterations, additions, or items not called for in the itemized Proposal, or contains irregularities of any kind, such may constitute sufficient cause for rejection of the Proposal. In case of any discrepancy in the unit price or amount bid for any item in the Proposal, the price as expressed in written words will govern. In no case is the Agreement Form to be filled out or signed by the Bidder.

In the case of certain jobs bid Lump Sum a "Schedule of Unit Prices" must be filled out as an attachment to the Lump Sum proposal. These prices may be used as a guide for the negotiation of change orders, at the City's option.

The proposal must be signed and certified and be presented on the prescribed form in a sealed envelope on/or before the time and at the place stated in the Notice of Bidders, endorsed with the name of the person, firm or corporation presenting it, the date of presentation, and the title of the work for which the Proposal is made.

Unless the apparent low bidder is now engaged in or has recently completed contract work for the City of Tampa, he, if requested, shall furnish to the City, after the opening of bids and prior to award, a summary statement of record of construction experience over the past three (3) years with proper supporting evidence, and, if required by the City, shall also furnish a list of equipment and other facilities pertinent to and available for the proper execution of the proposed work, and a statement of financial resources to the extent necessary to establish ability to carry on the proposed work. The City may make further investigations as considered necessary with respect to responsibility of the Bidder to whom it appears may be awarded the Contract.

If forwarded by mail, the sealed envelope containing the Proposal, endorsed as directed above, must be enclosed in another envelope addressed as specified in the Notice to Bidders and sent by registered mail.

I-2.03 ADDENDA AND INTERPRETATIONS

No interpretation of the meaning of the Plans, Specifications, or other Contract Documents will be made to any Bidder orally.

Every request for such interpretation must be in writing, addressed to the Contract Administration Department, Tampa Municipal Office Building, 4th Floor North, City Hall Plaza, Tampa, Florida 33602. To be given consideration, such request must be received at least seven (7) days prior to the date fixed for the opening of the Proposals. Any and all such interpretations and any supplemental instructions will be in the form of written addenda which, if issued, will be sent by certified mail, with return receipt requested, to all prospective bidders at the respective addresses furnished, for such purposes, not later than three (3) working days prior to the date fixed for the opening of the Proposals, and if requested, a copy will be delivered to the prospective bidder's representative. Failure of any Bidder to receive any such addenda shall not relieve said Bidder from any obligation under his Proposal as submitted. All addenda so issued shall become part of the Contract Documents.

I-2.04 BID SECURITY

Each Proposal must be accompanied by a certified or cashier's check issued by a solvent bank or trust company and payable at sight to the City of Tampa, in compliance with Section 255.051 Florida Statutes, or a Bid Bond upon the form provided herein, in an amount of not less than five percent of the sum of the computed total amount of the Bidder's Proposal as a guarantee that if the Proposal is accepted, the Bidder will execute and fill in the proposed Contract and Public Construction Bond within twenty (20) days after notice of award of the Contract. Certified checks shall have all necessary documentary revenue stamps attached if required by law. Surety on Bid Bonds shall be a duly authorized surety company authorized to do business in the State of Florida, and all such Bonds shall be issued or countersigned by a local resident producing agent, and satisfactory evidence of the authority of the person or persons executing such Bond to Execute the same shall be submitted with the Bond. Bid Bonds shall be issued by a surety company acceptable to the City.

Within ten (10) days after the opening of Proposals, the bid security of all but the three lowest Bidders will be returned. The bid security of the remaining two Bidders whose Proposals are not accepted will be

returned within ten (10) days after the execution of the Contract, or, if no such Contract has been executed, within ninety (90) days after the date of opening Proposals. The bid security of the Bidder whose Proposal is accepted will be returned only after he has duly executed the Contract and furnished the required Public Construction Bond and insurance.

Should it be necessary for the City to retain the bid security and said bid security is in the form of checks, the checks of these Bidders will be returned if replaced by Bid Bonds in an amount equal to the amount of the checks of such Bidders in such form and issued by a surety company acceptable to the City.

A Bidder may withdraw his Proposal before the time fixed for the opening of Proposals, without prejudice to himself, by communicating his purpose, in writing, to the Mayor and City Council, and when his communication is received, the Proposal will be handed to him or his authorized agent unopened. No Bidder may withdraw his Proposal within ninety (90) days after the day of opening Proposals.

The Bidder whose Proposal is accepted shall enter into a written contract, upon the Agreement form included herein, for the performance of the work and furnish the required Public Construction Bond within twenty (20) days after written notice by the City of Award of Contract has been served on such Bidder personally or after receipt of the written notice by registered mail to such Bidder at the address given in his Proposal.

If the Bidder to whom a Contract is awarded refuses or neglects to execute it or fails to furnish the required Public Construction Bond within twenty (20) days after receipt by him of the Notice of Award of Contract, the amount of his bid security shall be forfeited and shall be retained by the City as liquidated damages, and not as a penalty, it being now agreed that said sum is a fair estimate of the amount of damages that the City will sustain in case said Bidder fails to enter into a Contract and furnish the required Public Construction Bond. If a Bid Bond was furnished, the full amount of the Bond shall become due and payable as liquidated damages caused by such failure. The full amount of the bid security shall be forfeited as liquidated damages without consideration of the fact that an award may be less than the full amount of the Bidder's Proposal, excepting that the award shall be within the conditions of said Proposal relating to the basis of consideration for an award. No plea of mistake in the bid or misunderstanding of the conditions of forfeiture shall be available to the Bidder for the recovery of his deposit or as a defense to any action based upon the neglect or refusal to execute a contract.

I-2.05 LAWS AND REGULATIONS
The Bidder who is awarded the Contract must comply with all laws of the State of Florida, and all applicable Ordinances of the City of Tampa respecting labor and compensation and with all other statutes, ordinances, rules and regulations applicable and having the force of law.

I-2.06 PUBLIC CONSTRUCTION BOND
The Bidder who is awarded the Contract will be required to furnish a Public Construction Bond upon the form provided herein, equal to 100 percent of the Contract price, such Bond to be executed by a surety company acceptable to the City of Tampa and licensed to underwrite contracts in the State of Florida. Surety companies shall have a rating of not less than: B+ Class VI as evaluated in the most recently circulated BEST'S KEY RATING GUIDE PROPERTY-LIABILITY.

I-2.07 SIGNATURE AND QUALIFICATIONS OF BIDDERS
Proposals must be signed in ink by the Bidder with signature in full. When a firm is a Bidder, the Proposal shall be signed in the name of the firm by one or more of the partners. When a corporation is a Bidder the officer signing shall set out the corporate name in full beneath which he shall sign his name and give the title of his office. The Proposal shall also bear the seal of the corporation attested by its secretary. Anyone signing the Proposal as agent must file with it legal evidence of his authority to do so.

Bidders who are nonresident corporations shall furnish to the City a duly certified copy of their permit to transact business in the State of Florida, signed by the Secretary of State, within ten days of the notice to do so. Such notice will be given to Bidders who are nonresident corporations, to whom it appears an award will be made, and the copy of the permit must be filed with the City before the award will be made. Failure to promptly submit this evidence of qualification to do business in the State of Florida may be basis for rejection of the Proposal.

I-2.08 REJECTION OF PROPOSALS
The City reserves the right to reject any Proposal if investigation of the Bidder fails to satisfy the City that such Bidder is properly qualified to carry out the obligations and to complete the work contemplated therein. Any or all Proposals will be rejected if there is reason to believe that collusion exists among Bidders. Proposals will be considered irregular and may be rejected if they show serious omissions, alterations in form, additions not called for, conditions or unauthorized alternates, or irregularities of any kind. The City reserves the right to reject any or all Proposals and to waive such technical errors as may be deemed best for the interests of the City.

I-2.09 QUANTITIES ESTIMATED ONLY
The estimate of quantities of the various items of work and materials, if set forth in the Proposal Form, is approximate only and is given solely to be used as a uniform basis for the comparison of Proposals. The quantities actually required to complete the Contract work may be less or more than so estimated, and if awarded a Contract for the work specified, the Contractor agrees that he will not make any claim for damages or for loss of profits because of a difference between the quantities of the various classes of work assumed for comparison of Proposals and quantities of work actually performed. The City further reserves the right to vary the quantities in any amount.

I-2.10 COMPARISON OF PROPOSALS
Except jobs bid on a "One Lump Sum" basis, proposals will be compared on the basis of a total computed price arrived at by taking the sum of the estimated quantity of each time and the corresponding unit price of each item, and including any lump sum prices on individual items.

The computed total prices for individual Contract Items and the total computed price for the entire Contract, as entered by the Bidder in the Proposal Form, are for convenience only and are subject to correction in the tabulation and computation of the Proposals.

I-2.11 BASIS OF AWARD
The Contract will be awarded, if at all, to the lowest responsible Bidder or Bidders, as determined by the City and by the terms and conditions of the Contract Documents. Unless all bids are rejected, the award will be made within ninety (90) days after the opening of Proposals. The successful Bidder will be required to possess, or obtain, a valid City Occupational License.

I-2.12 INSURANCE REQUIRED
The successful Bidder and his subcontractors will be required to procure and pay for insurance covering the work in accordance with the provisions of Article 6.02 of the Agreement as indicated on special instructions pages beginning with INS-1.

I-2.13 NO ASSIGNMENT OF BID
No Bidder shall assign his bid or any rights thereunder.

I-2.14 NONDISCRIMINATION IN EMPLOYMENT
Contracts for work under this Proposal will obligate the contractors and subcontractors not to discriminate in employment practices.

Bidders must, if requested, submit with their initial bid a signed statement as to whether they have previously performed work subject to the President's Executive Order Nos. 11246 and 11375.
Bidders must, if requested, submit a compliance report concerning their employment practices and policies in order to maintain their eligibility to receive the award of the Contract.

Successful Bidders must, if requested, submit a list of all subcontractors who will perform work on the project and written,

signed statement from authorized agents of the labor pools with which they will or may deal for employees on the work together with supporting information to the effect that said labor pools practices and policies are in conformity with Executive Order No. 11246 and that said labor pools will affirmatively cooperate in or offer no hindrance to the recruitment, employment and equal treatment of employees seeking employment and performing work under the Contract, or a certification as to what efforts have been made to secure such statements when such agents or labor pools have failed or refused to furnish them prior to the award of the Contract.

I-2.15 LABOR STANDARDS
The Bidder's attention is directed to the Contract Provisions of the Labor Standards for federally assisted projects which may be attached to and made a part of the Agreement.

I-2.16 NOTICE TO LABOR UNIONS
If applicable, the successful Bidder will be required to provide Labor Unions and other organizations of workers a completed copy of the form entitled "Notice to Labor Unions or Other Organizations of Workers", and such form may be made a part of the Agreement.

I-2.17 NOTICE TO PROSPECTIVE FEDERALLY-ASSISTED CONSTRUCTION CONTRACTORS
A Certification of Nonsegregated Facilities, as required by the May 9, 1967, Order (32 F.R. 7439, May 19, 1967) on Elimination of Segregated Facilities, by the Secretary of Labor, must be submitted to said Secretary prior to the award of a federally-assisted construction and Contract exceeding $10,000 which is not exempt from the provisions of the Equal Opportunity Clause. The form of certification may be bound herein following the form of Bid Bond.

Contractors receiving federally-assisted construction Contract awards exceeding $10,000 which are not exempt from the provisions of the Equal Opportunity Clause will be required to provide for the forwarding of the following notice to prospective subcontractor for supplies and construction contracts where the subcontracts exceed $10,000 and are not exempt from the provisions of the Equal Opportunity Clause:

NOTICE TO PROSPECTIVE SUBCONTRACTORS OF REQUIREMENT
FOR CERTIFICATIONS OF NONSEGREGATED FACILITIES

"A Certification of Nonsegregated Facilities, as required by the May 9, 1967, Order (32 F.R. 7439, May 19, 1967) on Elimination of Segregated Facilities, by the Secretary of Labor, must be submitted prior to the award of a subcontract exceeding $10,000 which is not exempt from the provisions of the Equal Opportunity Clause."

"Contractors receiving subcontract awards exceeding $10,000 which are not exempt from the provisions of the Equal Opportunity Clause will be required to provide from the forwarding of this notice to prospective subcontractors for supplies and construction contracts where the subcontracts exceed $10,000 and are not exempt from the provisions of the Equal Opportunity Clause."

The United States requires a pre-award conference if a proposed construction contract exceeds one million dollars to determine if the the prospective contractor is in compliance with the Equal Employment Opportunity requirements of Executive Order 11246 of September 24, 1965. In such instances, a meeting may be scheduled at which the prospective contractor must specify what affirmative action he has taken or proposed to take to assure equal employment opportunity which must be approved by the United States before award of the contract will be authorized.

Bidders must be prepared to submit an Equal Employment Opportunity (EEO) plan at a pre-award conference. The plan must include bidding opportunities offered by the Bidder to minority subcontractors.

On October 13, 1971, President Nixon issued Executive Order 11246 emphasizing the government's commitment to the promotion of minority business enterprise. Accordingly, the United States is firmly committed to the utilization of available resources to support this important program. U.S. agencies are most interested in realizing minority participation on the subject. Achieving equal employment opportunity compliance is required through Executive Order 11246. WE cannot emphasize too strongly that minority subcontractors be extended subcontractors bidding opportunities as but one step in your affirmative action policy.

Due to the importance of this contract, U.S. Agencies may conduct an EEO Conference prior to the award of the Contract. It is suggested that the responsive Bidder confirm the minority subcontractors he contacted for bids or quotations in his EEO plan submitted at the conference.

I-2.18 EEO AFFIRMATIVE ACTION REQUIREMENTS
By the submission of a Proposal, each Bidder acknowledges that he understands and will agree to be bound by the equal opportunity requirements of Federal regulations which shall be applicable throughout the performance of work under any contract awarded pursuant to solicitation. Each Bidder agrees that if awarded a contract, he will similarly bind contractually each subcontractor. In policies, each Bidder further understands and agrees that if awarded a contract, he must engage in Affirmative Action directed to promoting and ensuring equal employment opportunity in the work force used under the contract (and he must require contractually the same effort of all subcontractors whose subcontracts exceed $100,000). The Bidder understands and agrees that "Affirmative Action" as used herein shall constitute a good faith effort to achieve and maintain minority employment in each trade in the on-site work force used on the project. * * * * * * * END of SECTION * * * * * * *

CITY OF TAMPA INSURANCE REQUIREMENTS

During the life of the award/contract the Awardee/Contractor shall provide, pay for, and maintain insurance with companies authorized to do business in Florida, with an A.M. Best rating of B+ (or better) Class VII (or higher), or otherwise be acceptable to the City if not rated by A.M. Best. All insurance shall be from responsible companies duly authorized to do business in the State of Florida.

All commercial general liability insurance policies (and Excess or Umbrella Liability Insurance policies, if applicable) shall provide that the City is an additional insured as to the operations of the Awardee/Contractor under the award/contract including the additional insured endorsement, the subrogation wavier endorsement, and the Severability of Interest Provision. In lieu of the additional named insured requirement, if the Awardee/Contractor's company has a declared existing policy which precludes it from including additional insureds, the City may permit the Contractor to purchase an Owners and Contractors Protective Liability policy. Such policy shall be written in the name of the City at the same limit as is required for General Liability coverage. The policy shall be evidenced on an insurance binder which must be effective from the date of issue until such time as a policy is in existence and shall be submitted to the City in the manner described below as applicable to certificates of insurance.

The insurance coverages and limits required must be evidenced by a properly executed Acord 25 Certificate of Insurance form or its equivalent. Each Certificate must be personally manually signed by the Authorized Representative of the insurance company shown in the Certificate with proof that he/she is an authorized representative thereof. Thirty days' written notice must be given to the City of any cancellation, intent not to renew, or reduction in the policy coverages, except in the application of the aggregate liability limits provisions. Should any aggregate limit of liability coverage be reduced, it shall be immediately increased back to the limit required by the contract. The insurance coverages required herein are to be primary to any insurance carried by the City or any self-insurance program thereof.

The following coverages are required:

A. Commercial General Liability Insurance shall be provided on the most current Insurance Services Office (ISO) form or its equivalent. This coverage must be provided to cover liability arising from premises and operations, independent contractors, products and completed operations, personal and advertising injury, contractual liability, and XCU exposures (if applicable). Completed operations liability coverage shall be maintained for a minimum of one-year following completion of work. The amount of Commercial General Liability insurance shall not be less than the amount specified.

(a) $1,000,000 per occurrence and a $2,000,000 general aggregate for projects valued at $2,000,000 or less. General aggregate limit for projects over that price shall equal or exceed the price of the project. An Excess or Umbrella Liability insurance policy can be provided to meet the required limit. Risk Management may be contacted for additional information regarding projects of this nature.

B. Automobile Liability Insurance shall be maintained in accordance with the laws of the State of Florida, as to the ownership, maintenance, and use of all owned, non-owned, leased, or hired vehicles. The amount of Automobile Liability Insurance shall not be less than the amount specified.

(a) $500,000 combined single limit each occurrence bodily injury & property damage- for projects valued at $100,000 and under

(b) $1,000,000 combined single limit each occurrence bodily injury & property damage – for projects valued over $100,000

C. Worker's Compensation and Employer's Liability Insurance shall be provided for all employees engaged in the work under the contract, in accordance with the Florida Statutory Requirements. The amount of the Employer's Liability Insurance shall not be less than:

(a) $500,000 bodily injury by accident and each accident, bodily injury by disease policy limit, and bodily injury by disease each employee – for projects valued at $100,00 and under
(b) $1,000,000 bodily injury by accident and each accident, bodily injury by disease policy limit, and bodily injury by disease each –for projects valued over $100,000

D. Excess Liability Insurance or Umbrella Liability Insurance may compensate for a deficiency in general liability, automobile, or worker's compensation insurance coverage limits. If the Excess or Umbrella policy is being provided as proof of coverage, it must name the City of Tampa as an additional insured **(IF APPLICABLE).**

E. Builder's Risk Insurance, specialized policy designed to cover the property loss exposures that are associated with construction of buildings. The amount of coverage should not be less than the amount of the project. **(IF APPLICABLE).**

F. Installation Floater- a builder's risk type policy that covers specific type of property during its installation, is coverage required for highly valued equipment or materials such as compressors, generators, or other machinery that are not covered by the builder's risk policy **(IF APPLICABLE).**

G. Longshoreman's & Harbor Worker's Compensation Act/Jones Act coverage shall be maintained for work being conducted upon navigable water of the United States. The limit required shall be the same limit as the worker's compensation/employer's liability insurance limit **(IF APPLICABLE).**

H. Professional Liability shall be maintained against claims of negligence, errors, mistakes, or omissions in the performance of the services to be performed and furnished by the Awardee/Contractor or any of its subcontractors when it acts as a DESIGN PROFESSIONAL. The amount of coverage shall be no less than amount specified **(IF APPLICABLE).**

(a) $1,000,000 per incident and general aggregate. Note all claims made policies must provide the date of retroactive coverage.

The City may waive any or all of the above referenced insurance requirements based on the specific nature of goods or services to be provided under the award/contract.

ADDITIONAL INSURED - The City must be included as an additional insured by on the general and (Excess or Umbrella liability policies) if applicable. Alternatively, the Contractor may purchase a separate owners protective liability policy in the name of the City in the specified amount as indicated in the insurance requirements.

CLAIMS MADE POLICIES - If any liability insurance is issued on a claims made form, Contractor agrees to maintain uninterrupted coverage for a minimum of one year following completion and acceptance of the work either through purchase of an extended reporting provision, or through purchase of successive renewals with a retroactive date not later than the beginning of performance of work for the City. The retroactive date must be provided for all claims made policies.

CANCELLATION/NON-RENEWAL - Thirty (30) days written notice must be given to the City of any cancellation, intent to non-renew or material reduction in coverages (except aggregate liability limits). However, ten (10) days notice may be given for non-payment of premium. Notice shall be sent to the City of Tampa Department of Public Works, 306 E. Jackson Street, Tampa, FL 33602.

NUMBER OF POLICIES - General and other liability insurance may be arranged under single policies for the full amounts required or by a combination of underlying policies with the balance provided by an excess or umbrella liability insurance policy.

WAIVER OF SUBROGATION - Contractor waives all rights against City, its agents, officers, directors and employees for recovery of damages to the extent such damage is covered under the automobile or excess liability policies.

SUBCONTRACTORS - It is the Contractor's responsibility to require all subcontractors to maintain adequate insurance coverage.

PRIMARY POLICIES - The Contractor's insurance is primary to the City's insurance or any self insurance program thereof.

RATING - All insurers shall be authorized to do business in Florida, and shall have an A.M. Best rating of B+ (or better), Class VII (or higher), or otherwise be acceptable to the City if not rated by A.M. Best.

DEDUCTIBLES - The Contractor is responsible for all deductibles. In the event of loss which would have been covered but for the presence of a deductible, the City may withhold from payment to Contractor an amount equal to the deductible to cover such loss should full recovery not be obtained under the insurance policy.

INSURANCE ADJUSTMENTS - These insurance requirements may be increased, reduced, or waived at the City's sole option with an appropriate adjustment to the Contract price.

Document updated on 12/22/2009 by RLD (Risk Management)

SOLICITATION FOR SUBCONTRACTOR QUOTES

From:
OUR COMPANY NAME:
TELEPHONE NUMBER:
ADDRESS:
FAX NUMBER:
E-MAIL ADDRESS:

To Subcontractor:

Our firm is in the process of preparing a bid for a **City of Tampa Contract**. Please accept this notice as our request for quotes for the scope of work identified below. Please respond to this request by filling in the information below and returning via e-mail or fax to the address or number provided. Please contact us if you need any assistance in obtaining bonding, lines of credit, insurance, assistance in obtaining necessary equipment, supplies, materials, participation in a City-sponsored mentor-protégé program, or if you have any questions.

Plans and Specs for this project are posted at:
http://www.tampagov.net/dept_contract_administration/programs_and_services/construction_project_bidding/

CONTRACT NO.:
CONTRACT NAME:
CITY'S BID OPENING DATE:
DEADLINE FOR YOUR SUBCONTRACTOR BID OR RESPONSE:
SPECIFIC SCOPE OF WORK:

Please complete and submit with your subcontract bid or response:
YOUR FIRM'S NAME:
MAILING ADDRESS:
CITY:
STATE:
ZIP:
FAX NUMBER:
E-MAIL ADDRESS:
__Yes, my company is interested in quoting this project for the following items of work:

__No, my company will not quote this project for the following reason(s):

(Sample Suggested Sub Solicitation 3-9-9 Tampa MBDO)

PROPOSAL

To the Mayor and City Council of the City of Tampa, Florida:

Name of Bidder _____

_____
Business Phone Number and Email Address

_____
Business Name and Mailing Address

_____
Phone Number and Name of Contact Regarding Permits

_____
Contractor/Qualifiers Name and Federal Identification Number

Date of Proposal _____

(If Bidder is a firm, fill in the following blanks):

Names and Residential Addresses of Partners

_____

_____

(If Bidder is a corporation, fill in the following blanks):

Organized under the laws of the State of _____

Names and Address of President

_____

_____

Name and Address of Vice President

_____

_____

Name and Address of Secretary

_____

_____

Names and Address of Treasurer

_____

_____

The above-named Bidder affirms and declares:

(1) That the Bidder is of lawful age and that no other person, firm or corporation has any interest in this Proposal or in the Contract proposed to be entered into.

(2) That this Proposal is made without any understanding, agreement or connection with any other person, firm, or corporation making Proposal for the same purposes, and is in all respects fair and without collusion or fraud.

(3) That the Bidder is not in arrears to the City of Tampa, upon debt or contract, and is not a defaulter, as surety or otherwise, upon any obligation to the City of Tampa.

(4) That no officer or employee or person whose salary is payable in whole or in part from the City Treasury is, shall be or become interested, directly or indirectly, as a contracting party, partner, stockholder, surety or otherwise, in this Proposal, or in the performance of the Contract, or in the supplies, materials, or equipment and work or labor to which it relates, or in any portion of the profits thereof.

(5) That the Bidder has carefully examined the site of the work and that, from his own investigations, he has satisfied himself as to the nature and location of the work, the character, quality, and quantity of materials and the kinds and extent of equipment and other facilities needed for the performance of the work, the general and local conditions and all difficulties to be encountered, and all other items which may, in any way, affect the work or its performance.

(6) That the Bidder

_____ Has; Treasury Number _____

_____ Has not
(Check applicable box)

previously performed work under the President's Executive Order Nos. 11246 and 11375.

(7) That the undersigned, as Bidder, also declares that he has carefully examined and fully understands all the component parts of the Contract Documents and agrees that he will execute the Contract and finish the required Performance Bond and will completely perform the work in strict accordance with the terms of the Contract and the Contract Documents therein referred to for the following prices, to wit:

Contract Item No.	Estimated Quantity	Description and Price in Words	Computed Total Price for Item in Figures
BASE BID	LS	The work includes the furnishing of all labor, equipment, and material for the upgrading of the existing house and performance stage lighting, upgrading of electrical service, replacement of the existing emergency generator and installation of temporary stage connections, any allowances that may be listed in Section 01020, and with all associated work required for a complete project in accordance with the Contract Documents. _____ _____ dollars and _____ cents (BASE BID) LS	$_____
ALTERNATE NO. 1	LS	The work includes the furnishing of all labor, equipment, and material to install new LED performance stage lighting and digital controls with control points in the booth and on the stage, with all associated work required for a complete project, as shown and indicated but not limited to Sheets TEG01, TEG02, TEG03, TEG04, TEG05, TPL01, TPL02, TPR01, with all associated work required for a complete project in accordance with the Contract Documents. _____ _____ dollars and _____ cents (ADDITIVE) LS	$_____
(ADDITIVE)			

Contract Item No.	Estimated Quantity	Description and Price in Words	Computed Total Price for Item in Figures
ALTERNATE	LS	The work includes the furnishing of all labor, equipment, and material for new house lighting for auditorium including decorative fixtures (i.e., cave stars, cloud & décor), with all associated work required for a complete project, as shown and indicated but not limited to Sheets E1.1, E1.2, E1.3, E1.4, E2.1, E2.2, E2.3, E2.4, E3.2 and E4.0, with all associated work required for a complete project in accordance with the Contract Documents.	
(ADDITIVE)		_____	
		_____ dollars	
		and _____ cents	
		(ADDITIVE) LS $_____	

Computed Total Price In Words:

_____

_____ dollars and _____ cents.

Computed Total Price in Figures: $_____

The bidder acknowledges that the following addenda have been received and that the changes covered by the addendum(s) have been taken into account in this proposal: #1 ___ #2 ___ #3 ___ #4___ #5___.

The bidder acknowledges the requirements of the City of Tampa's Equal Business Opportunity Program.

Bidder acknowledges that included in the various items of the proposal and the Total Bid Price are costs for complying with the Florida Trench Safety Act (90096), (Laws of Fla.) effective October 1, 1990. The bidder further identifies the costs to be summarized below:

	Trench Safety Measure (Description)	Unit of Measure (LF, SY)	Unit Quantity	Unit Cost	Extended Cost
A.	_____	_____	_____	_____	_____
B.	_____	_____	_____	_____	_____
C.	_____	_____	_____	_____	_____
D.	_____	_____	_____	_____	_____

Total Cost $_____

Signed _____

Failure to complete the above may result in the bid being declared non-responsive.

Accompanying this Proposal is a certified check, cashier's check or Bid Bond (form included herein must be used) on the form at least five (5) percent of the total amount of the Proposal which check shall become the property of the

_____ of _____
(Name of Bank or Surety) (City & State)

City of Tampa, or which bond shall become forthwith due and payable to the City of Tampa, if this Proposal shall be accepted by the City of Tampa and the undersigned shall fail to execute a contract with and to furnish the required Performance Bond and Payment Bond to the City of Tampa within twenty (20) days after the date of receipt of written Notice of Award by the City of Tampa to the undersigned so to do.

Dated _____, 20___

_____
(Name of Bidder)

_____
(Address of Bidder)

_____
(Signature)

_____
(Title)

Where Bidder is a Corporation:

Attest:

_____
Secretary

AFFIX
CORPORATE
SEAL

(ACKNOWLEDGMENT OF PRINCIPAL)

STATE OF)
) SS:
COUNTY OF)

For a Corporation:

STATE OF _____
COUNTY OF _____

The foregoing instrument was acknowledged before me this ___ of _____, 20___ by _____ of _____, a _____ corporation, on behalf of the corporation. He/she is ___ personally known or has ___ produced _____ as identification.

_____
Notary

My Commission Expires:

_____

For an Individual:

STATE OF _____
COUNTY OF _____

The foregoing instrument was acknowledged before me this ___ of _____, 20___ by _____ who is ___ personally known to me or has ___ produced _____ as identification.

_____
Notary

My Commission Expires:

_____

For a Firm:

STATE OF _____
COUNTY OF _____

The foregoing instrument was acknowledged before me this ___ of _____, 20___ by _____ who signed on behalf of the said firm. He/she is ___ personally known or has ___ produced _____ as identification.

_____
Notary

My Commission Expires:

_____

_____

Good Faith Effort Compliance Plan for Small Local Business Subcontracting

City of Tampa - Equal Business Opportunity Program

Contract _____ **Bid Date** _____

Bidder _____

Signature _____ **Date** _____

Name _____ **Title** _____

The following Compliance Plan is a true report of Good Faith Efforts made to accomplish subcontracting goals for Small Local Business Enterprises, SLBEs, on the referenced contract:

□ **The goal for SLBE participation has been met or exceeded. See the DMI form reporting subcontractors to be utilized.**
(Check Box, if appropriate; the remainder of the Compliance Plan need not be reported.)

□ **The goal for SLBE participation has not been met. The following is a recap of Good Faith Efforts made:**
(Check applicable boxes below. Enclose additional documents, and/or add remarks below as needed.)

(1) Soliciting through reasonable and available means the interest of SLBEs that have the capability to perform the work of the contract. The Bidder or Contractor must solicit this interest within sufficient time to allow the SLBEs to respond. The Bidder or Contractor must take appropriate steps to follow up initial solicitations with interested SLBEs. □ See DMI report forms for subcontractors solicited. □ See enclosed supplemental data on solicitation efforts. □ Remarks:

(2) Providing interested SLBEs with adequate information about the plans, specifications, and requirements of the contract, including addenda, in a timely manner to assist them in responding to the solicitation. □ See enclosed sample solicitation. □ Remarks:

(3) Negotiating in good faith with interested SLBEs that have submitted bids. Documentation of negotiation must include the names, addresses, and telephone numbers of SLBEs that were solicited; the date of each such solicitation; a description of the information provided regarding the plans and specifications for the work selected for subcontracting; and evidence as to why agreements could not be reached with SLBEs to perform the work. That there may be some additional costs involved in soliciting and using SLBEs is not a sufficient reason for a contractor's failure to meet the goals, as long as such costs are reasonable. Bidders are not required to accept higher quotes in order to meet the goal. □ DMI subcontractor-utilized forms reflect successful negotiations □ This project is of a low-bid nature and negotiations are limited to clarifications of scope and specifications. □ See enclosed document. □ Remarks:

(4) Not rejecting SLBEs as being unqualified without sound reasons based on a thorough investigation of their capabilities. The SLBEs standing within its industry, membership in specific groups, organizations, or associations and political or social affiliations are not legitimate causes for rejecting or not soliciting bids to meet the goals. □ Not applicable. □ See attached explanation for rejection of a low-bidding subcontractor's bid. □ Remarks:

(5) Making a portion of the work available to SLBE subcontractors and suppliers and to select those portions of the work or material consistent with the available SLBE subcontractors and suppliers, so as to facilitate meeting the goal. □ Sub-Contractors were allowed to bid on their own choice of work or trade without restriction to a pre-determined portion. □ See enclosed comments. □ Remarks:

(6) Making good faith efforts, despite the ability or desire of a Bidder or Contractor to perform the work of a contract with its own organization. A Bidder or Contractor who desires to self-perform the work of a contract must demonstrate good faith efforts unless the goal has been met. □ Sub-Contractors were not prohibited from submitting bids on work not usually sub-contracted. □ Remarks:

(7) Selecting portions of the work to be performed by SLBEs in order to increase the likelihood that the goals will be met. This includes, where appropriate, breaking out contract work items into economically feasible units to facilitate SLBE participation, even when the Bidder or Contractor might otherwise prefer to perform these work items with its own forces. □ Sub-Contractors were allowed to bid on their own choice of work or trade without restriction to a pre-determined portion. □ Sub-Contractors were not prohibited from submitting bids on work not usually sub-contracted. □ See enclosed comments. □ Remarks:

(8) Making efforts to assist interested SLBEs in obtaining bonding, lines of credit, or insurance as required by the city or contractor. □ See enclosed sample solicitation □ see enclosed document. □ Remarks:

(9) Making efforts to assist interested SLBEs in obtaining necessary equipment, supplies, materials, or related assistance or services, including participation in a City-sponsored mentor-protégé program. □ See enclosed sample solicitation. □ See enclosed document. □ Remarks:

(10) Effectively using the services of the City and other organizations that provide assistance in the recruitment and placement of SLBEs. □ See enclosed document. □ The following services were used:

Other Supporting Good Faith Efforts: □ See enclosed document. □ Remarks:

Compliance Plan: Guidance For Meeting Good Faith Efforts

1. All firms on the SLBE Goal Setting List must be solicited and documentation provided for email, fax, letters, phone calls, and other communication with the listed firms. The DMI Solicited and DMI-Utilized forms must be completed for all firms solicited or utilized. Other opportunities for subcontracting may be explored by consulting the City of Tampa and/or Hillsborough County certification listings of SLBE's.

2. Solicitation of SLBEs, via written or electronic notification, should provide specific information on the services needed, where plans can be reviewed and assistance offered in obtaining these, if required. Solicitations should be typically be sent a week or more before the bid date. Sample copies of the bidder's solicitations should be provided.

3. With any quotes received, a follow-up should be made whenever needed to confirm scope of work. For any SLBE low quotes rejected, an explanation should be provided detailing negotiation efforts.

4. If a low bid SLBE is rejected or deemed unqualified the contractor must provide an explanation and supporting documentation for this decision.

5. Prime should break down portions of work into economical feasible opportunities for subcontracting. The SLBE directory can be useful in identifying additional subcontracting opportunities and firms not listed in the "SLBE Goal Setting Firms List."

6. Contractor should not preclude SLBEs from bidding on any part of work, even if the Contractor can self-perform the work.

7. Contractor should avoid relying solely on subcontracting out work where availability is not sufficient to attain pre-determined goal.

8. In its solicitations, the Bidder should offer assistance to SLBEs in obtaining bonding, insurance, etc, if required of subcontractors by the City or Prime Contractor.

9. In its solicitation, the Bidder should offer assistance in obtaining equipment for a specific job to SLBEs, if needed.

10. Contractor should use the services offered by such agencies as the Minority Business Development Office of the City of Tampa, Hillsborough County and the NAACP Empowerment Center for the recruitment and placement of SLBEs.

City of Tampa –DMI -Schedule of All Sub-(Contractors/Consultants/Suppliers) Solicited

(FORM MBD-10)

Contract No.:_____ Contract Name:_____

Contractor Name:_____ Address:_____

Federal ID:_____Phone:_____ Fax:_____ Email:_____

[] No Firms were contacted/solicited for this contract.

[] No Firms were contacted because:_____

[] See attached documents with supplemental information.

NIGP Code General Categories: Buildings = 909, General = 912, Heavy = 913, Trades = 914, Architects = 906, Engineers & Surveyors = 925, Supplier = 912-77

This DMI Schedule Must Be Submitted with the Bid or Proposal (Do Not Modify This Form)

S = SLBE W=WMBE Federal ID	Company Name Address Phone & Fax	Type of Ownership (F=Female M=Male) BF BM = African Am. HF HM = Hispanic Am. AF AM = Asian Am. NF NM = Native Am. CF CM = Caucasian	Trade or Services NIGP Code (listed above)	Contact Method L=Letter F=Fax E=Email P=Phone	Quote or Resp. Rec'd Y/N

It is hereby certified that the information provided is an accurate and true account of contacts and solicitations for sub – contracting opportunitieson this contract. ***This form must be completed and submitted with the bid or proposal***.Modifying or failing to sign DMI forms may result in Non-Compliance and/or deemed non-responsive.

Signed:_____ Name/Title:_____ Date:_____

Note: Detailed Instructions for completing this form are on the next page

Instructions for completing The Sub-(Contractors/Consultants/ Suppliers) Solicited Form (Form MBD-10)

This form must be submitted with all bids or proposals. All subcontractors (regardless of ownership or size) solicited and subcontractors from whom unsolicited quotations were received must be included on this form. The instructions that follow correspond to the headings on the form required to be completed.Note: Ability or desire to self-perform all work shall not exempt the prime from Good Faith Efforts when Goal has been established.

- **Contract No.** This is the number assigned by the City of Tampa for the bid or proposal.
- **Contract Name.** This is the name of the contract assigned by the City of Tampa for the bid or proposal.
- **Contractor Name.** The name of your business.
- **Address.** The physical address of your business.
- **Federal ID.**FIN. A number assigned to your business for tax reporting purposes.
- **Phone.** Telephone number to contact business.
- **Fax.** Fax number for business.
- **Email.** Provide email address for electronic correspondence.
- **No Firms were contacted/solicited for this contract.** Checking the box indicates that a pre-determined Subcontract Goal was not set by the City resulting in your business not using subcontractors and will self-perform all work. If during the performance of the contract you employ subcontractors, the City must pre-approve subcontractors. Use of the "Sub-(Contractors/Consultants/Suppliers) Payments" form must be submitted with your invoices. Note: Certified SLBE or WMBE firms bidding as Primes are not exempt from outreach and solicitation of subcontractors.
- **No Firms were contacted because.** Provide brief explanation why no firms were contacted/solicited.
- **See attached documents.**Check box, if after you have completed the DMI Form in its entirety, you are providing any additional documentation relating to the form.All DMI data not submitted on the MBD Form-10 must be in the same format and have all requested data from MBD Form-10 included.

The following instructions are for information of any and all subcontractors solicited.

- **"S" = SLBE, "W" = WMBE.** Enter "**S**" for firms Certified by the City as Small Local Business Enterprises and/or "**W**" for firms Certified by the City as Women/Minority Business Enterprise.
- **Federal ID.**FIN. A number assigned to a business for tax reporting purposes. This information is critical in proper identification of the subcontractor.
- **Company Name, Address, Phone & Fax**. Provide company information for verification of payments.
- **Type of Ownership.** Indicate the Ethnicity and Gender of the owner of the subcontracting business.
- **Trade, Services, or Materials** Indicate the trade, service, or material provided by the subcontractor. NIGP codes are listed at top section of document.
- **Contact Method L=letter, F=fax, E=Email, P=Phone.** Indicate with letter the method of soliciting for bid.
- **Quote or Resp. (response) Rec'd (received) Y/N**. Indicate "Y" Yes if you received a quotation or if you received a response to your solicitation. Indicate "N" No if you received no response to your solicitation from the subcontractor.

If any additional information is required or you have any questions, you may call the Minority Business Development Office at (813) 274-5522.

City of Tampa –DMI Schedule of Sub-(Contractors/Consultants/Suppliers) to be Utilized

(FORM MBD-20)

Contract No.:_____ Contract Name:_____

Contractor Name:_____ Address:_____

Federal ID:_____Phone:_____ Fax:_____ Email:_____

[ ] See attached documents.

[ ] No Subcontracting (of any kind) will be performed on this contract.

NIGP Code General Categories: Buildings = 909, General = 912, Heavy = 913, Trades = 914, Architects = 906, Engineers & Surveyors = 925, Supplier = 912-77

This DMI Schedule Must Be Submitted with the Bid or Proposal (Do Not Modify This Form)

Enter "S" for firms Certified as Small Local Business Enterprises, "W" for firms Certified as Women/Minority Business Enterprise

S = SLBE W=WMBE Federal ID	Company Name Address Phone & Fax	Type of Ownership (F=Female M=Male) BF BM = African Am. HF HM = Hispanic Am. AF AM = Asian Am. NF NM = Native Am. CF CM = Caucasian	Trade, Services, or Materials NIGP Code Listed above	Amount of Quote. Letter of Intent if available.	Percent of Scope/Contract %

Total Subcontract/Supplier Utilization $_____

Total SLBE Utilization $ _____

Total WMBE Utilization $ _____

Percent SLBE Utilization of Total Bid/Proposal Amt. _____% Percent WMBE Utilization of Total Bid/Proposal Amt. _____%

It is hereby certified that the following information is a true and accurate account of utilization for sub-contracting opportunities on this contract. ***This form must be completed and submitted with the bid or proposal.*** Modifying or failing to sign DMI forms may result in Non-Complianceand/or deemed non-responsive.

Signed:_____ Name/Title:_____ Date:_____

Note: Detailed Instructions for completing this form are on the next page.

Instructions for completing The Sub-(Contractors/Consultants/ Suppliers) to be Utilized Form

(Form MBD-20)

This form must be submitted with all bids or proposals. All subcontractors projected to be utilized must be included on this form.

- **Contract No.** This is the number assigned by the City of Tampa for the bid or proposal.
- **Contract Name.** This is the name of the contract assigned by the City of Tampa for the bid or proposal.
- **Contractor Name.** The name of your business.
- **Address.** The physical address of your business.
- **Federal ID.**FIN. A number assigned to your business for tax reporting purposes.
- **Phone.** Telephone number to contact business.
- **Fax.** Fax number for business.
- **Email.** Provide email address for electronic correspondence.
- **No Subcontracting (of any kind) will be performed on this contract.** Checking box indicates your business will not use subcontractors when no Subcontract Goal has been set by the City, but will self-perform all work. When subcontractors are utilized during the performance of the contract, the "Sub-(Contractors/Consultants/Suppliers) Payments" form must be submitted with your invoices. Note: Certified SLBE or WMBE firms bidding as Primes are not exempt from outreach and solicitation of subcontractors.
- **See attached documents.** Check if you have provided any additional documentation relating to the utilization of subcontractors.
-

The following instructions are for information of Any and All subcontractors to be utilized.

- **Federal ID.**FIN. A number assigned to a business for tax reporting purposes. This information is critical in proper identification of the subcontractor.
- **"S" = SLBE, "W" = WMBE.** Enter "**S**" for firms Certified by the City as Small Local Business Enterprises and/or "**W**" for firms Certified by the City as Women/Minority Business Enterprise.
- **Company Name, Address, Phone & Fax**. Provide company information for verification of payments.
- **Type of Ownership.** Indicate the Ethnicity and Gender of the owner of the subcontracting business.
- **Trade, Services, or Materials (NIGP code if Known)** Indicate the trade, service, or material provided by the subcontractor. NIGP codes are available at http:/www.tampagov.net/mbd.
- **Amount of Quote, Letters of Intent** (required for both SLBEs and WMBEs)
- **Percent of Work/Contract.** Indicate the percent of the total contract price the subcontract(s) represent.
- **Total Subcontract/Supplier Utilization.** – Provide total dollar amount of all subcontractors/suppliers projected to be used for the contract. (Dollar amounts may not apply to CCNA proposals.)
- **Total SLBE Utilization.** Provide total dollar amount for all projected SLBE subcontractors/Suppliers used for this contract. (Dollar amounts may not apply to CCNA proposals.)
- **Total WMBE Utilization.** Provide total dollar amount for all projected WMBE subcontractors/Suppliers used for this contract. (Dollar amounts may not apply to CCNA proposals.)
- **Percent SLBE Utilization.** Total amount allocated to SLBEs divided by the total bid amount. (Dollar amounts may not apply to CCNA proposals.)
- **Percent WMBE Utilization.** Total amount allocated to WMBEs divided by the total bid/proposal amount. (Dollar amounts may not apply to CCNA proposals.)

If any additional information is required or you have any questions, you may call the Minority Business Development Office at (813) 274-5522.

TAMPA BID BOND
Contract 14-C-00046; Tampa Theatre Electrical Improvements

KNOW ALL MEN BY THESE PRESENTS, that we, _____

_____

(hereinafter called the Principal) and _____

(hereinafter called the Surety) a Corporation chartered and existing under the laws of the State of _____, with its principal offices in the City of _____, and authorized to do business in the State of Florida, are held and firmly bound unto the City of Tampa, a Municipal Corporation of Hillsborough County, Florida, in the full and just sum of 5% of the amount of the (Bid) (Proposal) good and lawful money of the United States of America, to be paid upon demand of the City of Tampa, Florida, to which payment will and truly to be made we bind ourselves, our heirs, executors, administrators, successors, and assigns, jointly and severally and firmly these presents.

WHEREAS, the Principal is about to submit, or has submitted to the City of Tampa, Florida, a Proposal for the construction of certain facilities for the City designated Contract 14-C-00046, Tampa Theatre Electrical Improvements.

WHEREAS, the Principal desires to file this Bond in accordance with law, in lieu of a certified Bidder's check otherwise required to accompany this Proposal.

NOW, THEREFORE: The conditions of this obligation are such that if the Proposal be accepted, the Principal shall, within twenty (20) days after the date of receipt of written Notice of Award, execute a contract in accordance with the Proposal and upon the terms, conditions and price set forth therein, in the form and manner required by the City of Tampa, Florida and execute a sufficient and satisfactory Public Construction Bond payable to the City of Tampa, Florida in an amount of one hundred percent (100%) of the total contract price, in form and with security satisfactory to said City, then this Bid Bond obligation is to be void; otherwise to be and remain in full force and virtue in law, and the Surety shall, upon failure of the Principal to comply with any or all of the foregoing requirements within the time specified above, immediately pay to the aforesaid City, upon demand, the amount thereof, in good and lawful money of the United States of America, not as a penalty, but as liquidated damages.

IN TESTIMONY THEREOF, the Principal and Surety have caused these presents to be duly signed and sealed this _____ day of _____, 20___.

Principal _____

BY _____

TITLE _____

BY _____

TITLE _____

(SEAL)

_____
Producing Agent

_____
Producing Agent's Address

_____
Name of Agency

_____
The addition of such phrases as "not to exceed" or like import shall render the (Bid) (Proposal)non-responsive.

AGREEMENT

For furnishing all labor, materials and equipment, together with all work incidental thereto, necessary and required for the performance of the work for the construction of Contract 14-C-00046 in accordance with your Proposal dated _____, amounting to a total of $_____ as completed in accordance with subsections I-2.09 and I-2.10 of the Instruction to Bidders.

THIS AGREEMENT, made and entered into in triplicate, this ____ day of _____, 20___, between the City of Tampa, Florida, hereinafter called the City, and hereinafter called the Contractor.

WITNESSETH that, in consideration of the mutual stipulations, agreements, and covenants herein contained, the parties hereto have agreed and hereby agree with each other, the Party of the First Part for itself, its successors and assigns, and the Party of the Second Part for itself, or himself, or themselves, and its successors and assigns, or his or their executors, administrators and assigns, as follows:

Contract 14-C-00046; Tampa Theatre Electrical Improvements, shall include, but not be limited to, upgrading of the existing house and performance stage lighting, upgrading of electrical service, replacement of the existing emergency generator and installation of temporary stage connections with all associated work required for a complete project in accordance with the Contract Documents.

Contract Documents referred to in Article 1.01 of this Agreement also includes this volume, applicable standard drawings, the plans and any provisions referred to whether actually attached or not.

TAMPA AGREEMENT

SECTION 1
GENERAL

ARTICLE 1.01 THE CONTRACT

Except for titles, subtitles, headings, running headlines, and tables of contents (all of which are printed herein merely for convenience), the following, except for such portions thereof as may be specifically excluded, constitute the Contract:

The Notice to Bidders;
The Instructions to Bidders, including Special Instructions and General Instructions;
The Proposal;
The Bid Bond;
The Certification of Nonsegregated Facilities;
The Notice of Award;
The Agreement;
The Performance Bond;
The Notice To Proceed;
The Specifications, including the General Provisions, the Workmanship and Materials, the Specific Provisions or the Contract Items
The Plans;
All Supplementary Drawings Issued after award of the Contract;
All Addenda issued by the City prior to the receipt of proposals;
All provisions required by law to be inserted in this Contract, whether actually inserted or not.

ARTICLE 1.02 DEFINITIONS

The following words and terms, or pronouns used in their stead, shall, wherever they appear in this Contract, be construed as follows, unless different meaning is clear from the context:

(a)"City" shall mean the City of Tampa, Florida, represented by its Mayor and City Council, Party of the First Part, or such other City official as shall be duly empowered to act for the City on matters relating to this Contract.

(b)"Contractor" shall mean the Party of the Second Part hereto, whether corporation, firm or individual, or any combination thereof, and its, their, or his successors, personal representatives, executors, administrators, and assigns, and any person, firm or corporation who or which shall at any time be substituted in the place of the Party of the Second Part under this Contract.

(c)"Engineer" shall mean the Director of the Department or his duly authorized representative.

(d)"Consultant" shall mean the engineering or architectural firm or individual employed by the City to consult with and advise the City in the construction of the project.

(e)"Surety" shall mean any person, firm or corporation that has executed as Surety the Contractor's Performance Bond securing the performance of this Contact.

(f)"The Work" shall mean everything expressly or implied required to be furnished and done by the Contractor under the Contract, and shall include both Contract Work and Extra Work.

(g)"Contract Work" shall mean everything expressly or implied required to be furnished and done by the Contractor by any one or more of the Contract parts referred to in Article 1.01 hereof, except Extra Work, as hereinafter defined; it being understood that, in case of any inconsistency in or between any part or parts of this Contract, the Engineer shall determine which shall prevail.

(h)"Contract" or "Contract Documents" shall mean each of the various part of the Contract referred to in Article 1.01 hereof, both as a whole and severally.

(i)"Extra Work" shall mean work other than that required either expressly or implied by the contract in its present form.

(j)"Plans" shall mean only those drawings specifically referred to as such in these documents, or in any Addendum. Drawings issued after the execution of the Contract to explain further, or to illustrate, or to show changes in the work, will be known as "Supplementary Drawings" and shall be binding upon the Contractor with the same force as the Plans.

(k)"Specifications" shall mean all of the directions, requirements, and standards of performance applying to the work, as hereinafter detailed and designated as such, or which may be issued in an addendum.

(l)"Addendum or Addenda" shall mean the additional contract provisions issued in writing prior to the receipt of bids.

(m)"Notice" shall mean written notice. Notice shall be served upon the Contractor, either personally or by leaving the said notice at his residence or with any employee found on the work, or addressed to the Contractor at the residence or place of business given in his proposal and deposited in a postpaid wrapper in any post office box regularly maintained by the United States Post Office.

(n)"Project" shall mean the entire improvement package or related work. The "project" may consist of several different, but related, contracts.

(o)"Site" shall mean, and be limited to, the area upon or in which the Contractor's operations are carried on and such other appropriate areas as may be designed as such by the Engineer.

(p)"Subcontractor" shall mean any person, firm, or corporation, other than employees of the Contractor, who or which contracts with the Contractor to furnish, or actually furnishes labor, or labor and materials, or labor and equipment or labor, materials, and equipment at the site.

(q)Whenever in the Contract the words "directed", "required", "permitted", "ordered", "designated", "prescribed", and words of like import are used, they shall imply the direction, requirement, permission, order, designation, or prescription of the Engineer; and "approved", "acceptable", "satisfactory", "in the judgement of", and words of like import shall mean approved by, or acceptable to, or satisfactory to, or in the judgment of the Engineer.

(r)Whenever in the Contract the word "day" is used, it shall mean calendar day.

(s)"Final Acceptance" shall mean acceptance of the

work as evidenced by an official resolution of the City. Such acceptance shall be deemed to have taken place only if and when an approving resolution has been adopted by the City Council. The final acceptance shall be signed only after the City has assured itself by tests, inspection, or otherwise, that all of the provisions of the Contract have been carried out to its satisfaction.

(t)"Eastern Standard Time" shall be construed as the time being observed in the City on the day proposals are received or other documents issued or signed.

SECTION 2
POWERS OF THE CITY'S REPRESENTATIVES

ARTICLE 2.01 THE ENGINEER

It is covenanted and agreed that the Engineer, in addition to those matters elsewhere herein expressly made subject to his determination, direction, or approval, shall have the power, subject to such express provisions and limitations herein contained as are not in conflict herewith, and subject to review by the Mayor and City Council:

(a)To monitor the performance of the work.

(b)To determine the amount, kind, quality, sequence, and location of the work to be paid for hereunder and, when completed, to measure such work for payment.

(c)To determine all questions of an engineering character in relation to the work, to interpret the Plans, Specifications and Addenda.

(d)To determine how the work of this Contract shall be coordinated with the work of other contractors engaged simultaneously on this project.

(e)To make minor changes in the work as he deems necessary, provided such changes do not result in a net increase in the cost to the City or to the Contractor of the work to be done under the Contract.

(f)To amplify the Plans, add explanatory information and furnish additional Specifications and Drawings consistent with the intent of the Contract Documents.

The power of the Engineer shall not be limited to the foregoing enumeration, for it is the intent of this Contract that all of the work shall be subject to his determinations and approval, except where the determination or approval of someone other than the Engineer is expressly called for herein and except as subject to review by the Mayor and City Council. All orders of the Engineer requiring the Contractor to perform work as Contract work shall be promptly obeyed by the Contractor.

The Engineer shall not, however, have the power to issue an extra work order, and the performance of such work on the order of the Engineer without previously obtaining written confirmation thereof from the Mayor in accordance with Article 7.02 hereof may constitute a waiver of any right to extra compensation therefor. The Contractor is warned that the Engineer has no power to change the terms and provisions of this Contract, except minor changes where such change results in no net increase in the Contract Price.

ARTICLE 2.02 DIRECTOR

The Director of the Department in addition to those matters expressly made subject to his determination, direction or approval in his capacity as "Engineer", shall also have the power:

(a)To review any and all questions in relation to this Contract and its performance, except as herein otherwise specifically provided, and his determination upon such review shall be final and conclusive upon the Contractor.

(b)With the approval of the Mayor and City Council to authorize modifications or changes in the Contract so as to require: (1) the performance of extra work, or (2) the omission of Contract work whenever he deems it in the interest of the City to do so, or both.

(c)To suspend the whole or any part of the work whenever, in his judgment, such suspension is required: (1) in the interest of the City generally, or (2) to coordinate the work of the various Contractors engaged on this project, or (3) to expedite the completion of the entire project, even though the completion of this particular Contract may be thereby delayed, <u>without compensation to the Contractor for such suspension other than extending the time for the completion of the work, as much as it may have been, in the opinion of the City, delayed by such a suspension.</u>

(d)If, before the final acceptance of all the work contemplated herein, it shall be deemed necessary to take over, use, occupy, or operate any part of the completed or partly completed work, the Engineer shall have the right to do so and the Contractor will not, in any way, interfere with or object to the use, occupation, or operation of such work by the City after receipt of notice in writing from the Engineer that such work or part thereof will be used by the City on and after the date specified in such notice. Such taking over, use, occupancy or operation of any part of the completed or partially completed work shall not constitute final acceptance or approval of any such part of the work.

ARTICLE 2.03 NO ESTOPPEL

The City shall not, nor shall any department, officer, agent, or employee thereof, be bound, precluded, or estopped by any determination, decision, acceptance, return, certificate, or payment made or given under or in connection with this Contract by any officer, agent or employee of the City at any time either before or after final completion and acceptance of the work and payment therefor: (a) from showing the true and correct classification, amount, quality, or character of the work done, or that any determination, decision, acceptance, return certificate or payment is untrue, incorrect or improperly made in any particular, or that the work or any part thereof does not in fact conform to the requirements of the Contract Documents, and (b) from demanding and recovering from the Contractor any overpayments made to him or such damages as it may sustain by reason his failure to comply with the requirements of the Contract of Documents, or both.

ARTICLE 2.04 NO WAIVER OF RIGHTS

Neither the inspection, nor any order, measurements or certificate of the City or its employees, officers, or agents, nor by any order of the City for payment of money, nor any money, nor payments for or acceptance of the whole or any part of the work by the City, nor any extension of time, nor any changes in the Contract, Specifications or Plans, nor any possession by the City or its employees shall operate as a

waiver of any provisions of this Contract, nor any power herein provided nor shall any waiver of any breach of this Contract be held as a waiver of any other subsequent breach.

Any remedy provided in this Contract shall be taken and construed as cumulative, namely, in addition to each and every other suit, action, or legal proceeding. The City shall be entitled as of right to an injunction against any breach of the provisions of this Contract.

SECTION 3
PERFORMANCE OF WORK

ARTICLE 3.01 CONTRACTOR'S RESPONSIBILITY
The Contractor shall do all the work and furnish, at his own cost and expense, all labor, materials, equipment, and other facilities, except as herein otherwise provided, as may be necessary and proper for performing and completing the work under this Contract. The Contractor shall be responsible for the entire work until completed and finally accepted by the City.

The work shall be performed in accordance with the true intent and meaning of the Contract Documents. Unless otherwise expressly provided, the work must be performed in accordance with the best modern practice, with materials as specified and workmanship of the highest quality, all as determined by and entirely to the satisfaction of the Engineer.

Unless otherwise expressly provided, the means and methods of construction shall be such as the Contractor may choose, subject, however, to the approval of the Engineer. Only adequate and safe procedure, methods, structures and equipment shall be used. The Engineer's approval or the Engineer's failure to exercise his right thereon shall not relieve the Contractor of obligations to accomplish the result intended by the Contract, nor shall such create a cause of action for damages.

ARTICLE 3.02 COMPLIANCE WITH LAWS
The Contractor must comply with all local, State and Federal laws, rules, ordinances and regulations applicable to this Contract and to the work done hereunder, and must obtain, at his own expense, all permits, licenses or other authorization necessary for the prosecution of the work.

No work shall be performed under this Contract on Sundays, legal holidays or after regular working hours without the express permission of the Engineer. Where such permission is granted, the Engineer may require that such work be performed without additional expense to the City.

ARTICLE 3.03 INSPECTION
During the progress of the work and up to the date of final acceptance, the Contractor shall, at all times, afford the representatives of the City, the Florida Department of Environmental Regulation, and if applicable, the Federal Environmental Protection Agency and the Federal Department of Labor every reasonable, safe and proper facility for inspecting the work done or being done at the site. The inspection of any work shall not relieve the Contractor of any of his obligations to perform proper and satisfactory work as herein specified. Finished or unfinished work found not to be in strict accordance with the Contract shall be replaced as directed by the Engineer, even though such work may have been previously approved and payment made therefor.

The City shall have the right to reject materials and workmanship which are defective or require their correction. Rejected work and materials must be promptly removed from the site, which must at all times be kept in a reasonably clean and neat condition.

Failure or neglect on the part of the City to condemn or reject bad or inferior work or materials shall not be construed to imply an acceptance of such work or materials, if it becomes evident at any time prior to the final acceptance of the work by the City. Neither shall it be construed as barring the City at any subsequent time from the recovery of damages of such a sum of money as may be needed to build anew all portions of the work in which inferior work or improper materials were used, wherever found.

Should it be considered necessary or advisable by the City at any time before final acceptance of the entire work to make examinations of work already completed, by removing or tearing out all or portions of such work, the Contractor shall, on request, promptly furnish all necessary facilities, labor, and material for that purpose. If such work is found to be defective in any material respect, due to the fault of the Contractor or his subcontractors, he shall defray all expenses of such examination and of satisfactory reconstruction. If, however, such work is found to meet the requirements of the Contract, the cost of examination and restoration of the work shall be considered an item of extra work to be paid for in accordance with the provisions of Article 7.02 hereof.

ARTICLE 3.04 PROTECTION
During performance and until final acceptance, the Contractor shall be under an absolute obligation to protect the finished and unfinished work against any damage, loss, or injury. The Contractor shall take proper precaution to protect the finished work from loss or damage, pending completion and the final acceptance of all the work included in the entire Contract, provided that such precaution shall not relieve the Contractor from any and all liability and responsibility for loss or damage to the work occurring before final acceptance by the City. Such loss or damage shall be at the risk of and borne by the Contractor, whether arising from acts or omissions of the Contractor or others. In the event of any such loss or damage, the Contractor shall forthwith repair, replace, and make good the work without extension of time therefor, except as may be otherwise provided herein.

The provisions of this Article shall not be deemed to create any new right of action in favor of third parties against the Contractor or the City.

ARTICLE 3.05 PRESERVATION OF PROPERTY

The Contractor shall preserve from damage all property along the line of the work, or which is in the vicinity of or is in anywise affected by the work, the removal or destruction of which is not called for by the Plans. This applies, but is not limited, to the public utilities, trees, lawn areas, building monuments, fences, pipe and underground structures, public streets (except natural wear and tear of streets resulting from legitimate use thereof by the Contractor), and wherever such property is damaged due to the activities of the Contractor, it shall be immediately restored to its original condition by the Contractor and at his own expense.

In case of failure on the part of the Contractor to restore such property, or make good such damage or injury, the City may, upon forty-eight (48) hour written notice, proceed to repair, rebuild, or otherwise restore such property as may be deemed necessary, and the cost thereof will be deducted from any monies due or which may become due the Contractor under this Contract. Nothing in this clause shall prevent the Contractor from receiving proper compensation for the removal, damage, or replacement of any public or private property not shown on the Plans, when this is made necessary by alteration of grade or alignment authorized by the Engineer, provided that such property has not been damaged through fault of the Contractor, his employees or agents.

ARTICLE 3.06 BOUNDARIES
The Contractor shall confine his equipment, apparatus, the storage of materials, supplies and apparatus of his workmen to the limits indicated on the plans, by law, ordinances, permits or direction of the Engineer.

ARTICLE 3.07 SAFETY AND HEALTH REGULATIONS
The Contractor shall comply with the Department of Labor Safety and Health Regulations for construction promulgated under the Occupational Safety and Health Act of 1970 (PL 91- 596) and under Section 107 of the Contract Work Hours and Safety Standards Act (PL91-54).

ARTICLE 3.08 TAXES
All taxes of any kind and character payable on account of the work done and materials furnished under this Contract shall be paid by the Contractor and shall be deemed to have been included in his bid. The laws of the State of Florida provide that sales and use taxes are payable by the Contractor upon the tangible personal property incorporated in the work and such taxes shall be paid by the Contractor and shall be deemed to have been included in his bid.

ARTICLE 3.09 ENVIRONMENTAL CONSIDERATIONS
The Contractor, in the performance of the work under this Contract, shall comply with all Local, State and Federal laws, statutes, ordinances, rules and regulations applicable to protection of the environment; and, in the event he violates any of the provisions of same, he shall be answerable to the Local, State and Federal agencies designated by law to protect the environment. In the event the City receives, from any of the environmental agencies, a citation which is occasioned by an act or omission of the Contractor or his subcontractor or any officers, employees or agents of either, it is understood and agreed that the Contractor shall automatically become a party-respondent under said citation; and the City immediately shall notify the Contractor and provide him with a copy of said citation.

The Contractor shall comply with the requirements of the citation and correct the offending conditions(s) within the time stated in said citation and further shall be held fully responsible for all fines and/or penalties.

SECTION 4
TIME PROVISIONS

ARTICLE 4.01 TIME OF START AND COMPLETION
The Contractor must commence work within thirty (30) days subsequent to the date of the receipt of the "Notice to Proceed" by the City unless otherwise provided in the Specific Provisions and Special Instructions. Time being of the essence of this Contract, the Contractor shall thereafter prosecute the work diligently, using such means and methods of construction as well as secure its full completion in accordance with the requirements of the Contract Documents no later than the date specified therefor, or on the date to which the time for completion may be extended.

The Contractor must complete the work covered by this Contract in the number of consecutive calendar days set forth in the Instructions to Bidders, unless the date of completion is extended pursuant to the provisions of Article 4.05 hereof. The period for performance shall start from the date of signing of this Agreement by the City.

The actual date of completion will be established after a final inspection as provided in Article 4.07 hereof.

ARTICLE 4.02 PROGRESS SCHEDULE
To enable the work to be laid out and prosecuted in an orderly and expeditious manner, the Contractor shall submit to the Engineer a proposed progress schedule within fifteen (15) days after the award of this Contract.

The schedule shall state the Contract starting date, time for completion and date of completion and shall show the anticipated time of starting and completion of each of the various operations to be performed under this Contract, together with all necessary and appropriate information regarding sequence and correlation of work and an estimated time required for the delivery of all materials and equipment required for the work. The proposed schedule shall be revised as directed by the Engineer until finally approved by him, and, after such approval, shall be strictly adhered to by the Contractor. The approved progress schedule may be changed only with the written permission of the Engineer.

If the Contractor shall fail to adhere to the approved progress schedule or the schedule as revised, he shall promptly adopt such other or additional means and methods of construction as will make up for the time lost, and will assure completion in accordance with the contract time.

ARTICLE 4.03 APPROVAL REQUESTS
From time to time, as the work progresses and in the sequence indicated by the approved schedule, the Contractor must submit to the Engineer a specific request, in writing, for each item of information or approval required of him by the Contract. These requests must be submitted sufficiently in advance of the date upon which the information or approval is actually required by the Contractor to allow for the time the Engineer may take to act upon such submissions or resubmissions. The Contractor shall not have any right to an extension of time on account of delays due to his failure to submit his requests for the required information or the required approval in accordance with these requirements.

ARTICLE 4.04 COORDINATION WITH OTHER CONTRACTORS
During progress of the work, other Contractors may be engaged in performing other work on this project or on other projects on the site. In that event, the Contractor shall coordinate the work to be done hereunder with the work of such other Contractors in such manner as the Engineer may direct.

ARTICLE 4.05 EXTENSION OF TIME
If such an application is made, the Contractor shall be entitled to an extension of time for delay in completion of the work should the Contractor be obstructed or delayed in the commencement, prosecution or completion of any part of said work by any act or delay of the City, or by acts or omissions of other Contractors on this project, or by a riot, insurrection, war, pestilence, acts of public authorities, fire, lightning, hurricanes, earthquakes, tornadoes, floods, extremely abnormal and excessive inclement weather as indicated by the records of the local weather bureau for a five-year period preceding the date of the Contract, or by strikes, or other causes, which causes of delay mentioned in this Article, in the opinion of the City, are entirely beyond the expectation and control of the Contractor.

The Contractor shall, however, be entitled to an extension of time for such causes only for the number of days of delay which the City may determine to be due solely to such causes and only to the extent that such occurrences actually delay the completion of the project and then only if the Contractor shall have strictly complied with all of the requirements of Articles 4.01, 4.02, 4.03 and 4.04 hereof. It is hereby understood that the determination by the Engineer as to the order and sequence of the work shall not in itself constitute a basis for extension of time.

The determination made by the City on an application for an extension of time shall be binding and conclusive on the Contractor.

Delays caused by failure of the Contractor's materialmen, manufacturers, and dealers to furnish approved working drawings, materials, fixtures, equipment, appliances, or other fittings on time or failure of subcontractors to perform their work shall not constitute a basis of extension of time.

The Contractor agrees to make no claim for damages for delay in the performance of this Contract occasioned by any act or omission to act of the City or any of its representatives or because of any injunction which may be brought against the City or its representatives and agrees that any such claim shall be fully compensated for by an extension of time to complete performance of the work as provided herein.

ARTICLE 4.06 LIQUIDATED DAMAGES
It is mutually agreed between the parties that time is the essence of this Contract and that there will be on the part of the City considerable monetary damage in the event the Contractor should fail to complete the work within the time fixed for completion in the Contract or within the time to which such completion may have been extended.

The amount per day set forth in the Instructions to Bidders is hereby agreed upon as the liquidated damages for each and every calendar day that the time consumed in completing the work under this Contract exceeds the time allowed.

This amount shall, in no event, be considered as a penalty or otherwise than as the liquidated and adjusted damages to the City because of the delay and the Contractor and his Surety agree that the stated sum per day for each such day of delay shall be deducted and retained out of the monies which may become due hereunder and if not so deductible, the Contractor and his Surety shall be liable therefor.

ARTICLE 4.07 FINAL INSPECTION
When the work has been completed in accordance with the requirements of the Contract and final cleaning up performed, a date for final inspection of the work by the Engineer shall be set by the Contractor in a written request therefor, which date shall be not less than ten (10) days after the date of such request. The work will be deemed complete as of the date so set by the Contractor if, upon such inspection, the Engineer determines that no further work remains to be done at the site.

If such inspection reveals interms of work still to be performed, however, the Contractor shall promptly perform them and then request a reinspection. If, upon such inspection, the Engineer determines that the work is complete, the date of final completion shall be deemed to be the last day of such reinspection.

SECTION 5
SUBCONTRACTS AND ASSIGNMENTS

ARTICLE 5.01 LIMITATIONS AND CONSENT
The Contractor shall not assign, transfer, convey, sublet or otherwise dispose of this Contract or of his right, title, or interest therein, or his power to execute such Contract, or to assign any monies due or to become due thereunder to any other person, firm or corporation unless the previous written consent of the City shall first be obtained thereto and the giving of any such consent to a particular subcontract or assignment shall not dispense with the necessity of such consent to any further or other assignment.

Before making any subcontract, the Contractor must submit a

written statement to the Engineer, giving the name and address of the proposed contractor, the portion of the work and materials which he is to perform and furnish and any other information tending to prove that the proposed subcontractor has the necessary facilities, skill, integrity, past experience and financial resources to perform the work in accordance with the terms and conditions of this Contract.

If the City finds that the proposed subcontractor is qualified, the Contractor will be notified in writing. The City may revoke approval of any subcontractor when such subcontractor evidences an unwillingness or inability to perform his work in strict accordance with these Contract Documents. Notice of such revocation of approval will be given in writing to the Contractor.

The Contractor will promptly, upon request, file with the City a conformed copy of the subcontract. The Contractor shall cause appropriate provisions to be inserted in all subcontracts relative to the work to bind subcontractors to the Contractor by the terms of these Contract Documents, insofar as applicable to the work of subcontractors, and to give the Contractor the same power as regards terminating any subcontracts that the City may exercise over the Contractor under provisions of these Contract Documents.

The Contractor shall be required to perform with his own forces at least twenty-five (25) percent of the work, unless written consent to subcontract a greater percentage of the work is first obtained from the City.

ARTICLE 5.02 RESPONSIBILITY
The approval by the City of a subcontractor shall not relieve the Contractor of any of his responsibilities, duties, and liabilities hereunder. The Contractor shall be solely responsible to the City for the acts or defaults or omissions of his subcontractor and of such subcontractor's officers, agents, and employees, each of whom shall for all purposes be deemed to be the agent or employee of the Contractor. Nothing contained in the Contract Documents shall create any contractual relationship between any subcontractor and the City.

SECTION 6
SECURITY AND GUARANTY

ARTICLE 6.01 CONTRACT SECURITY
The Contractor shall execute and deliver to the City a Performance Bond on the form as provided herein, in an amount at least equal to one hundred (100) percent of the full Contract price, such Bond to be executed by a surety company acceptable to the City. The surety on such Performance Bond shall be a surety company duly authorized to do business in the State of Florida, and the Bond shall be issued or countersigned by a local resident producing agent of such surety company who is a resident of the State of Florida, regularly commissioned and licensed in said State, and satisfactory evidence of the authority of the person or persons executing such Bond shall be submitted with the Bond. The Performance Bond shall serve as security for the faithful performance of this Contract, including maintenance and guaranty provisions, and for the payment of all persons performing labor and furnishing materials in connection with the Contract. The premiums on the Performance Bond shall be paid by the Contractor.

If, at any time, the City shall become dissatisfied with any surety or sureties then upon the Performance Bond, or if for any other reason such bond shall cease to be adequate security for the City, the Contractor shall, within five days after notice so to do, substitute an acceptable Bond in such form and sum and signed by such other sureties as may be satisfactory to the City. The premiums on such Bond shall be paid by the Contractor. No further partial payments shall be deemed due or shall be made until the new sureties have qualified.

ARTICLE 6.02 CONTRACTORS INSURANCE
Insurance required shall be as indicated on Special Instructions pages beginning with "INS-1"

ARTICLE 6.03 AGAINST CLAIMS AND LIENS
The City may withhold from the Contractor as much as any approved payments to him as may, in the opinion of the City, be necessary to secure (a) just claims of any persons supplying labor or materials to the Contractor or any of his subcontractors for the work then due and unpaid; (b) loss due to defective work not remedied, or (c) liability, damage, or loss due to injury to persons or damages to the work or property of other contractors, subcontractors, or others, caused by the act or neglect of the Contractor or of any of his subcontractors. The City shall have the right, as agent for the Contractor, to apply any such amounts so withheld in such manner as the City may deem proper to satisfy such claims or to secure such protection. Such application of such money shall be deemed payments for the account of the Contractor.

ARTICLE 6.04 MAINTENANCE AND GUARANTY
The Contractor hereby guarantees all the work furnished under this Contract against any defects in workmanship and materials for a period of one year following the date of final acceptance of the work by the City. Under this guarantee, the Contractor hereby agrees to make good, without delay, at his own expense, any failure of any part of the work due to faulty materials or manufacture, construction, or installation, or the failure of any equipment to perform satisfactorily all the work put upon it within the limits of the Contract Documents, and further, shall make good any damage to any part of the work caused by such failure. It is hereby agreed that the Performance Bond shall fully cover all guarantees contained in this Article.
It is also agreed that all warranties, expressed or implied, inure to the benefit of the City and are enforceable by the City.

SECTION 7
CHANGES

ARTICLE 7.01 MINOR CHANGES
The City reserves the right to make such additions, deductions, or changes to this Contract from time to time as

it deems necessary and in a manner not materially affecting the substance thereof or materially changing the price to be paid in order to carry out and complete more fully and perfectly the work herein agreed to be done and performed. This Contract shall in no way be invalidated by any such additions, deductions, or changes, and no claim by the Contractor shall be made for any loss of anticipated profits thereby.

Construction conditions may require that minor changes be made in the location and installation of the work and equipment to be furnished and other work to be performed hereunder, and the Contractor when ordered by the Engineer, shall make such adjustments and changes in said locations and work as may be necessary, without additional cost to the City, provided such adjustments and changes do not alter the character, quantity of cost of the work as a whole, and provided further that Plans and Specifications showing such adjustments and changes are furnished to the Contractor by the City within a reasonable time before any work involving such adjustment and changes is begun. The Engineer shall be the sole judge of what constitutes a minor change for which no additional compensation shall be allowed.

ARTICLE 7.02 EXTRA WORK

The City may at any time by a written order and without notice to the sureties require the performance of such extra work as it may find necessary or desirable. An order for extra work shall be valid only if issued in writing and signed by the Mayor and the work so ordered must be performed by the Contractor.

The amount of compensation to be paid to the Contractor for any extra work as so ordered shall be determined as follows:

(a)By such applicable unit prices, if any, as are set forth in the Proposal; or

(b)If no such unit prices are set forth then by a lump sum or other unit prices mutually agreed upon by the City and the Contractor; or

(c)If no such unit prices are set forth in the Proposal and if the parties cannot agree upon a lump sum or other unit prices then by the actual net cost in money to the Contractor of the extra work performed, which cost shall be determined as follows:

(1) For all labor and foreman in direct charge of the authorized operations, the Contractor shall receive the current local rate of wages to be agreed upon, in writing, before starting such work for each hour that said labor and foremen are actually engaged thereon, to which shall be added an amount equal to 25 percent of the sum thereof which shall be considered and accepted as full compensation for general supervision, FICA taxes, contributions under the Florida Unemployment Compensation Act, insurance, bond, subcontractor's profit and overhead, the furnishing of small tools and miscellaneous equipment used, such as picks, shovels, hand pumps, and similar items.

(2) For all materials used, the Contractor shall receive the actual cost of such materials delivered at the site or previously approved delivery point as established by original receipted bills. No percentage shall be added to this cost.

(3) For special equipment and machinery such as power-driven pumps, concrete mixers, trucks, and tractors, or other equipment, required for the economical performance of the authorized work, the Contractor shall receive payment based on the average local area rental price for each item of equipment and the actual time of its use on the work. No percentage shall be added to this sum.

(4) Records of extra work done under this procedure shall be reviewed at the end of each day by the Contractor or his representative and the Engineer. Duplicate copies of accepted records shall be made and signed by both Contractor or his representative and the Engineer, and one copy retained by each.

Request for payment for approved and duly authorized extra work shall be submitted in the same form as Contract work or in the case of work performed under paragraph (c) (1) above upon a certified statement supported by receipted bills. Such statement shall be submitted for the current Contract payment for the month in which the work was done.

ARTICLE 7.03 DISPUTED WORK

If the Contractor is of the opinion that any work required, necessitated, or ordered violates the terms and provisions of this Contract, he must promptly notify the Engineer, in writing, of his contentions with respect thereto and request a final determination thereof. If the Engineer determines that the work in question is Contract work and not extra work or that the order complained of is proper, he will direct the Contractor to proceed and the Contractor shall promptly comply. In order, however, to reserve his right to claim compensation for such work or damages resulting from such compliance, the Contractor must, within five (5) days after receiving notice of the Engineer's determination and direction, notify the City in writing that the work is being performed or that the determination and direction is being complied with under protest. Failure of the Contractor to notify shall be deemed as a waiver of claim for extra compensation or damages therefor.

Before final acceptance by the City, all matters of dispute must be adjusted to the mutual satisfaction of the parties thereto. Final determinations and decisions, in case any questions shall arise, shall constitute a condition precedent to the right of the Contractor to receive the money therefor until the matter in question has been adjusted.

ARTICLE 7.04 OMITTED WORK

The City may at any time by a written order and without notice to the sureties require the omission of such Contract work as it may find necessary or desirable.

An order for omission of work shall be valid only if signed by the Mayor and the work so ordered must be omitted by the Contractor. The amount by which the Contract price shall be reduced shall be determined as follows:

(a) By such applicable unit prices, if any, as are set forth in the Contract; or

(b) By the appropriate lump sum price set forth in the Contract; or

(c) By the fair and reasonable estimated cost to the City

of such omitted work as determined by the Engineer and approved by the City.

SECTION 8
CONTRACTOR'S EMPLOYEES

ARTICLE 8.01 CHARACTER AND COMPETENCY
The Contractor and his subcontractors shall employ upon all parts of the work herein contracted for only competent, skillful, and trustworthy workers. Should the Engineer at any time give notice, in writing, to the Contractor or his duly authorized representative on the work that any employee in his opinion is incompetent, unfaithful, disorderly, careless, unobservant of instructions, or in any way a detriment to the satisfactory progress of the work, such employee shall immediately be dismissed and not again allowed upon the site.

ARTICLE 8.02 SUPERINTENDENCE
The Contractor shall give his personal supervision to the faithful prosecution of the work and in case of his absence shall have a competent, experienced, and reliable supervisor or superintendent, acceptable to the Engineer on the site who shall follow without delay all instructions of the Engineer in the prosecution and completion of the work and every part thereof, in full authority to supply workers, material, and equipment immediately. He shall keep on hand at all times copies of the Contract Documents.

ARTICLE 8.03 EMPLOYMENT OPPORTUNITIES
The Contractor shall, in the performance of the work required to be done under this Contract, employ all workers without discrimination regarding race, creed, color, sex or national origin and must not maintain or provide facilities that are segregated on the basis of race, color, creed or national origin.

ARTICLE 8.04 RATES OF WAGES
On federally assisted projects, the rates of wages to be paid under this Contract shall not be less than the rates of wages set forth in Section 12 of this Agreement.

On other projects, no wage rate determination is included. Florida's Prevailing Wage Law (Section 215.19, Florida Statutes) was repealed effective April 25, 1979.

ARTICLE 8.05 PAYROLL REPORTS
The Contractor and each subcontractor shall, if requested to do so, furnish to the Engineer a duly certified copy of his payroll and also any other information required by the Engineer to satisfy him that the provisions of the law as to the hours of employment and rate of wages are being observed.

Payrolls shall be prepared in accordance with instructions furnished by the City and on approved forms. The Contractor shall not carry on his payroll any persons not employed by him. Subcontractor's employees shall be carried only on the payrolls of the employing subcontractor.

SECTION 9
CONTRACTOR'S DEFAULT

ARTICLE 9.01 CITY'S RIGHT AND NOTICE
It is mutually agreed that: (a) if the Contractor fails to begin work when required to do so, or (b) if at any time during the progress of the work it shall appear to the Engineer that the Contractor is not prosecuting the work with reasonable speed, or is delaying the work unreasonably and unnecessarily, or (c) if the force of workmen or quality or quantity of material furnished are not sufficient to insure completion of the work within the specified time and in accordance with the Specifications hereto attached, or (d) if the Contractor shall fail to make prompt payments for materials or labor or to subcontractors for work performed under the Contract, or (e) if legal proceedings have been instituted by others than the City in such manner as to interfere with the progress of the work and may subject the City to peril of litigation or outside claims of (f) if the Contractor shall be adjudged a bankrupt or make an assignment for the benefit of creditors, or (g) if in any proceeding instituted by or against the Contractor an order shall be made or entered granting an extension of time of payment, composition, adjustment, modification, settlement or satisfaction of his debts or liabilities, or (h) if a receiver or trustee shall be appointed for the Contractor or the Contractor's property, or (i) if the Contract or any part thereof shall be sublet without the consent of the City being first obtained in writing, or (j) if this Contract or any right, monies, or claim thereunder shall be assigned by the Contractor, otherwise than as herein specified, or (k) if the Contractor shall fail in any manner of substance to observe the provisions of this Contract, or (l) if any of the work, machinery, or equipment shall be defective, and shall not be replaced as herein provided, or (m) if the work to be done under this Contract shall be abandoned, then such fact or conditions shall be certified by the Engineer and thereupon the City without prejudice to any other rights or remedies of the City, shall have the right to declare the Contractor in default and so notify the Contractor by a written notice, setting forth the ground or grounds upon which such default is declared and the Contractor must discontinue the work, either as a portion of the work or the whole thereof, as directed.

ARTICLE 9.02 CONTRACTOR'S DUTY UPON DEFAULT
Upon receipt of notice that his Contract is in default, the Contractor shall immediately discontinue all further operations on the work or such part thereof, and shall immediately quit the site or such part thereof, leaving untouched all plant, materials, equipment, tools, and supplies.

ARTICLE 9.03 COMPLETION OF DEFAULTED WORK
The City, after declaring the Contractor in default, may then have the work completed or the defective equipment or machinery replaced or anything else done to complete the work in strict accordance with the Contract Documents by such means and in such manner, by Contract with or without public letting, or otherwise, as it may deem advisable,

utilizing for such purpose without additional cost to the City such of the Contractor's plant, materials, equipment, tools, and supplies remaining on the site, and also such subcontractors as it may deem advisable.

The City shall reimburse all parties, including itself, for the expense of such completion, including liquidated damages, if any, and the cost of reletting. The City shall deduct this expense from monies due or to become due to the Contractor under this Contract, or any part thereof, and in case such expense is more than the sum remaining unpaid of the original contract price, the Contractor and his sureties shall pay the amount of such deficiency to the City.

ARTICLE 9.04 PARTIAL DEFAULT
In case the City shall declare the Contractor in default as to a part of the work only, the Contractor shall discontinue such part, shall continue performing the remainder of the work in strict conformity with the terms of the Contract, and shall in no way hinder or interfere with any other contractor or person whom the City may engage to complete the work as to which the Contractor was declared in default.

SECTION 10
PAYMENTS

ARTICLE 10.01 PRICES
For the Contractor's complete performance of the work, the City will pay and the Contractor agrees to accept, subject to the terms and conditions hereof, the lump sum prices or unit prices in the Contractor's Proposal and the award made therein, plus the amount required to be paid for any extra work ordered under Article 7.02 hereof, less credit for any work omitted pursuant to Article 7.04 hereof. Under unit price items, the number of units actually required to complete the work under the Contract may be more than stated in the Proposal. The Contractor agrees that no claim will be made for any damages or for loss of profits because of a difference between the quantities of the various classes of work assumed and stated in the Proposal Form as a basis for comparing Proposals and the quantities of work actually performed.

The sum as awarded for any lump sum Contract or lump sum Contract Item shall represent payment in full for all of the various classes of work, including materials, equipment, and labor necessary or required to complete, in conformity with the Contract Document, the entire work shown, indicated or specified under the lump sum Contract or lump sum Contract Item.

The amount as awarded as a unit price for any unit price Contact Item shall represent payment in full for all the materials, equipment, and labor necessary to complete, in conformity with the Contract Documents, each unit of work shown, specified, or required under the said unit price Contract Item.

No payment other than the amount as awarded will be made for any class of work included in a lump sum Contract Item or a unit price Contract Item, unless specific provision is made therefor in the Contract Documents.

ARTICLE 10.02 SUBMISSION OF BID BREAKDOWN
Within fifteen (15) days after the execution of this Contract, the Contractor must submit to the Engineer in duplicate an acceptable breakdown of the lump sums and unit prices bid for items of the Contract, showing the various operations to be performed under the Contract, as described in the progress schedule required under Article 4.02 hereof, and the value of each of such operations, the total of such items to equal the total price bid. The Contractor shall also submit such other information relating to the bid prices as may be required and shall revise the bid breakdown as directed. Thereafter, the breakdown may be used for checking the Contractor's applications for partial payments hereunder but shall not be binding upon the City or the Engineer for any purpose whatsoever.

ARTICLE 10.03 REPORTS, RECORDS AND DATA
The Contractor shall furnish to the Engineer such schedules of quantities and costs, progress schedules, reports, invoices, delivery tickets, estimates, records, and other data as the Engineer may request concerning work performed or to be performed and the materials furnished under the Contract.

ARTICLE 10.04 PAYMENTS BY CONTRACTOR
The Contractor shall pay (a) for all transportation and utility services not later than the 20th day of the calendar month following that in which such services are rendered, (b) for all materials, tools, and equipment delivered at the site of the project, and the balance of the cost thereof not later than the 30th day following the completion of that part of the work in or on which such materials, tools, and equipment are incorporated or used, and (c) to each of his subcontractors, not later than the 5th day following each payment to the Contractor, the respective amounts allowed the Contractor on account of the work performed by his subcontractors, to the extent of each subcontractor's interest therein; and proof of such payments or releases therefor shall be submitted to the Engineer upon request.

ARTICLE 10.05 PARTIAL PAYMENTS
On or about the first of each month, the Contractor shall make and certify an estimate, on forms prescribed by the City, of the amount and fair value of the work done, and may apply for partial payment therefor. The Contractor shall revise the estimate as the Engineer may direct. When satisfactory progress has been made, and shows that the value of the work completed since the last payment exceeds one percent (1%) of the total Contract price in amount, the Engineer will issue a certificate that such work has been completed and the value thereof. The City will then issue a voucher to the Contractor in accordance with the following schedule:

FOR CONTRACT AMOUNTS UNDER $250,000
(A)In the amount of ninety percent (90%) of the value of the work completed as certified until construction is one hundred percent (100%) complete (operational or beneficial occupancy), the withheld amount may be reduced below ten percent (10%), at the Engineer's option, to only that amount necessary to assure completion.

FOR CONTRACT AMOUNTS OVER $250,000

(A)In the amount of ninety percent (90%) of the value of the work completed as certified until construction is fifty percent (50%) complete.

(B)When the dollar value, as determined by the Engineer, of satisfactorily completed work in place is greater than fifty percent (50%) of the original contract price, vouchers for partial payment will be issued by the City to the Contractor in the amount of one hundred percent (100%) of the value of the work, above 50%, completed as certified for that payment period.

(C)If the Contractor has performed satisfactorily and the work is substantially complete (operational or beneficial occupancy) the withheld amount may be reduced, at the Engineer's option, to only that amount necessary to assure completion.

In addition to the Conditions set forth in (A), (B), and (C) above, payments will always be less any sums that may be retained or deducted by the City under the terms of any of the contract documents and less any sums that may be retained to cover monetary guarantees for equipment, materials or progress performance.

Payment on estimates made on or about the first of the month may be expected on or about the 20th of the month.

Unless specified otherwise in the Contract Items, the delivered cost of equipment and nonperishable materials suitably stored at the site of the work and tested for adequacy may be included in the Contractor's application for partial payment provided, however, that the Contractor shall furnish evidence satisfactory to the City that the Contractor is the unconditional owner and in possession of such materials or equipment. The amount to be paid will be 90 percent of the invoice cost to the Contractor which cost shall be supported by receipted bills within 30 days of the date of payment by the City to the Contractor. Such payment shall not relieve the Contractor from full responsibility for completion of the work and for protection of such materials and equipment until incorporated in the work in a permanent manner as required by the Contract Documents.

Before any payment will be made under this Contract, the Contractor and every subcontractor, if required, shall deliver to the Engineer a written, verified statement, in satisfactory form, showing in detail all amounts then due and unpaid by such Contractor or subcontractor to all laborers, workmen, and mechanics, employed by him under the Contract for the performance of the work at the site thereof, for daily or weekly wages, or to other persons for materials, equipment, or supplies delivered at the site of the work during the period covered by the payment under consideration.

ARTICLE 10.06 FINAL PAYMENT

Under determination of satisfactory completion of the work under this Contract as provided in Article 4.07 hereof, the Engineer will prepare the final estimate showing the value of the completed work. This estimate will be prepared within 30 days after the date of completion or as soon thereafter as the necessary measurements and computations can be made. All prior certificates and estimates, being approximate only, are subject to correction in the final estimate and payment.

When the final estimate has been prepared and certified by Engineer, he will submit to the Mayor and City Council the final certificate stating that the work has been completed and the amount based on the final estimate remaining due to the Contractor. The City will then accept the work as fully completed and will, not later than 30 days after the final acceptance, as defined in Article 1.02, of the work done under this Contract, pay the Contractor the entire amount so found due thereunder after deduction of all previous payments and all percentages and amounts to be kept and retained under provisions of this Contract; provided, however, and it is understood and agreed that, as a precedent to receiving final payment, the Contractor shall submit to the City a sworn affidavit that all bills for labor, service, materials, and subcontractors have been paid and that there are no suits pending in connection with this work. The City, at its option, may permit the Contractor to execute a separate surety bond in a form satisfactory to the City. The surety bond shall be in the full amount of the suit or suits.

Neither the final payment nor any part of the retained percentage shall be paid until the Contractor, if required, shall furnish the City with a complete release from any should remain unsatisfied after all payments are made, the Contractor shall refund to the City all monies which the City may be compelled to pay in discharging such claim, including incidental costs and attorney's fees.

ARTICLE 10.07 ACCEPTANCE OF FINAL PAYMENT

The acceptance by the Contractor, or by anyone claiming by or through him, of the final payment shall operate as and shall be a release to the City and every officer and agent thereof from any and all claims and liability to the Contractor for anything done or furnished in connection with the work or project and for any act or neglect of the Contractor or of any others relating to or affecting the work. No payment, however, final or otherwise, shall operate to release the Contractor or his sureties from any obligations under this Contract or the Performance Bond.

SECTION 11
MISCELLANEOUS PROVISIONS

ARTICLE 11.01 CONTRACTOR'S WARRANTIES

In consideration of, and to induce the award of this contract to him, the Contractor represents and warrants:

(a)That he is not in arrears to the City upon debt or contract, and he is not a defaulter, as surety, contractor, or otherwise.

(b)That he is financially solvent and sufficiently experienced and competent to perform the work.

(c)That the work can be performed as called for by the Contract Documents.

(d)That the facts stated in his proposal and the information given by him are true and correct in all respects.

(e)That he is fully informed regarding all the conditions affecting the work to be done and labor and materials to be

furnished for the completion of this Contract, and that his information was secured by personal investigation and research.

ARTICLE 11.02 PATENTED DEVICES, MATERIAL AND PROCESSES

It is mutually understood and agreed that Contract prices include all royalties and costs arising from patents, trademarks, and copyrights in any way involved in the work. Whenever the Contractor is required or desires to use any design, device, material, or process covered by letters of patent or copyright, the Contractor shall indemnify and save harmless the City, its officers, agents and employees from any and all claims for infringement by reason of the use of any such patented design, device, tool, material, equipment, or process, to be performed under the Contract, and shall indemnify the said City, its officers, agents, and employees for any costs, expenses, and damages which may be incurred by reason of such infringement at any time during the prosecution or after completion of the work.

ARTICLE 11.03 SUITS AT LAW

In case any action at law or suit in equity may or shall be brought against the City or any of its officers, agents, or employees for or on account of the failure, omission, or neglect of the Contractor or his subcontractors, employees, or agents, to do or perform any of the covenants, acts, matters, or things by this Contract undertaken to be done or performed by the Contractor of his subcontractors, employees, or agents, or from any injuries done to property or persons and caused by the negligence or alleged negligence of the Contractor of his subcontractors, employees, or agents, or in any other manner arising out of the performance of this Contract, then the Contractor shall immediately assume and take charge of the defense of such actions or suits in like manner and to all intents and purposes as if said actions or suits have been brought directly against the Contractor, and the Contractor shall also indemnity and save harmless the City, its officers, agents, and employees from any and all loss, cost or damage whatever arising out of such actions or suits, in like manner and to all intents and purposes as if said actions or suits have been brought directly against the Contractor.

The Contractor shall and does hereby assume all liability for and agrees to indemnify the City or its Engineer against any or all loss, costs, damages, and liability for any or by reason of any lien, claims or demands, either for materials purchased or for work performed by laborers, mechanics, and others and from any damages, costs, actions, or causes of action and judgement arising from injuries sustained by mechanics, laborers, or other persons by reason of accidents or otherwise, whether caused by the carelessness or inefficiency or neglect of said Contractor, his subcontractors, agents, employees, workmen or otherwise.

ARTICLE 11.04 CLAIMS FOR DAMAGES

If the Contractor shall claim compensation for any damage sustained, other than for extra or disputed work covered by Article 7.02 and 7.03 hereof, by reason of any act or omission of the City, its agents, or any persons, he shall, within five days after sustaining such damage, make and deliver to the Engineer a written statement of the nature of the damage sustained and of the basis of the claim against the City. On or before the 15th of the month succeeding that in which any damage shall have been sustained, the Contractor shall make and deliver to the Engineer an itemized statement of the details and amounts of such damage, duly verified by the Contractor. Unless such statements shall be made delivered within the times aforesaid, it is stipulated that and all claims for such compensation shall be forfeited and invalidated, and the Contractor shall not be entitled to payment on account of such claims.

ARTICLE 11.05 NO CLAIMS AGAINST INDIVIDUALS

No claim whatsoever shall be made by the Contractor against any officer, agent, employee of the City for, or on account of, anything done or omitted to be done in connection with this Contract.

ARTICLE 11.06 LIABILITY UNAFFECTED

Nothing herein contained shall in any manner create any liability against the City on behalf of any claim for labor, services, or materials, or of subcontractors, and nothing herein contained shall affect the liability of the Contractor or his sureties to the City or to any workmen or materialsmen upon bond given in connection with this Contract.

ARTICLE 11.07 INDEMNIFICATION PROVISIONS

Whenever there appears in this Agreement, or in the other Contact Documents made a part hereof, an indemnification provision within the purview of Chapter 725.06, Laws of Florida, the monetary limitation on the extent of the indemnification under each such provision shall be One Million Dollars or a sum equal to the total Contract price, whichever shall be the greater.

ARTICLE 11.08 UNLAWFUL PROVISIONS DEEMED STRICKEN

If this contract contains any unlawful provisions not an essential part of the Contract and which shall not appear to have a controlling or material inducement to the making thereof, such provisions shall be deemed of no effect and shall, upon notice by either party, be deemed stricken from the Contract without affecting the binding force of the remainder.

ARTICLE 11.09 LEGAL PROVISIONS DEEMED INCLUDED

Each and every provision of any law and clause required by law to be inserted in this Contract shall be deemed to be inserted herein, and the Contract shall be read and enforced as though it were included herein and if, through mistake or otherwise, any such provision is not inserted or is not correctly inserted, then upon application of either party the Contract shall forthwith be physically amended to make such insertion.

ARTICLE 11.10 DEATH OR INCOMPETENCY OF CONTRACTOR

In the event of death or legal incompetency of a Contractor who shall be an individual or surviving member of a contracting firm, such death or adjudication of incompetency

shall not terminate the Contract, but shall act as default hereunder to the effect provided in Article 9.01 hereof and the estate of the Contractor and his surety shall remain liable hereunder to the same extent as though the Contractor had lived. Notice of default, as provided in Article 9.01 hereof, shall not be required to be given in the event of such death or adjudication of incompetency.

ARTICLE 11.11 NUMBER AND GENDER OF WORDS

Whenever the context so admits or requires, all references herein in one number shall be deemed extended to and including the other number, whether singular or plural, and the use of any gender shall be applicable to all genders.

ARTICLE 11.12 ACCESS TO RECORDS

Representatives of Federal Agencies, if applicable, and the State of Florida shall have access to the work whenever it is in preparation of progress. On federally assisted projects the Federal Agency, the Comptroller General of the United States, or any authorized representative shall have access to any books, documents, papers, and records of the Contractor which are pertinent to the project for the purpose of making audit, examination, excerpts, and transcription thereof.

SECTION 12
LABOR STANDARDS

ARTICLE 12.01 LABOR STANDARDS

The Contractor shall comply with all of the regulations set forth in "Labor Standards Provisions for Federally Assisted Construction Contracts", which may be attached, and any applicable Florida Statutes.

ARTICLE 12.02 NOTICE TO LABOR UNIONS

If required, the Contractor shall provide Labor Unions and other organizations of workers, and shall post, in a conspicuous place available to employees or applicants for employment, a completed copy of the form entitled "Notice to Labor Unions or Other Organizations of Workers" attached to and made a part of this Agreement.

ARTICLE 12.03 SAFETY AND HEALTH REGULATIONS

The Contractor shall comply with the Department of Labor Safety and Health Regulations for construction promulgated under the Occupational Safety and Health Act of 1970 (PL 91- 596) and under Section 107 of the Contract Work Hours and Safety Standards Act (PL 91-54). Nothing in these Acts shall be construed to supersede or in any manner affect any worker's compensation law or statutory rights, duties, or liabilities of employers and employees under any law with respect to injuries, diseases, or death of employees arising out of, or in the course of, employment.

ARTICLE 12.04 EEO AFFIRMATIVE ACTION REQUIREMENTS

The Contractor understands and agrees to be bound by the equal opportunity requirements of Federal regulations which shall be applicable throughout the performance of work under this Contract. The Contractor also agrees to similarly bind contractually each subcontractor. In policies, the Contractor agrees to engage in Affirmative Action directed at promoting and ensuring equal employment opportunity in the work force used under the Contract (and the Contractor agrees to require contractually the same effort of all subcontractors whose subcontractors exceed $100,000). The Contractor understands and agrees that "Affirmative Action" as used herein shall constitute a good faith effort to achieve and maintain minority employment in each trade in the on-site work force used on the Contract.

ARTICLE 12.05 PREVAILING RATES OF WAGES

Florida's prevailing wage law was repealed effective April 25, 1979.

For Federally assisted projects, appropriate prevailing wage rate determinations are indicated on pages beginning with WR-1.

* * * * * * *

IN WITNESS THEREOF, the parties have hereunto set their hands and seals, and such of them as are corporation have caused these present to be signed by their duly authorized officers.

CITY OF TAMPA, FLORIDA

_____
Bob Buckhorn, Mayor
(SEAL)

ATTEST:

_____
City Clerk

Approved as to Form:
The execution of this document was authorized by Resolution No. _____

_____
Justin R. Vaske, Assistant City Attorney

Contractor

By:_____
(SEAL)

Title:

ATTEST:

_____
, Secretary

STATE OF)
) SS:
COUNTY OF)

For a Corporation:

STATE OF _____
COUNTY OF _____

The foregoing instrument was acknowledged before me this ___ of _____, 20___ by _____ of _____, a _____ corporation, on behalf of the corporation. He/she is ___ personally known or has ___ produced _____ as identification.

_____
Notary

My Commission Expires:

_____

For an Individual:

STATE OF _____
COUNTY OF _____

The foregoing instrument was acknowledged before me this ___ of _____, 20___ by _____ who is ___ personally known to me or has ___ produced _____ as identification.

_____
Notary

My Commission Expires:

_____

For a Firm:

STATE OF _____
COUNTY OF _____

The foregoing instrument was acknowledged before me this ___ of _____, 20___ by _____ who signed on behalf of the said firm. He/she is ___ personally known or has ___ produced _____ as identification.

_____
Notary

My Commission Expires:

_____

_____

PUBLIC CONSTRUCTION BOND

Bond No. (enter bond number)_____

Name of Contractor:_____

Principal Business Address of Contractor:_____

_____

Telephone Number of Contractor:_____

Name of Surety (if more than one list each):_____

_____

Principal Business Address of Surety:_____

_____

Telephone Number of Surety:_____

Owner is The City of Tampa, Florida

Principal Business Address of Owner: 306 E Jackson St, Tampa, FL 33602

Contract Administration Department (280A4N)

Telephone Number of Owner: 813/274-8456

Contract Number Assigned by City to contract which is the subject of this bond:_____

Legal Description or Address of Property Improved or Contract Number is:_____

_____

_____

_____

General Description of Work and Services:_____

_____

_____

_____

KNOW ALL MEN BY THESE PRESENTS That we, _____

_____
(Name of Contractor)

as Principal, hereinafter called CONTRACTOR, of the State of _____, and

_____(Name of Surety)
a corporation organized and existing under and by virtue of the laws of the State of _____, and regularly authorized to do business in the State of Florida, as SURETY, are held and firmly bound unto the City of Tampa, a municipal corporation organized and existing under the laws of the State of Florida, hereinafter called Owner, in the penal sum of _____Dollars and _____Cents ($_____), lawful money of the United States of America, for the payment whereof well and truly to be made, we bind ourselves, our heirs, executors, and administrators, successors and assigns, jointly and severally, firmly by these presents.

THE CONDITION OF THIS BOND is that if Principal:

1. Performs the contract dated _____, _____, 20___, between Principal and Owner for construction of _____, the contract being made a part of this bond by reference, in the time and in the manner prescribed in the contract; and

2. Promptly makes payments to all claimants, as defined in Section 255.05(1) (Section 713.01), Florida Statutes, supplying Principal with labor, materials, or supplies, used directly or indirectly by Principal in the prosecution of the work provided for in the contract; and

3. Pays Owner all losses, damages, expenses, costs, and attorney's fees, including appellate proceedings, that Owner sustains because of a default by Principal under the contract; and

4. Performs the guarantee of all work and materials furnished under the contract for the time specified in the contract, then this bond is void; otherwise it remains in full force.

5. Contractor and Surety acknowledge that the Work for which this bond has been issued may be one of several such contract documents for a group of projects. This bond does not secure covenants to pay for or to perform design services survey or program management services. The Owner/Obligee is expected to reasonably account for damages that are caused to Owner with respect to Principal's (Contractor's) default in performance of the scope of the Work incorporated by reference into the bond, and notwithstanding any contractual or common law remedy permitted to Owner as against Contractor, the obligation of Surety for any damages under this bond shall be determined by the cost of completion of the Work less the contract balance unpaid upon default of Contractor for the Work plus liquidated damages at the rate of $500.00 per day for delays by the Contractor and/or Surety in reaching substantial completion.

6. The notice requirements for claimants and conditions for entitlement to payment set forth in Section 255.05, Fla. Stat. and the limitations period to actions upon Section 255.05, Fla. Stat. bonds apply to claimants seeking payment from surety under this bond. Any action instituted by a claimant under this bond for payment must be in accordance with the notice and time limitation provisions in Section 255.05, Florida Statutes.

7. The Surety, for value received, hereby stipulates and agrees that no changes, extensions of time, alterations or additions to the terms of the contract documents or other Work to be performed hereunder, or the specifications referred to therein shall in any way affect its obligations under this bond, and it does hereby waive notice of any such changes, extensions of time, alterations or additions to the terms of the Contract or to Work or to the specifications.

8. The above SURETY states that it has read all of the Contract Documents made by the CONTRACTOR with the CITY, hereto attached, and the terms and conditions of the contract and work, and is familiar therewith and in particular those portions of the Agreement concerning the guaranty of such CONTRACTOR for a period of one year following the date of the final acceptance of the completed work under the Contract by the CITY, all of which this BOND includes.

DATED ON _____, 20___

_____
(Name of Principal)

_____
(Principal Business Address)

By _____

Title _____

_____
Telephone Number of Principal

Countersignature:

_____
(Name of Local Agency)

_____
(Address of Resident Agent)

By _____

Title _____

_____
Telephone Number of Local Agency

_____
(Name of Surety)

_____
(Surety Address)

By _____
(As Attorney in Fact)*

_____
Telephone Number of Surety

Accepted by City of Tampa:

By _____
Bob Buckhorn, Mayor

Date: _____ 20____

Approved as to legal sufficiency:

By _____
Assistant City Attorney

Date: _____, 20____

*(As Attorney in Fact) attach Power of Attorney and Current Certificate with Original Signature

SPECIFICATIONS
GENERAL PROVISIONS

SECTION 1
SCOPE AND INTENT

G-1.01 DESCRIPTION
The work to be done consists of the furnishing of all labor, materials and equipment, and the performance of all work included in this Contract.

G-1.02 WORK INCLUDED
The Contractor shall furnish all labor, superintendence, materials, plant, power, light, heat, fuel, water, tools, appliances, equipment, supplies, and other means of construction necessary or proper for performing and completing the work. He shall obtain and pay for all required permits. He shall perform and complete the work in the manner best calculated to promote rapid construction consistent with safety of life and property and to the satisfaction of the Engineer, and in strict accordance with the Contract Documents. The Contractor shall clean up the work and maintain it during and after construction, until accepted, and shall do all work and pay all costs incidental thereto. He shall repair or restore all structures and property that may be damaged or disturbed during performance of the work.

The cost of incidental work described in these General Provisions, for which there are no specific Contract Items, shall be considered as part of the overhead cost of doing the work and shall be included in the prices for the various Contract Items. No additional payment will be made therefor.

The Contractor shall provide and maintain such modern plant, tools, and equipment as may be necessary, in the opinion of the Engineer, to perform in a satisfactory and acceptable manner all the work required by this Contract. Only equipment of established reputation and proven efficiency shall be used. The Contractor shall be solely responsible for the adequacy of his plant and equipment, prior approval of the Engineer notwithstanding.

G-1.03 PUBLIC UTILITY INSTALLATIONS AND STRUCTURES
Public utility installations and structures shall be understood to include all poles, tracks, pipes, wires, conduits, house service connections, vaults, manholes, and all other appurtenances and facilities pertaining thereto whether owned or controlled by the City, other governmental bodies or privately owned by individuals, firms, or corporations, and used to serve the public with transportation, traffic control, gas, electricity, telephone, sewerage, drainage, water or other public or private property which may be affected by the work.

The Contract Documents contain data relative to existing public utility installations and structures above and below the ground surface. These data are not guaranteed as to their completeness or accuracy and it is the responsibility of the Contractor to make his own investigations to inform himself fully of the character, condition and extent of all such installations and structures as may be encountered and as may affect the construction operations.

The Contractor shall protect all public utility installations and structures from damage during the work. Access across any buried public utility installation or structure shall be made only in such locations and by means approved by the Engineer. The Contractor shall so arrange his operations as to avoid any damage to these facilities. All required protective devices and construction shall be provided by the Contractor at his expense. All existing public utilities damaged by the Contractor which are shown on the Plans or have been located in the field by the utility shall be repaired by the Contractor, at his expense, as directed by the Engineer. No separate payment shall be made for such protection or repairs to public utility installations or structures.

Public utility installations or structures owned or controlled by the City or other governmental body which are shown on the Plans to be removed, relocated, replaced or rebuilt by the Contractor shall be considered as a part of the general cost of doing the work and shall be included in the prices bid for the various Contract Items. No separate payment shall be made therefor.

Where public utility installations or structures owned or controlled by the City or other governmental body are encountered during the course of the work, and are not indicated on the Plans or in the Specifications, and when, in the opinion of the Engineer, removal, relocation, replacement or rebuilding is necessary to complete the work under this Contract, such work shall be accomplished by the utility having jurisdiction or such work may be ordered, in writing by the Engineer, for the Contractor to accomplish. If such work is accomplished by the utility having jurisdiction it will be carried out expeditiously and the Contractor shall give full cooperation to permit the utility to complete the removal, relocation, replacement or rebuilding as required. If such work is accomplished by the Contractor, it will be paid for as extra work as provided for in Article 7.02 of the Agreement.

The Contractor shall, at all times in performance of the work, employ approved methods and exercise reasonable care and skill so as to avoid unnecessary delay, injury, damage or destruction of public utility installations and structures; and shall, at all times in the performance of the work, avoid unnecessary interference with, or interruption of, public utility services, and shall cooperate fully with the owners thereof to that end.

All City and other governmental utility departments and other owners of public utilities, which may be affected by the work, will be informed in writing by the Engineer within two weeks after the execution of the Contract or Contracts covering the work. Such notice will set out, in general, and direct attention to, the responsibilities of the City and other governmental

utility departments and other owners of public utilities for such installations and structures as may be affected by the work and will be accompanied by one set of Plans and Specifications covering the work under such Contract or Contracts.

In addition to the general notice given by the Engineer, the Contractor shall give written notice to all City and other governmental utility departments and other owners of public utilities of the location of his proposed construction operations, at least forty-eight (48) hours in advance of breaking ground in any area or on any unit of the work. This can be accomplished by making the appropriate contact with the "Underground Utility Notification Center for Excavators (Call Candy)".

The maintenance, repair, removal, relocation, or rebuilding of public utility installations and structures, when accomplished by the Contractor as herein provided, shall be done by methods approved by the Engineer.

SECTION 2
PLANS AND SPECIFICATIONS

G-2.01 PLANS
The Plans referred to in the Contract Documents bear the general project name and number as shown in the Notice To Bidders.

When obtaining data and information from the Plans, figures shall be used in preference to scaled dimensions, and large scale drawings in preference to small scale drawings.

G-2.02 COPIES FURNISHED TO CONTRACTOR
After the Contract has been executed, the Contractor will be furnished with five sets of paper prints, the same size as the original drawings, of each sheet of the Plans and five copies of the Specifications. Additional copies of the Plans and Specifications, when requested, may be furnished to the Contractor at cost of reproduction.

The Contractor shall furnish each of the subcontractors, manufacturers, and material suppliers such copies of the Contract Documents as may be required for his work.

G-2.03 SUPPLEMENTARY DRAWINGS
When, in the opinion of the Engineer, it becomes necessary to explain more fully the work to be done or to illustrate the work further or to show any changes which may be required, drawings known as Supplementary Drawings, with specifications pertaining thereto, will be prepared by the Engineer and five paper prints thereof will be given to the Contractor.

The Supplementary Drawings shall be binding upon the Contractor with the same force as the Plans. Where such Supplementary Drawings require either less or more than the estimated quantities of work, credit to the City or compensation therefor to the Contractor shall be subject to the terms of the Agreement.

G-2.04 CONTRACTOR TO CHECK PLANS AND DATA
The Contractor shall verify all dimensions, quantities, and details shown on the Plans, Supplementary Drawings, Schedules, Specifications, or other data received from the Engineer, and shall notify him of all errors, omissions, conflicts, and discrepancies found therein. Failure to discover or correct errors, conflicts or discrepancies shall not relieve the Contractor of full responsibility for unsatisfactory work, faulty construction or improper operation resulting therefrom nor from rectifying such conditions at his own expense. He will not be allowed to take advantage of any errors or omissions as full instructions will be furnished by the Engineer, should such errors or omissions be discovered. All schedules are given for the convenience of the Engineer and the Contractor and are not guaranteed to be complete. The Contractor shall assume all responsibility for the making of estimates of the size, kind, and quality of materials and equipment included in work to be done under the Contract.

G-2.05 SPECIFICATIONS
The specifications consist of four parts, the General Provisions, the Technical Specifications, the Special Provisions and the Contract Items. The General Provisions and Technical Specifications contain general requirements which govern the work. The Special Provisions and the Contract Items modify and supplement these by detailed requirements for the work and shall always govern, whenever there appears to be conflict.

G-2.06 INTENT
All work called for in the Specifications applicable to this Contract, but not shown on the Plans in their present form, or vice versa, shall be of like effect as if shown or mentioned in both. Work not specified in either the Plans or in the Specifications, but involved in carrying out their intent or in the complete and proper execution of the work, is required and shall be performed by the Contractor as though it were specifically delineated or described.

The apparent silence of the Specifications as to any detail, or the apparent omission from them of a detailed description concerning any work to be done and materials to be furnished, shall be regarded as meaning that only the best general practice is to prevail and that only material and workmanship of the best quality is to be used, and interpretation of these Specifications shall be made upon that basis.

SECTION 3
WORKING DRAWINGS

G-3.01 SCOPE
The Contractor shall promptly prepare and submit layout, detail and shop drawings to insure proper construction, assembly, and installation of the work using those materials and methods as hereafter specified under the Technical Specifications, Special Provisions and Contract Items.

These drawings shall accurately and distinctly present the following:

a. All working and erection dimensions.
b. Arrangements and sectional views.
c. Necessary details, including complete information for making connections between work under this Contract and work under other Contracts.
d. Kinds of materials and finishes.
e. Parts listed and description thereof.

Drawings for mechanical equipment shall present, where applicable, such data as dimensions, weight and performance characteristics. These data shall show conformance with the performance characteristics and other criteria incorporated in the Plans and Specifications.

Each drawing shall be dated and shall contain the name of the project, Division number and description, the technical specifications section number, names of equipment or materials and the location at which the equipment or materials are to be installed. Location shall mean both physical location and location relative to other connected or attached material. The Engineer will return unchecked any submittal which does not contain complete data on the work and full information on related matters.

Stock or standard drawings will not be accepted for review unless full identification and supplementary information is shown thereon in ink or typewritten form.

The Contractor shall review all working drawing submittals before transmitting them to the Engineer to determine that they comply with requirements of the Specifications. Drawings which are incomplete or are not in compliance with the Contract Documents shall not be submitted for processing by the Engineer. The Contractor shall place his stamp of approval on all working drawings submitted to the Engineer to indicate compliance with the above.

G-3.02 APPROVAL
If the working drawings show departures from the Contract requirements, the Contractor shall make specific mention thereof in his letter of submittal; otherwise approval of such submittals shall not constitute approval of the departure. Approval of the drawings shall constitute approval of the subject matter thereof only and not of any structure, material, equipment, or apparatus shown or indicated.

The approval of drawings will be general and shall not relieve the Contractor of responsibility for the accuracy of such drawings, nor for the proper fitting and construction of the work, nor for the furnishing of materials or work required by the Contract and not indicated on the drawings. No work called for by working drawings shall be done until such drawings have been approved by the Engineer.

The procedure in seeking approval of the working drawings shall be as follows:

1.The Contractor shall submit four complete sets of drawings and other descriptive data together with one copy of a letter of transmittal to the Engineer for approval. The letter of transmittal shall contain the name of the project, contract number, technical specifications section number, the name of the Contractor, a list of drawings with numbers and titles, and any other pertinent information.

2.Drawings or descriptive data will be stamped "Approved", "Approved Subject to Corrections Marked", or "Examined and Returned for Correction" and one copy with a letter of transmittal will be returned to the Contractor.

3.If a drawing or other data is stamped "Approved", the Contractor shall insert the date of approval on five additional copies of the document and transmit the five copies to the Engineer together with one copy of a letter of transmittal containing substantially the same information as described in Instruction 1. above.

4.If a drawing or other data is stamped "Approved Subject to Corrections Marked", the Contractor shall make the corrections indicated and proceed as in Instruction 3., above.

5.If a drawing or data is stamped "Examined and Returned for Correction", the Contractor shall make the necessary corrections and resubmit the documents as set forth in Instruction 1., above. The letter of transmittal shall indicate that this is a resubmittal.

The Contractor shall revise and resubmit the working drawings as required by the Engineer, until approval thereof is obtained.

SECTION 4
MATERIALS AND EQUIPMENT

G-4.01 GENERAL REQUIREMENTS
All materials, appliances, and types or methods of construction shall be in accordance with the Specifications and shall, in no event, be less than that necessary to conform to the requirements of any applicable laws, ordinances, and codes.

All materials and equipment shall be new, unused, and correctly designed. They shall be of standard first grade quality, produced by expert personnel, and intended for the use for which they are offered. Materials or equipment which, in the opinion of the Engineer, are inferior or of a lower grade than indicated, specified, or required will not be accepted.

The quality of Workmanship and Materials entering into the work under this Contract shall conform to the requirements of the pertinent sections, clauses, paragraphs, and sentences, both directly and indirectly applicable thereto, of that part of the Technical Specifications, whether or not direct reference to such occurs in the Contract Items.

Equipment and appurtenances shall be designed in conformity with ANSI, ASME, IEEE, NEMA and other

generally accepted standards and shall be of rugged construction and of sufficient strength to withstand all stresses which may occur during fabrication, testing, transportation, installation, and all conditions of operation. All bearings and moving parts shall be adequately protected against wear by bushings or other approved means and shall be fully lubricated by readily accessible devices. Details shall be designed for appearance as well as utility. Protruding members, joints, corners, gear covers, and the like, shall be finished in appearance. All exposed welds shall be ground smooth and the corners of structural shapes shall be mitered.

Equipment shall be of the approximate dimensions as indicated on the Plans or as specified, shall fit the spaces shown on the Plans with adequate clearances, and shall be capable of being handled through openings provided in the structure for this purpose. The equipment shall be of such design that piping and electrical connections, ductwork, and auxiliary equipment can be assembled and installed without causing major revisions to the location or arrangement of any of the facilities.

Machinery parts shall conform exactly to the dimensions shown on the working drawings. There shall be no more fitting or adjusting in setting up a machine than is necessary in assembling high grade apparatus of standard design. The equivalent parts of identical machines shall be made interchangeable. All grease lubricating fittings on equipment shall be of a uniform type. All machinery and equipment shall be safeguarded in accordance with the safety codes of the ANSI and applicable state and local codes.

G-4.02 MANUFACTURER

The names of proposed manufacturers, suppliers, material, and dealers who are to furnish materials, fixtures, equipment, appliances or other fittings shall be submitted to the Engineer for approval, as early as possible, to afford proper investigation and checking. Such approval must be obtained before shop drawings will be checked. No manufacturer will be approved for any materials to be furnished under this Contract unless he shall be of good reputation and have a plant of ample capacity. He shall, upon the request of the Engineer, be required to submit evidence that he has manufactured a similar product to the one specified and that it has been previously used for a like purpose for a sufficient length of time to demonstrate its satisfactory performance.

All transactions with the manufacturers or subcontractors shall be through the Contractor, unless the Contractor shall request, in writing to the Engineer, that the manufacturer or subcontractor deal directly with the Engineer. Any such transactions shall not in any way release the Contractor from his full responsibility under this Contract.

Any two or more pieces of material or equipment of the same kind, type or classification, and being used for identical types of service, shall be made by the same manufacturer.

G-4.03 REFERENCE TO STANDARDS

Whenever reference is made to the furnishing of materials or testing thereof to conform to the standards of any technical society, organization or body, it shall be construed to mean the latest standard, code, specification or tentative specification adopted and published at the date of advertisement for proposals, even though reference has been made to an earlier standard, and such standards are made a part hereof to the extent which is indicated or intended.

Reference to a technical society, organization or body may be made in the Specifications by abbreviations, in accordance with the following list:

AASHTO for American Association of State Highway and Transportation Officials (formerly AASHO)
ACI for American Concrete Institute
AGMA for American Gear Manufacturer's Association
AFBMA for Anti-Friction Bearing Manufacturer's Association
AISC for American Institute of Steel Construction
AISI for American Iron and Steel Institute
ANSI for American National Standards Institute
ASCE for American Society of Civil Engineers
ASTM for American Society for Testing and Materials
ASME for American Society of Mechanical Engineers
AWS for American Welding Society
AWWA for American Water Works Association
AWPA for American Wood Preservers Association
CEMA for Conveyor Equipment Manufacturers Association
CIPRA for Cast Iron Pipe Research Association
IEEE for Institute of Electrical and Electronic Engineers
IPCEA for Insulated Power Cable Engineers Association
NEC for National Electrical Code
NEMA for National Electrical Manufacturers Association
SAE for Society of Automotive Engineers
SHBI for Steel Heating Boiler Institute
Fed.Spec. for Federal Specifications
Navy Spec. for Navy Department Specifications
U.L.,Inc. for Underwriters' Laboratories, Inc.

When no reference is made to a code, standard or specification, the Standard Specifications of the ANSI, the ASME, the ASTM, the IEEE, or the NEMA shall govern.

G-4.04 SAMPLES

The Contractor shall, when required, submit to the Engineer for approval typical samples of materials and equipment. The samples shall be properly identified by tags and shall be submitted sufficiently in advance of the time when they are to be incorporated into the work, so that rejections thereof will not cause delay. A letter of transmittal, in duplicate, from the Contractor requesting approval must accompany all such samples.

G-4.05 EQUIVALENT QUALITY

Whenever, in the Contract Documents, an article, material, apparatus, equipment, or process is called for by trade name or by the name of a patentee, manufacturer, or dealer or by reference to catalogs of a manufacturer or dealer, it shall be understood as intending to mean and specify the article, material, apparatus, equipment or process designated, or any

equal thereto in quality, finish, design, efficiency, and durability and equally serviceable for the purposes for which it is intended.

Whenever material or equipment is submitted for approval as being equal to that specified, the decision as to whether or not such material or equipment is equal to that specified shall be made by the Engineer.

Upon rejection of any material or equipment submitted as the equivalent of that specifically named in the Contract, the Contractor shall immediately proceed to furnish the designated material or equipment.

Neither the approval by the Engineer of alternate material or equipment as being equivalent to that specified nor the furnishing of the material or equipment specified, shall in any way relieve the Contractor of responsibility for failure of the material or equipment, due to faulty design, material, or workmanship, to perform the functions required of them by the Specifications.

G-4.06 DELIVERY
The Contractor shall deliver materials in ample quantities to insure the most speedy and uninterrupted progress of the work so as to complete thw work within the allotted time. The Contractor shall also coordinate deliveries in order to avoid a delay in, or impediment of, the progress of the work of any related Contractor.

G-4.07 CARE AND PROTECTION
The Contractor shall be solely responsible for properly storing and protecting all materials, equipment, and work furnished under the Contract from the time such materials and equipment are delivered at the site of the work until final acceptance thereof. He shall, at all times, take necessary precautions to prevent injury or damage by water, freezing, or by inclemencies of the weather to such materials, equipment and work. All injury or damage to materials, equipment, or work resulting from any cause whatsoever shall be made good by the Contractor.

The Engineer shall, in all cases, determine the portion of the site to be used by the Contractor for storage, plant or for other purposes. If, however, it becomes necessary to remove and restack materials to avoid impeding the progress of any part of the work or interference with the work to be done by any other Contractor, the Contractor shall remove and restack such materials at his own expense.

G-4.08 TOOLS AND ACCESSORIES
The Contractor shall, unless otherwise stated in the Contract Documents, furnish with each type, kind or size of equipment, one complete set of suitably marked high grade special tools and appliances which may be needed to adjust, operate, maintain, or repair the equipment. Such tools and appliances shall be furnished in approved painted steel cases, properly labeled and equipped with good grade cylinder locks and duplicate keys.

Spare parts shall be furnished as specified.

Each piece of equipment shall be provided with a substantial nameplate, securely fastened in place and clearly inscribed with the manufacturer's name, year of manufacture, serial number, weight and principal rating data.

G-4.09 INSTALLATION OF EQUIPMENT
The Contractor shall have on hand sufficient proper equipment and machinery of ample capacity to facilitate the work and to handle all emergencies normally encountered in work of this character.

Equipment shall be erected in a neat and workmanlike manner on the foundations at the locations and elevations shown on the Plans, unless directed otherwise by the Engineer during installation. All equipment shall be correctly aligned, leveled and adjusted for satisfactory operation and shall be installed so that proper and necessary connections can be made readily between the various units.

The Contractor shall furnish, install and protect all necessary anchor and attachment bolts and all other appurtenances needed for the installation of the devices included in the equipment specified. Anchor bolts shall be as approved by the Engineer and made of ample size and strength for the purpose intended. Substantial templates and working drawings for installation shall be furnished.

The Contractor shall, at his own expense, furnish all materials and labor for, and shall properly bed in non-shrink grout, each piece of equipment on its supporting base that rests on masonry foundations. Grout shall completely fill the space between the equipment base and the foundation.

G-4.10 OPERATING INSTRUCTIONS
The Contractor, through qualified individuals, shall adequately instruct designated employees of the City in the operation and care of all equipment installed hereunder, except for equipment that may be furnished by the City.

The Contractor shall also furnish and deliver to the Engineer three complete sets for permanent files, identified in accordance with Subsection G-3.01 hereof, of instructions, technical bulletins and any other printed matter, such as diagrams, prints or drawings, containing full information required for the proper operation, maintenance, and repair, of the equipment installed and the ordering of spare parts, except for equipment that may be furnished by the City.

In addition to the above three copies, the Contractor shall furnish any additional copies that may be required for use during construction and start-up operations.

G-4.11 SERVICE OF MANUFACTURER'S ENGINEER
The Contract prices for equipment shall include the cost of furnishing a competent and experienced engineer or superintendent who shall represent the manufacturer and shall assist the Contractor, when required, to install, adjust, test and place in operation the equipment in conformity with the Contract Documents. After the equipment is placed in

permanent operation by the City, such engineer or superintendent shall make all adjustments and tests required by the Engineer to provide that such equipment is in proper and satisfactory operating condition, and shall instruct such personnel as may be designated by the City in the proper operation and maintenance of such equipment.

SECTION 5
INSPECTION AND TESTING

G-5.01 GENERAL
The Contractor's attention is hereby directed to Article 3.03 of the Agreement.

Inspection and testing of materials will be performed by the City unless otherwise specified.

For tests specified to be made by the Contractor, the testing personnel shall make the necessary inspections and tests and the reports thereof shall be in such form as will facilitate checking to determine compliance with the Contract Documents. Five copies of the reports shall be submitted and authoritative certification thereof must be furnished to the Engineer as a prerequisite for the acceptance of any material or equipment.

If, in the making of any test of any material or equipment, it is ascertained by the Engineer that the material or equipment does not comply with the Contract, the Contractor will be notified thereof and he will be directed to refrain from delivering said material and equipment, or to remove it promptly from the site or from the work and replace it with acceptable material, without cost to the City.

Tests of electrical and mechanical equipment and appliances shall be conducted in accordance with recognized test codes of the ANSI, ASME, or the IEEE, except as may otherwise be stated herein.

The Contractor shall be fully responsible for the proper operation of equipment during tests and instruction periods and shall neither have nor make any claim for damage which may occur to equipment prior to the time when the City formally takes over the operation thereof.

G-5.02 COSTS
All inspection and testing of materials furnished under this Contract will be performed by the City or duly authorized inspection engineers or inspection bureaus without cost to the Contractor, unless otherwise expressly specified.

The cost of shop and field tests of equipment and of certain other tests specifically called for in the Contract Documents shall be borne by the Contractor and such costs shall be deemed to be included in the contract price.

Materials and equipment submitted by the Contractor as the equivalent to those specifically named in the Contract may be tested by the City for compliance. The Contractor shall reimburse the City for the expenditures incurred in making such tests on materials and equipment which are rejected for noncompliance.

G-5.03 INSPECTIONS OF MATERIALS
The Contractor shall give notice, in writing to the Engineer, sufficiently in advance of his intention to commence the manufacture or preparation of materials especially manufactured or prepared for use in or as part of the permanent construction. Such notice shall contain a request for inspection, the date of commencement and the expected date of completion of the manufacture or preparation of materials. Upon receipt of such notice the Engineer will arrange to have a representative present at such times during the manufacture as may be necessary to inspect the materials or he will notify the Contractor that inspection will be made at a point other than the point of manufacture, or he will notify the Contractor that inspection will be waived. The Contractor must comply with these provisions before shipping any material. Such inspection shall not release the Contractor from the responsibility for furnishing materials meeting the requirements of the Contract Documents.

G-5.04 CERTIFICATE OF MANUFACTURE
When inspection is waived or when the Engineer so requires, the Contractor shall furnish to him authoritative evidence in the form of Certificates of Manufacture that the materials to be used in the work have been manufactured and tested in conformity with the Contract Documents. These certificates shall be notarized and shall include copies of the results of physical tests and chemical analyses, where necessary, that have been made directly on the product or on similar products of the manufacturer.

G-5.05 SHOP TESTS OF OPERATING EQUIPMENT
Each piece of equipment for which pressure, duty, capacity, rating, efficiency, performance, function, or special requirements are specified shall be tested in the shop of the maker in a manner which shall conclusively prove that its characteristics comply fully with the requirements of the Contract Documents. No such equipment shall be shipped to the work until the Engineer notifies the Contractor, in writing, that the results of such tests are acceptable.

Five copies of the manufacturer's actual test data and interpreted results thereof, accompanied by a certificate of authenticity sworn to by a responsible official of the manufacturing company, shall be forwarded to the Engineer for approval.

The cost of the shop tests and of furnishing manufacturer's preliminary and shop test data of operating equipment shall be borne by the Contractor.

G-5.06 PRELIMINARY FIELD TESTS
As soon as conditions permit, the Contractor shall furnish all labor, materials, and instruments and shall make preliminary field tests of equipment. If the preliminary field tests disclose any equipment furnished under this Contract which does not comply with the requirements of the Contract Documents, the Contractor shall, prior to the acceptance tests, make all changes, adjustments, and replacements required.

G-5.07 FINAL FIELD TESTS
Upon completion of the work and prior to final payment, all equipment and appliances installed under this Contract shall be subjected to acceptance tests as specified or required to prove compliance with the Contract Documents.

The Contractor shall furnish labor, fuel, energy, water and all other materials, equipment, and instruments necessary for all acceptance tests, at no additional cost to the City.

G-5.08 FAILURE OF TESTS
Any defects in the materials and equipment or their failure to meet the tests, guarantees or requirements of the Contract Documents shall be promptly corrected by the Contractor by replacements or otherwise. The decision of the Engineer as to whether or not the Contractor has fulfilled his obligations under the Contract shall be final and conclusive. If the Contractor fails to make those corrections or if the improved materials and equipment, when tested, shall again fail to meet the guarantees or specified requirements, the City, notwithstanding its partial payment for work, and materials and equipment, may reject the materials and equipment and may order the Contractor to remove them from the site at his own expense.

In case the City rejects any materials and equipment, then the Contractor shall replace the rejected materials and equipment within a reasonable time. If he fails to do so, the City may, after the expiration of a period of thirty calendar days after giving him notice in writing, proceed to replace such rejected materials and equipment, and the cost thereof shall be deducted from any compensation due or which may become due the Contractor under this Contract.

The City agrees to obtain other equipment within a reasonable time and the Contractor agrees that the City may use the equipment furnished by him without rental or other charges until the new equipment is obtained.

Materials or work in place that fails to pass acceptability tests shall be retested at the direction of the construction engineer all such retests shall be at the Contractor's expense. The rates charged shall be in accordance with the Department of Public Works current annual inspection contract which is available for inspection at the offices of the Department of Public Works.

G-5.09 FINAL INSPECTION
The procedures for final inspection shall be in accordance with the provisions of Article 4.07 of the Agreement. During such final inspections, the work shall be clean and free from water. In no case will the final estimate be prepared until the Contractor has complied with all the requirements set forth and the Engineer has made his final inspection of the entire work and is satisfied that the entire work is properly and satisfactorily cosntructed in accordance with the requirements of the Contract Documents.

SECTION 6

TEMPORARY STRUCTURES

G-6.01 GENERAL
All false work, scaffolding, ladders, hoistways, braces, pumping plants, shields, trestles, roadways, sheeting, centering forms, barricades, drains, flumes, and the like, any of which may be needed in the construction of any part of the work and which are not herein described or specified in detail, must be furnished, maintained and removed by the Contractor, and he shall be responsible for the safety and efficiency of such works and for any damages that may result from their failure or from their improper construction, maintenance, or operation.

G-6.02 PUBLIC ACCESS
At all points in the work where public access to any building, house, place of business, public road, or sidewalk would be obstructed by any action of the Contractor in executing the work required by this Contract, the Contractor shall provide such temporary structure, bridges or roadway as may be necessary to maintain public access at all times. At least one lane for vehicular traffic shall be maintained in streets in which the Contractor is working. Street closure permits are required from the Department of Public Works.

The Contractor shall provide suitable temporary bridges, as directed by the Engineer, at street intersections when necessary for the maintenance of vehicular and pedestrian traffic.

Prior to temporarily cutting of access to driveways and garages, the Contractor shall give twelve (12) hours notice to affected property owners. Interruptions to use of private driveways shall be kept to a minimum.

G-6.03 CONTRACTOR'S FIELD OFFICE
The Contractor shall erect, furnish and maintain a field office with a telephone at the site during the entire period of construction. He or an authorized agent shall be present at this office at all times while his work is in progress. Readily accessible copies of both the Contract Documents and the latest approved working drawings shall be kept at this field office.

G-6.04 TEMPORARY FENCE
If, during the course of the work, it is necessary to remove or disturb any fence or part thereof, the Contractor shall, at his own expense, if so ordered by the Engineer, provide a suitable temporary fence which shall be maintained until the permanent fence is replaced. The Engineer shall be solely responsible for the determination of the necessity for providing a temporary fence and the type of temporary fence to be used.

G-6.05 RESPONSIBILITY FOR TEMPORARY STRUCTURES
In accepting the Contract, the Contractor assumes full responsibility for the sufficiency and safety of all temporary structures or work and for any damage which may result from their failure or their improper construction, maintenance, or operation and will indemnify and save harmless the City from

all claims, suits or actions and damages or costs of every description arising by reason of failure to comply with the above provisions.

SECTION 7
TEMPORARY SERVICES

G-7.01 WATER
The Contractor shall provide the necessary water supply at his own expense. He shall, if necessary, provide and lay necessary waterlines from existing mains to the place of using, shall secure all necessary permits and pay for all taps to water mains or hydrants and for all water used at the established rates.

G-7.02 LIGHT AND POWER
The Contractor shall provide, at his own expense, temporary lighting and power facilities required for the proper prosecution and inspection of the work. If, in the opinion of the Engineer, these facilities are inadequate, the Contractor will not be permitted to proceed with any portion of the work affected thereby.

G-7.03 SANITARY REGULATIONS
The Contractor shall prohibit and prevent the committing of nuisances on the site of the work or on adjoining property and shall discharge any employee who violates this rule.

Ample washrooms and toilet facilities and a drinking water supply shall be furnished and maintained in strict conformity with the law by the Contractor for use by his employees.

G-7.04 ACCIDENT PREVENTION
Precautions shall be exercised at all times for the protection of persons and property. The safety provisions of applicable laws, building and construction codes shall be observed. The Contractor shall comply with the U. S. Department of Labor Safety and Health Regulations for construction promulgated under the Occupational Safety and Health Act of 1970 (PL 91-596), and under Section 107 of the Contract Work. Hours and Safety Standards Act (PL 91-54), except where state and local safety standards exceed the federal requirements and except where state safety standards have been approved by the Secretary of Labor in accordance with provisions of the Occupational Safety and Health Act.

G-7.05 FIRST AID
The Contractor shall keep upon the site, at each location where work is in progress, a completely equipped first aid kit and shall provide ready access thereto at all times when men are employed on the work.

G-7.06 HEATING
The Contractor shall provide temporary heat, at his own expense, whenever required on account of work being carried on during cold weather and to prevent freezing of water pipes and other damage to the work.

SECTION 8
LINES AND GRADES

G-8.01 GENERAL
All work done under this Contract shall be constructed in accordance with the lines and grades shown on the Plans, or as given by the Engineer. The full responsibility for keeping alignment and grade shall rest upon the Contractor.

The Engineer will establish bench marks and base line controlling points. Reference remarks for lines and grades as the work progresses will be located to cause as little inconvenience to the prosecution of the work as possible. The Contractor shall so place excavation and other materials as to cause no inconvenience in the use of the use of the reference marks provided. He shall remove any obstructions placed by him contrary to this provision.

G-8.02 SURVEYS
The Contractor shall furnish and maintain, at his own expense, stakes and other such materials, and give such assistance, including qualified helpers, as may be required by the Engineer for setting reference marks. The Contractor shall check such reference marks by such means as he may deem necessary and, before using them, shall call the Engineer's attention to any inaccuracies. The Contractor shall, at his own expense, establish all working or construction lines and grades as required from the reference marks set by the Engineer, and shall be solely responsible for the accuracy thereof. He shall, however, be subject to the check and review of the Engineer.

The Contractor shall keep the Engineer informed a reasonable time in advance as to his need for line and grade reference marks, in order that they may be furnished and all necessary measurements made for record and payment with the minimum of inconvenience to the Engineer or of delay to the Contractor.

It is the intention not to delay the work for the establishment of reference marks but, when necessary, working operations shall be suspended for such reasonable time as the Engineer may require for this purpose.

G-8.03 SAFEGUARDING MARKS
The Contractor shall safeguard all points, stakes, grade marks, monuments and bench marks made or established on the work, bear the cost of reestablishing them if disturbed, and bear the entire expense of rectifying work improperly installed due to not maintaining or protecting or to removing without authorization such established points, stakes and marks.

The Contractor shall safeguard all existing and known property corners, monuments and marks adjacent to but not related to the work and, if required, shall bear the cost of reestablishing them if disturbed or destroyed.

G-8.04 DATUM PLANE
All elevations indicated or specified refer to the Mean Sea Level Datum of the U.S.C. & G.S. (N.O.S.) which is 0.80 feet above the Mean Low Water Datum of the U. S. Army

Corps of Engineers.

SECTION 9
ADJACENT STRUCTURES AND LANDSCAPING

G-9.01 RESPONSIBILITY
The responsibility for removal, replacement, relocation, repair, rebuilding or protection of all public utility installations, including poles, tracks, pipes, wires, conduits, house service connections, vaults, manholes, sewers, traffic control and fire alarm signal circuit installations and other appurtenances and facilities shall be in accordance with G-1.02 and G-1.03.

The Contractor shall also be entirely responsible and liable for all damage or injury as a result of his operations to all other adjacent public and private property, structures of any kind and appurtenances thereto met with during the progress of the work. The cost of protection, replacement in their original locations and conditions or payment of damages for injuries to such adjacent public and private property and structures affected by the work, whether or not shown on the Plans, and the removal, relocation, and reconstruction of such items called for on the Plans or specified shall be included in the various Contract Items and no separate payment will be made therefor. Where such public and private property, structures of any kind and appurtenances thereto are not shown on the Plans and when, in the opinion of the Engineer, removal or relocation and reconstruction is necessary to avoid interference with the work, payment therefor will be made as provided for extra work in Article 7.02 of the Agreement.

G-9.02 PROTECTION OF TREES
All trees and shrubs shall be adequately protected by the Contractor with boxes or otherwise and, within the City of Tampa, in accordance with ordinances governing the protection of trees. No excavated materials shall be placed so as to injure such trees or shrubs. Trees or shrubs destroyed by negligence of the Contractor or his employees shall be replaced by him with new stock of similar size and age, at the proper season, and at the sole expense of the Contractor.

Beneath trees or other surface structures, where possible, pipelines may be built in short tunnels, backfilled with excavated materials, except as otherwise specified, or the trees or structures carefully supported and protected from damage.

The City may order the Contractor, for the convenience of the City, to remove trees along the line of trench excavation. If so ordered, the City will obtain any permits required for removal of trees. Such tree removal ordered shall be paid for under the appropriate Contract Items.

G-9.03 LAWN AREAS
Lawn areas shall be left in as good condition as before the starting of the work. Where sod is to be removed, it shall be carefully removed and later replaced, or the area where sod has been removed shall be restored with new sod in the manner described in the Technical Specifications section.

G-9.04 RESTORATION OF FENCES
Any fence, or part thereof, that is damaged or removed during the course of the work shall be replaced or repaired by the Contractor and shall be left in as good a condition as before the starting of the work. The manner in which the fence is repaired or replaced and the materials used in such work shall be subject to the approval of the Engineer. The cost of all labor, materials, equipment, and work for the replacement or repair of any fence shall be deemed included in the appropriate Contract Item or Items, or if no specific Item is provided therefor, as part of the overhead cost of the work, and no additional payment will be made therefor.

SECTION 10
PROTECTION OF WORK AND PUBLIC

G-10.01 TRAFFIC REGULATIONS
The Contractor shall arrange his work to comply with Article G-6.02. The work shall be done with the least possible inconvenience to the public and to that end the work may be confined by the Engineer to one block at a time.

G-10.02 BARRIERS AND LIGHTS
During the prosecution of the work, the Contractor shall put up and maintain at all times such barriers, and lights, as will effectually prevent accidents. The Contractor shall provide suitable barricades, red lights, "danger" or "caution" or "street closed" signs and watchmen at all places where the work causes obstructions to the normal traffic or constitutes in any way a hazard to the public. Such barriers and signs shall be constructed to State of Florida Department of Transportation standards and placed as recommended by the Traffic Division of the City's Department of Public Works.

No open fires will be permitted.

G-10.03 SMOKE PREVENTIONS
The Contractor shall use hard coal, coke, oil or gas as fuel for equipment generating steam. A strict compliance with ordinances regulating the production and emission of smoke will be required.

G-10.04 NOISE
The Contractor shall eliminate noise to as great an extent as practicable at all times. Air compressing plants shall be equipped with silencers and the exhaust of all gasoline motors or other power equipment shall be provided with mufflers. In the vicinity of hospitals and schools, special care shall be used to avoid noise or other nuisances. The Contractor shall strictly observe all local regulations and ordinances covering noise control.

Except in the event of an emergency, no work shall be done between the hours of 7:00 p.m. and 7:00 a.m., or on Sundays. If the proper and efficient prosecution of the work requires operations during the night, the written permission of the Engineer shall be obtained before starting such items of the work.

G-10.05 ACCESS TO PUBLIC SERVICES
Neither the materials excavated nor the materials or plant used in the construction of the work shall be so placed as to prevent free access to all fire hydrants, valves or manholes.

G-10.06 DUST PREVENTION
The Contractor shall prevent dust nuisance from his operations or from traffic by keeping the streets sprinkled with water at all times.

G-10.07 PRIVATE PROPERTY
The Contractor shall so conduct the work that no equipment, material, or debris will be placed or allowed to fall upon private property in the vicinity of the work unless he shall have obtained the owner's written consent thereto and shall have shown this consent to the Engineer.

SECTION 11
SLEEVES AND INSERTS

G-11.01 COORDINATION
When the Contract requires the placing of conduits, saddles, boxes, cabinets, sleeves, inserts, foundation bolts, anchors, and other like work in floors, roofs, or walls of buildings and structures, they shall be promptly installed in conformity with the construction program. The Contractor who erects the floors, roofs, and walls shall facilitate such work by fully cooperating with the Contractors responsible for installing such appurtenances. The Contractor responsible for installing such appurtenances shall arrange the work in strict conformity with the construction schedule and avoid interference with the work of other contractors.

G-11.02 OPENINGS TO BE PROVIDED
In the event timely delivery of sleeves and other materials cannot be made and to avoid delay, the affected Contractor may arrange to have boxes or other forms set at the locations where the appurtenances are to pass through or into the floors, roofs, walls, or other work. Upon the subsequent installation of these appurtenances, the Contractor erecting the structure shall fill around them with materials as required by the Contract. The necessary expenditures incurred for the boxing out and filling in shall be borne by the Contractor or Contractors required to furnish the sleeves and inserts. Formed openings and later installation of sleeves will not be permitted at locations subject to hydrostatic pressure.

SECTION 12
CUTTING AND PATCHING

G-12.01 GENERAL
The Contractor shall do all cutting, fitting, or patching of his portion of the work that may be required to make the several parts thereof join and coordinate in a manner satisfactory to the Engineer and in accordance with the Plans and Specifications. The work must be done by competent workmen skilled in the trade required by the restoration.

SECTION 13
CLEANING

G-13.01 DURING CONSTRUCTION
During construction of the work, the Contractor shall, at all times, keep the site of the work and adjacent premises as free from material, debris, and rubbish as is practicable and shall remove the same from any portion of the site if, in the opinion of the Engineer, such material, debris, or rubbish constitutes a nuisance or is objectionable.

The Contractor shall remove from the site all of his surplus materials and temporary structures when no further need therefor develops.

G-13.02 FINAL CLEANING
At the conclusion of the work, all erection plant, tools, temporary structures and materials belonging to the Contractor shall be promptly taken away, and he shall remove and promptly dispose of all water, dirt, rubbish or any other foreign substances.

The Contractor shall thoroughly clean all equipment and materials installed by him and shall deliver such materials and equipment undamaged in a bright, clean, polished, and new appearing condition.

SECTION 14
MISCELLANEOUS

G-14.01 PROTECTION AGAINST SILTATION AND BANK EROSION
The Contractor shall arrange his operations to minimize siltation and bank erosion on construction sites and on existing or proposed watercourses and drainage ditches.

G-14.02 EXISTING FACILITIES
The work shall be so conducted to maintain existing facilities in operation insofar as is possible. Work shall be scheduled to minimize bypassing during construction. Requirements and schedules of operations for maintaining existing facilities in service during construction shall be as described in the Special Provisions.

G-14.03 USE OF CHEMICALS
All chemicals used during project construction or furnished for project operation, whether herbicide, pesticide, disinfectant, polymer, reactant or of other classification, must show approval of either EPA or USDA. Use of all such chemicals and disposal of residues shall be in strict conformance with instructions.

* * * * * * *

SUPPLEMENTARY GENERAL PROVISIONS

1.0 GENERAL:

1.1 This Section sets forth modifications to the "General Provisions" of the Contract Documents which are referred to as Specifications, General Provisions.

1.2 Paragraph numbers and titles used herein refer to similarly numbered and titled articles in the General Provisions.

1.3 Only those paragraphs contained herein shall be assumed to be modified. Paragraphs not appearing herein shall apply as written in the General Provisions.

1.4 Any portion of the General Provisions, whether or not modified herein, may be further modified in Special Conditions and in the Instructions to Bidders of these Specifications.

1.5 Where the Supplementary General Provisions, Special Conditions and Instructions to Bidders conflict with the General Provisions, the Supplementary General Provisions, Special Conditions and the Instructions to Bidders shall take precedence.

2.0 MODIFICATIONS TO THE GENERAL PROVISIONS AS FOLLOWS:

2.1 SECTION 1 SCOPE AND INTENT

G-1.02 WORK INCLUDED

The first paragraph shall be deleted in its entirety and replaced by the following paragraph:

"The Contractor shall furnish all labor, superintendence, materials, plant, power, light, heat, fuel, water, tools, appliances, equipment, supplies, and other means of construction necessary or proper for performing and completing the work. He shall obtain all required permits. He shall perform and complete the work in the manner best calculated to promote rapid construction consistent with safety of life and property and to the satisfaction of the Engineer, and in strict accordance with the Contract Documents. The Contractor shall clean up the work and maintain it during and after construction, until incidental thereto. He shall repair or restore all during performance of the work."

2.2 SECTION 3 WORKING DRAWINGS

a. Change to read as follows:

SECTION 3 SHOP DRAWINGS

b. Replace the existing paragraphs in their entirety with the following paragraphs:

G-3.01 SCOPE

Shop drawings, schedules, etc., shall be submitted to the Engineer and/or Architect in quadruplet, accompanied by a letter of transmittal. Subcontractors and suppliers shall submit shop drawings and make requests for approvals through their respective prime Contractors.

The drawings shall be numbered consecutively and shall accurately and distinctly present the following:

(1) Names of equipment or materials, and the locations at which the equipment or materials are to be installed in the work.

(2) All working and erection dimensions.

(3) Arrangement and sectional views.

(4) Necessary details, including complete information for making connections between work under this contract and work under other contracts.

(5) Kinds of materials and finishes.

(6) Parts list and description thereof.

The Engineer and/or Architect may decline to consider any shop drawing that does not contain complete data on the work and full information of related matters.

Fax submittals will not be reviewed.

G-3.02 APPROVAL:

Shop drawings shall be examined by the Contractor prior to his transmitting them to the Engineer and/or Architect. Shop drawings submitted to the Engineer and/or Architect shall bear the Contractor's stamp of approval evidencing that he has examined and checked each drawing and that he has found said drawings to be in accordance with the Contract requirements. Any drawings submitted without this stamp will not be considered by the Engineer and/or Architect and will be returned to the Contractor for re- submission.

If the shop drawings show departures from the Contract requirements, the Contractor shall make specific mention thereof in his letter of submittal and the following shall be submitted:

(1) Each request shall include a complete description of the proposed substitute and the name of the material or equipment for which it is to be substituted.

(2) Furnish drawings, cut, manufacturer's printed specifications, performance and test data and any other data or information necessary for a complete evaluation of both the item specified and the proposed substitute item.

Approval of the drawings shall constitute approval of the subject matter thereof only and not of any structure, material, equipment or apparatus shown or indicated.

Approval of the drawings shall be general and shall not relieve the Contractor of responsibility for the accuracy of such drawings, nor for the quantities of materials and equipment, nor for the proper fitting and construction of the work, nor for the furnishing of materials, tools, equipment, etc., required by this contract and not indicated on the drawings.

No work called for by Shop Drawings shall be done until the said drawings have been approved by the Engineer and/or Architect.

The Contractor shall revise and resubmit the shop drawings as required by the Engineer and/or Architect until approval thereof is obtained.

The City shall retain four (4) copies of all submittals unless the Engineers and/or Architect makes a specific request for additional copies.

Items	Submittals	*Approval
All trade	Fourteen (14) Days	Fourteen (14) Days

*From date of receipt of submittal.

Delays on account of tardy or untimely submittals will not be considered as causes of extension of time of the Contract or increases to the Contract Sum.

G-3.03 JOB SITE:

One (1) copy of all approved submittals SHALL BE available at the Contractor's Office at the job site.

2.3 SECTION 4 MATERIALS AND EQUIPMENT

G-4.01 GENERAL REQUIREMENTS

In the first paragraph, second line, delete the word "specifications" and substitute the words "Contract Documents".

G4.03 REFERENCE TO STANDARDS

The following paragraph shall be added in its entirety:

"Compliance with the Standard Building Code, latest edition, and all local electrical and plumbing codes shall be required. In the event of a conflict in code requirements, the most stringent code or standard shall apply."

G-4.05 EQUIVALENT QUALITY

Add the following sentence to paragraph two: "Any professional fees associated with shop drawing review of materials or equipment submitted for approval as equivalent to that specified shall be borne by the Contractor.

2.4 SECTION 5 INSPECTION AND TESTING

G-5.06 PRELIMINARY FIELD TESTS

G-5.07 FINAL FIELD TEST

A. Add the following sentence to BOTH of the above paragraphs:

The Contractor shall provide, at NO EXTRA COST to the City, ALL labor, tools, equipment, materials, etc., for the Engineer and/or Architect to make any field test that may be required in the judgment of the Engineer and/or Architect.

2.5 SECTION 6 TEMPORARY STRUCTURES

G-6.03 CONTRACTOR'S FIELD OFFICE

a. In the last sentence of this paragraph, add the following words: "...and Shop Drawings".

G-6.03 CONTRACTOR'S FIELD OFFICE

A. Delete this paragraph G-6.03 in its entirety.

2.6 SECTION 7 TEMPORARY SERVICES

G-7.01 WATER, G-7.02 LIGHT AND POWER, AND G-7.03 SANITARY REGULATIONS

The City of Tampa shall provide, at no cost to the Contractor, water, electricity and washroom/toilet facilities for installation of this project. All water and electricity shall be applied and/or connected by the Contractor.

G-7.07 TELEPHONE

The Contractor shall furnish the Engineer with a telephone number(s) by which the Engineer may contact the site.

2.7 SECTION 14 MISCELLANEOUS

G-14.04 USE OF EXPLOSIVES:

Explosives will not be used on the work except when authorized by the Engineer and/or Architect. The use of same, if authorized, shall conform to laws or ordinances which may pertain to the use of same and the utmost care will be exercised by the Contractor so as not to endanger life or property. The Contractor will assume full responsibility in connection with use of any explosives even though authorized. Explosives will not be stored within the City limits.

G-14.05 OWNERSHIP OF MATERIALS:

The removal of any underground and surface structures as required shall be performed in a careful manner to permit salvaging of as much material, such as pipe and brick, also broken section of sidewalk, as practical for use in repair and maintenance of City-owned facilities.

Such acceptable salvaged material remains the property of the City and shall be placed in stock piles so as not to interfere with new construction work but accessible for loading and hauling by the City or by the Contractor within the free haul limit of six (6) miles. The Engineer and/or Architect shall direct the Contractor as to the location of stockpile.

The paving material, such as vitrified brick, asphalt block and other paving materials removed from the excavated areas and suitable for reuse but not reused in the work, shall also be considered the property of the City. The handling of such materials shall be as set forth elsewhere in the Specifications or Special Provisions.

G-14.06 NOTICE OR SERVICE THEREOF:

All notices, which shall include demands, instructions, requests, approvals and claims, shall be in writing.

Any notice to or demand upon the Contractor shall be sufficiently given if delivered to the office of the Contractor specified in the bid (or to such other office as the Contractor may, from time to time, designate to the City in writing), or if deposited in the United States mail in a sealed, postage-prepaid envelope, or delivered, with charges case addressed to such office.

All notices required to be delivered to the City shall, unless otherwise specified in writing to the Contractor, be delivered to Contract Administration Department – Construction Management Division, 3808 East 26th Avenue, Tampa, Florida 33605, and any notice to or demand upon the City shall be sufficiently given if delivered to the office of the said Engineer and/or Architect, or if deposited in the United States mail in a sealed, postage- prepaid envelope, or delivered with charges prepaid to any telegraph company for transmission, in each case addressed to said Engineer and/or Architect or to such other representative of the City or to such other address as the City may subsequently specify in writing to the Contractor or to its representative at the construction site for such purposes.

Any such notice or demand shall be deemed to have been given or made as of the time of actual delivery or (in the case of mailing) when the same should have been received in due course of post or (in the case of telegram) at the time of actual receipt, as the case may be.

G-14.07 REQUIREMENTS FOR CONTROL OF THE WORK:

Prior to the start of the work included in this contract, a Preconstruction Conference will be held by the Engineer and/or Architect to be attended by the Contractor and representatives of the various utilities and others for the purpose of establishing a schedule of operations which will coordinate the work to be done under this contract with all related work to be done by others within the limits of the project. The Contractor shall be prepared for this meeting and shall present a comprehensive construction schedule for all items of work to be accomplished by him, which will be used as the basis for the development of an overall operational schedule and a list of subcontractors to be used on this work.

All items of work on this contract shall be coordinated so that progress on each related work item will be continuous from week to week. The progress of the work will be reviewed by the Engineer and/or Architect at the end of each week, and if the progress on any item of work during that week is found to be unsatisfactory, the Contractor shall be required to adjust the rate of progress on that item or other items as directed by the Engineer and/or Architect.

The Contractor shall conduct his operations in such a manner as will result in a minimum of inconvenience to occupants of adjacent homes and business establishments and shall provide temporary access as directed or as conditions in any particular location may require.

G-14.08 WORK DIRECTIVE CHANGE:

"A Work Directive Change is a written directive to the Contractor, issued on or after the date of the execution of the Agreement, and signed by the Engineer on behalf of the City, ordering an addition, deletion or revision in the work, or responding to an emergency. A Work Directive Change will not change the contract price or the time for completion, but is evidence that the parties expect that the change directed or documented by a Work Directive Change will be incorporated in a subsequently issued Change Order following negotiations by the parties as to its effect, if any, on the contract price or the time for completion. "Without invalidating the Agreement, additions, deletions or revisions in the Work may, at any time or from time to time, be authorized by a Change Order or a Work Directive Change. Upon receipt of any such document, the Contractor shall promptly proceed with the work involved."

DELETE AS REQUIRED BELOW

G-14.09 RESERVED PARKING SIGNS IN PARKING METER AREAS

The Contractor shall reimburse the Department of Public Works, Parking Division, located at 107 N. Franklin Street, Tampa, Florida 33602, for any and all metered parking spaces occupied or made unusable or unavailable as a result of, or because of, construction activity by the Contractor. Private automobiles may not be parked in any reserved space, unless clearly marked as associated with the project.

In order to receive temporary or permanent reserved signs in parking areas which are required by parking meters, there shall first be paid to the Parking Revenue Fund for the elimination of each such meter a charge based on the following schedules:

1. Meter Removal: The charge for removing a meter is ten (10) times the hourly meter fee, with a minimum charge of $12.50. Such charge will be assessed for each day a meter is removed, excluding Saturdays, Sundays, and City holidays.

2. Reservation of Parking Metered Spaces During Hours of City Parking Division Operation: The charge for reservation of a metered space is ten (10) times the hourly meter fee. Such charge will be assessed for each day a meter is reserved. The minimum total charge per rental agreement is $12.50.

3. Reservation of Parking Metered Spaces During Hours of City Parking Division Non- Operation: The charge for reservation of a metered space during hours of non-operation shall be $2.00. Such charge will be assessed for each day a meter is reserved. The minimum charge per rental agreement is $12.50.

4. Reservation of Parking Metered Spaces During Hours of City of Tampa Parking Division Operation and Non-Operation: Meter reservation periods, which include both operation and non-operational hours, shall be charged the operational rate.

In the event that an entire block or area of parking meters are reserved for a period of 90 days or longer, the Contractor may arrange a payment schedule with the Department of Public Works, Parking Division. Said payment schedule will be paid on a monthly basis after a deposit equivalent to the first and last month rental charges has been received by the Parking Division prior to commencement of construction.

Any meter or meters which may sustain damage due to construction activities in the immediate area must be removed. The meter removal/installation charge is $7.50 per meter. Failure to have a meter(s) removed will result in the Contractor being held liable for damage occurring to said meter(s) and further, the Contractor will be required to reimburse the Department of Public Works, Parking Division for meter(s) repaired or replaced.

G-14.10 EROSION AND SEDIMENT CONTROL:

During construction, the Contractor shall provide adequate erosion and sediment controls to prevent adverse effects to the environment and public and private property. He shall construct and maintain control structures necessary to prevent erosion and sediment. He shall conduct and schedule construction operations to avoid, prevent, and minimize erosion and sediment. He shall comply with City, County, State, and Federal codes, laws, and regulations and the plans and specifications for this project pertaining to erosion and sediment prevention and control.

At the Preconstruction Conference, the Contractor shall present a plan for erosion and sediment prevention and control. This plan shall include the operations methods, also temporary and permanent control measures and structures to be used on this project.

G-14.11 ENGINEER'S FIELD OFFICE:

The Contractor shall provide and maintain an adequate field office, which shall be a structure completely separated from the Contractor's field office, for the exclusive use of the Construction Engineer and/or Architect and engineering technicians within the project limits. No additional payment shall be made for this item. Location of said field office shall be as directed by the Engineer and/or Architect.

Contractor shall provide one (1) desk with chair, one (1) four-drawer metal file cabinet with lock, plan rack to hold a minimum of eight (8) separate sets of plans and one (1) plan table, top shall be minimum of 3'-0" wide x 6'-8" long; also adequate heating, air conditioning, lighting and one (1) window, 36"x36" minimum size, in each of four (4) walls.

G-14.12 PROJECT SIGNS:

The Contractor shall furnish and install, as directed by the Engineer and/or Architect, a project sign of design, size, color, etc., as per drawing page SIGN-1.

G-15.0 NOTIFICATION TO CONTRACTORS:

All Contractors working in City of Tampa buildings and facilities that contain ACM will be provided with a written notice, including contract custodial firms. The notice when applicable will advise Contractors about the possibility of encountering ACM while working for the City and will require Contractors to become familiar with locations of ACM within their work areas. The Contractor Notice shall include the name and phone number of the designated Building Asbestos Contact Person assigned to that building/facility. This notice is provided in Appendix C.

Appendix C

Contractor Notification Requirements

Asbestos-Containing Material (ACM) may be present in the facility. The presence of ACM does not necessarily mean that a hazard exists; however, a hazard may be created when ACM is disturbed and asbestos fibers become airborne. The best way to maintain a safe environment is to avoid the disturbance of ACM.

It is possible that you may encounter ACM while working in the facility. On the bulletin board, there is a summary of known locations of ACM in that building. The summary may or may not be all inclusive. Therefore, workers must exercise caution and be watchful for materials that might contain asbestos. Avoid disturbing ACM or suspected ACM as you carry out your work.

If your work necessitates the disturbance of ACM you shall take whatever precautions that are necessary to protect human health and the environment from asbestos fibers. At minimum, you will comply with all Federal, Sate, and Local responsible for assuring that you are medically certified, trained, and equipped with the proper personal protective devices for safe handling of ACM. You must notify the designated Building Asbestos Contact Person before disturbing any asbestos-containing materials in City-Owned buildings. The designated Building Asbestos Contract Person is listed on the bulletin board with the asbestos location summary.

If you need additional information regarding ACM in a particular building or would like to see a copy of the Operations and Maintenance Plan, contact the Building Asbestos Contact Person responsible for the building for which you will be working.

Comply with all regulatory requirements for removal and disposal.

SPECIAL CONDITIONS

1.0 PRECONSTRUCTION BRIEFING:

The Contractor, upon receiving notice that he has been awarded the contract for the construction of the project, shall make an appointment with the Engineer and/or Architect for said briefing. The Contractor shall bring to this meeting the following:

1. Contract Documents not yet submitted.
2. A detailed Job Progress Schedule.
3. Samples, questions, etc., he feels necessary.
4. List of subcontractors.

Failure to bring the above items to the meeting will result in cancellation of meeting. Once items have been submitted, meeting will be rescheduled by the City. Site access and commencement of work will not be allowed during period between meetings.

Contractor shall have representatives present at meeting that are familiar with, and conversant on, the scope of the work and Contract Document requirements. Failure to have such persons present will also result in cancellation and rescheduling of meeting until such a time when condition is corrected.

Elapsed time as a result of the Contractor's failure to comply with above will not result in an extension of contract time.

2.0 SITE REVIEW:

Before submitting Proposals, Bidders shall carefully examine the entire site of the proposed work and adjacent premises and the various means of approach and access to the site, and make all necessary investigations to inform themselves thoroughly as to the facilities for delivering, placing and operating the necessary construction equipment, and for delivering and handling materials at the site, and inform themselves thoroughly as to all difficulties involved in the completion of all the work in accordance with the Contract Documents.

The Contractor shall immediately, upon entering project site for the purpose of beginning work, review project site with the Engineer and/or Architect for the purpose of selecting area(s) to place materials for storage.

The Contractor must exercise proper precaution to verify all figures shown or indicated on the drawings, all existing trees, paved areas; utilities, etc., shall be located before beginning any work, and he shall be held responsible for any error resulting from his failure to exercise such precaution.

2.1 LAYING OUT WORK:

The Contractor shall locate all general reference points and take necessary action to prevent their destruction; lay out his own work and be responsible for all lines, elevations, measurements, grading, trenching, backfilling, utilities and other work to be executed by him for a complete project under this contract.

The Contractor shall lay out all work and have final approval by the Engineer and/or Architect before installation begins. Contractor shall be held responsible for any error resulting from his failure to exercise such approval. Said errors shall be corrected by the Contractor at NO EXTRA COST to the City.

The Contractor shall coordinate with the Parks Department and shall identify each and every tree to remain prior to the start of work. The specific trees to remain shall be approved by the Parks Department.

The final location of all work to be performed shall be made jointly by the Engineer and/or Architect and the Contractor at the project site.

3.0 SAFETY AND HEALTH STANDARDS:

The performance of all construction under this contract shall conform to ALL Local, State, Federal Occupation Safety and Health Act Standards.

At the end of each work day, all work areas shall be left in a safe condition. Barricades and/or warning devices shall be provided for at any open excavations or barriers on the project site.

The Contractor's attention is directed to paragraphs Article 3.07 (page A-10) and Article 12.03 (page A-31) of the Agreement, and paragraph G-7.04 (page G-18) of the General Provisions.

4.0 INFORMATION FOR COLOR SCHEDULES:

Not later than thirty (30) calendar days after authorization to proceed with contract work, the Contractor shall submit to the Engineer and/or Architect the names of all manufacturers and trade names for all materials involving selection based upon color or texture or other design appearance features which are to be used in this project. Where samples are necessary for such selection, furnish same.

If such information is not furnished by Contractor within thirty (30) day period, the Engineer and/or Architect will select colors and textures from products named in the Contract Documents.

5.0 RESPONSIBILITY OF CONTRACTOR:

The Contractor shall take all necessary precautions to protect all project surfaces and adjoining areas from mechanical damage from tools, equipment, materials, supports, etc., and shall provide adequate protection from leaking lubricants or fluids from his equipment.

Damage to said project surfaces and adjoining areas caused by a lack of protection or negligence by the Contractor shall be repaired and/or replaced at NO EXTRA COST to the City and to the full satisfaction of the Engineer and/or Architect.

The Contractor and all subcontractors are charged with the protection of the work and property, but the final responsibility for these provisions rests with the Contractor who shall take complete charge of the project site from start to finish of work.

The Contractor shall take particular precautions to protect existing trees and plant material. All trees and other plant material to remain shall be marked by the City prior to start of work.

Excavation, earthwork or sitework within the drip line of existing trees shall be done either manually or by methods approved by the City of Tampa Parks Department.

If the Contractor damages any tree or plant material in any way he shall be required to replace the damaged tree or plant material as follows:

1. Trees

    a. Replace a 6" caliper or less with a 6" caliper of the same species.

    b. Replace a 7"-10" caliper with two (2) 6" caliper of the same species.

    c. Replace a 10"-15" caliper with three 6" caliper of the same species.

    d. Replace a 16"-20" caliper with five (5) 6" caliper of the same species.

e. Replace a 21"-36" caliper with ten (10) 6" caliper of the same species.

2. Plant Material

Replace any damaged plant material with an equal size and quantity of the same material.

The replaced trees and plant material shall be guaranteed by the Contractor for a period of six (6) months.

6.0 COORDINATION WITH N.I.C. ITEMS:

The Contractor shall give to the Engineer and/or Architect, in writing, a time schedule for the installation or removal of all N.I.C. items at the beginning of the project. Failure of the Contractor to supply the Engineer and/or Architect with said schedule shall not be used for reason of time extension by the Contractor.

7.0 ELECTRICAL SERVICE LOCATION:

The Contractor shall verify and coordinate the service location with the local power company and the Engineer and/or Architect.

The Contractor shall coordinate with the local power company and shall include in his bid all costs for electrical service to work area(s) under this Contract, including but not limited to new service, connections from existing and/or new service and all required labor, equipment, materials etc. and all other associated electrical work.

8.0 SCHEDULING:

The Contractor shall provide the City with a detailed schedule prior to start of work.

The schedule shall be a fully developed, horizontal bar-chart type Contractor's construction schedule. Provide a separate time bar for each significant construction activity. Provide a continuous vertical line to identify the first working day of each week. Use the same breakdown of units of the Work as indicated in the "Schedule of Values".

Unless otherwise directed or approved, prepare schedule on a single 8-1/2" X 14" sheet of plain bond white paper.

Secure time commitments for performing critical elements of the Work from parties involved. Coordinate each element on the schedule with other construction activities; include minor elements involved in the sequence of the Work. Show each activity in proper sequence. Indicate graphically the sequences necessary for completion of related portions of the Work.

Contractor shall also prepare schedule in accordance with applicable portions of Section 4.02 of the Agreement.

9.0 ASSIGNMENT OF CONTRACT: Not applicable.

10.0 WORKMANSHIP AND MATERIALS:

Workmanship and materials shall be installed in accordance with accepted standards of the specific trade, as defined by the applicable recognized trade association(s). In the event of a conflict between these trade standards and the Contract Documents, the conflict shall be brought to the Engineer's and/or Architect's attention writing and the final decision shall be made by the Engineer and/or Architect.

11.0 RECORD DRAWINGS:

During the course of the work, Contractor shall maintain, at the site, a clean undamaged set of the Contract Documents. Contractor shall mark set, on a daily basis, with location and progress of all contract work, including but not limited to:

1. Sewer, water, stormwater and irrigation fabrication drawings showing to scale all manholes, all distances and angles between manholes, line dimension, grid co-ordinates, trunk lines, inverts and cleanouts,

2. Fencing, roadway, parking and sleeving,

3. Electrical service, and

4. General building location, and/or foundations, structures, etc.

Drawings shall be on site at all times and available for review by the City. Failure of Contractor to have drawings on site and/or up to date may result in suspension of work until situation is corrected. Extension of contract will not be granted for such condition.

At conclusion of work, the Contractor shall provide the City with one complete set of Electronic Record Drawings incorporating changes described above, and four marked hard copy sets of as-built record drawings clean and damaged free shall also be submitted to the City at the same time. Electronic files will be issued to the Contractor by the City of Tampa. These files will be AutoCAD DWG, AutoCAD DWF or Adobe PDF latest versions.

A Work Directive Change is a written directive to the Contractor, issued on or after the date of the execution of the Agreement, and signed by the Engineer on behalf of the City, ordering an addition, deletion or revision in the work, or responding to an emergency. A Work Directive Change will not change the contract price or the time for completion, but is evidence that the parties expect that the change directed or documented by an Authorization to Proceed with Extra Work letter will be incorporated in a subsequently issued Change Order following negotiations by the parties as to its effect, if any, on the contract price or the time for completion.

12.0 ON SITE RECYCLABLE CRITERIA:

Contractor shall make reasonable attempts to recycle and/or salvage at least 50% of non-hazardous construction and demolition debris. Contractor shall develop and implement a Construction Waste Management Plan that identifies the materials that are to be diverted from disposal by weight or volume and be directed to a recycling facility. Specific area(s) on the construction site shall be designated for collection and tracking of the designated materials as needed. Location of the recycling area on site shall be coordinated with the project owner's representative on site prior to construction start. The intent of this section is to encourage recycling where practical in the context of the scope of work.

Contractor shall submit the following but not limited to items related to this section:

1. Provide a submittal of the contractor's plan of action to recycle

2. Contractor is required to document all activities with above requirements and provide to the city upon request items that are recyclable, documentation of the quantity of material disposed at a recycling facility.

City of Tampa – DMI Sub-(Contractors/Consultants/Suppliers) Payments

(FORM MBD-30)

[ ] Partial [ ] Final

Contract No.: _____ WO#,(if any):_____ Contract Name:_____

Contractor Name:_____ Address:_____

Federal ID:_____ Phone:_____ Fax:_____ Email:_____

GC Pay Period:_____ Payment Request/Invoice Number:_____ City Department:_____

Total Amount Requested for pay period: $_____ Total Contract Amount(including change orders):$_____

-Type of Ownership - (F=Female M=Male), BF BM = African Am., HF HM = Hispanic Am., AF AM = Asian Am., NF NM = Native Am., CF CM = Caucasian S = SLBE

Type Trade/Work Activity []Sub []Supplier Federal ID		Total Sub Contract Or PO Amount	Amount Paid To Date Amount Pending Previously Reported	Amount To Be Paid For This Period Sub Pay Period Ending Date
			$	$
			$	$
			$	$
			$	$
			$	$
			$	$

(Modifying This Form or Failure to Complete and Sign May Result in Non-Compliance)

Certification: I hereby certify that the above information is a true and accurate account of payments to sub – contractors/consultants on this contract.

Signed:_____ Name/Title:_____ Date:_____

Note: Detailed Instructions for completing this form are on the next page

Page 2 of 2 – DMI Payment

Instructions for completing The DMI Sub-(Contractors/Consultants/ Suppliers) Payment Form (Form MBD-30)

This form must be submitted with all invoicing or payment requests where there has been subcontracting rendered for the pay period. If applicable, after payment has been made to the subcontractor, "Waiver and Release of Lien upon Progress Payment", "Affidavit of Contractor in Connection with Final Payment", or an affidavit of payment must be submitted with the amount paid for the pay period. The following will detail what data is required for this form. The instructions that follow correspond to the headings on the form required to be completed. **(Modifying or omitted information from this form my result in non-compliance).**

- **Contract No.** This is the number assigned by the City of Tampa for the bid or proposal.
- **W.O.#** If the report covers a work order number (W.O.#) for the contract, please indicate it in that space.
- **Contract Name.** This is the name of the contract assigned by the City of Tampa for the bid or proposal.
- **Contractor Name.** The name of your business.
- **Address.** The physical address of your business.
- **Federal ID.** A number assigned to a business for tax reporting purposes.
- **Phone.** Telephone number to contact business.
- **Fax.** Fax number for business.
- **Email.** Provide email address for electronic correspondence.
- **Pay Period.** Provide start and finish dates for pay period. (e.g. 05/01/13 – 05/31/13)
- **Payment Request/Invoice Number.** Provide sequence number for payment requests. (ex. Payment one, write 1 in space, payment three, write 3 in space provided.)
- **City Department**. The City of Tampa department to which the contract pertains.
- **Total Amount Requested for pay period.** Provide all dollars you are expecting to receive for the pay period.
- **Total Contract Amount (including change orders).** Provide expected total contract amount. This includes any change orders that may increase or decrease the original contract amount.
- **Signed/Name/Title/Date**. This is your certification that the information provided on the form is accurate.
- **See attached documents.** Check if you have provided any additional documentation relating to the payment data. Located at the bottom middle of the form.
- **Partial Payment.** Check if the payment period is a partial payment, not a final payment. Located at the top right of the form.
- **Final Payment.** Check of this period is the final payment period. Located at the top right of the form.

The following instructions are for information of any and all subcontractors used for the pay period.

- **(Type) of Ownership.** Indicate the Ethnicity and Gender of the owner of the subcontracting business or SLBE.
- **Trade/Work Activity.** Indicate the trade, service, or material provided by the subcontractor.
- **SubContractor/SubConsultant/Supplier.** Please indicate status of firm on this contract.
- **Federal ID.** A number assigned to a business for tax reporting purposes. This information is critical in proper identification of the subcontractor.
- **Company Name, Address, Phone & Fax**. Provide company information for verification of payments.
- **Total Subcontract Amount.** Provide total amount of subcontract for subcontractor including change orders.
- **Amount Paid To Date.** Indicate all dollars paid to date for the subcontractor.
- **Amount Pending, Previously Reported.** Indicate any amount previously reported that payments are pending.
- **Amount To Be Paid for this Period.** Provide dollar amount of dollars requested for the pay period.
- **Sub Pay Period Ending Date.** Provide date for which subcontractor invoiced performed work.

Forms must be signed and dated or will be considered incomplete. The company authorized representative must sign and certify the information is true and accurate. Failure to sign this document or return the document unsigned can be cause for determining a company is in non-compliance of Ordinance 2008-89.

If any additional information is required or you have any questions, you may call the Minority Business Development Office at (813) 274-5522.

SIGN EXAMPLE ONLY GRAPHIC TO BE DEVELOPED BY CONTRACTOR

scale: 3" = 3"

Sign Information

Building a Better Tampa

Downtown Riverwalk

Creates a waterfront pedestrian walkway connecting the south edge of the CapTrust building with MacDill Park.

$1.5 Million investment
Scheduled for completion in October 2012

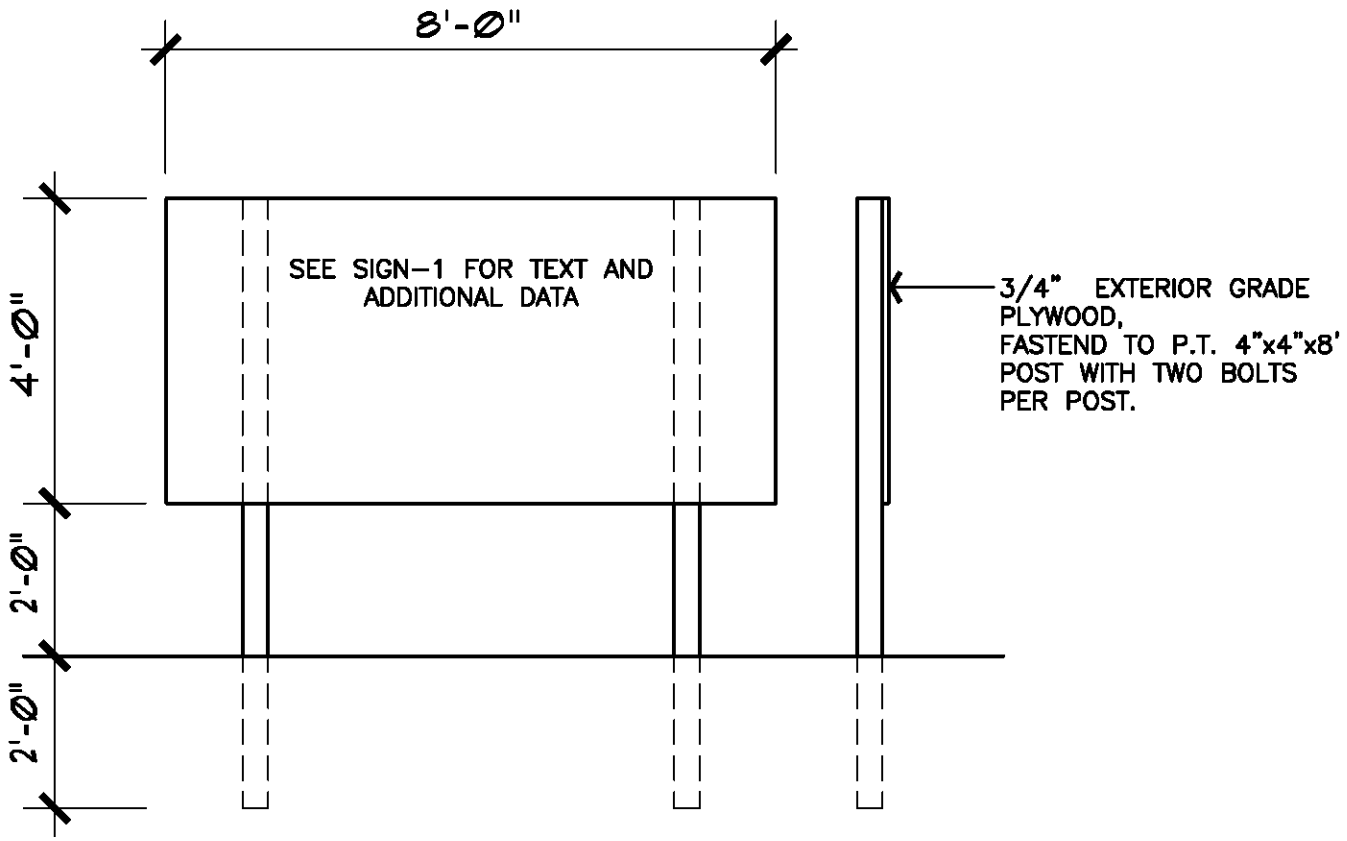
Orion Marine
Construction, Inc.

Colors

Blue: Sherwin Williams Naval SW6244
Green: Sherwin Williams Center Stage SW6920
White: Sherwin Williams Pure White SW7005

Font

Franklin Gothic



CITY OF TAMPA–PROJECT SIGN
REVISED 4/28/04

SECTION 01010 - SUMMARY OF WORK

1.0 GENERAL:

The work shall consist of furnishing all materials, labor, equipment, tools, and all items and services required for the complete construction in conformity with Contract Documents of:

Tampa Theatre Electrical Improvements
at
711 North Franklin Street
for the
City of Tampa

All construction work and materials, in addition to complying with requirements of Contract Documents, shall fully comply with all requirements of local building codes, all ordinances, and regulations of other Federal, State and public authorities having jurisdiction over this type of work in the given area.

2.0 SCOPE:

The work shall include but not be limited to, upgrading of the existing house and performance stage lighting, upgrading of electrical service, replacement of the existing emergency generator, installation of temporary stage connections, and all associated work required for a complete project in accordance with the contract, with all associated work required for a complete project, as shown and indicated on the Drawings and in the Specifications.

3.0 LEGAL DESCRIPTION OF PROJECT SITE:

Legal description as shown on the drawings, Sheet G-1.

4.0 VERIFICATION OF OWNER'S SURVEY DATA:

Prior to commencing any work, the Contractor shall satisfy himself as to accuracy of all survey data which shall affect his work as indicated in these plans and specifications and/or provided by the City.

Should the Contractor discover any inaccuracies or errors which will affect his work, he shall notify the Engineer and/or Architect in order that proper adjustments can be ordered.

The exact location of the building and related items shall be determined on site jointly by the Contractor and the Engineer and/or Architect. NO work shall commence until said final approval of the locations is made by the Engineer and/or Architect.

5.0 CONTRACT DOCUMENTS:

a. BIDDING REQUIREMENTS

b. GENERAL PROVISIONS, SUPPLEMENTARY GENERAL PROVISIONS, AND SPECIAL, CONDITIONS

6.0 SPECIFICATIONS: (DATED: April 2015)

Divisions: 1, 2.

7.0 DRAWINGS: (DATED: April 2015)

Cover Sheet, S-1, LS-1, A-2, A-2.1, A-3, A-3.1, E0.0, E1.0, E1.1, E1.3, E1.4, E2.0, E2.1, E2.2, E2.3, E2.4, E.3.1, E3.2, E4.0, TEG01, TEG02, TEG03, TEG04, TEG05, TPL01, TPL02, E1.2, TPR01.

8.0 ADDENDA AND LETTERS OF CLARIFICATION:

All addenda and letters of clarification issued prior to bid opening time date.

SECTION 01017 - ALTERNATES

1.0 GENERAL:

All applicable provisions of the General Conditions are a part of this section.

This section consists of including all labor tools, equipment, materials, appliances, etc., in connection with the following Alternates.

A separate bid amount shall be submitted for each Alternate in the space provided on the Proposal Form.

2.0 SELECTION OF ALTERNATES:

The City reserves the right to accept or reject any or all alternates.

3.0 ALTERNATES:

3.1 ALTERNATE NO. 1 (ADDITIVE):

To install new LED performance stage lighting and digital controls with control points in the booth and on the stage, with all associated work required for a complete project, as shown and indicated but not limited to Sheets TEG01, TEG02, TEG03, TEG04, TEG05, TPL01, TPL02, TPR01.

3.2 ALTERNATE NO. 2 (ADDITIVE):

To provide new house lighting for auditorium including decorative fixtures (i.e., cave stars, cloud & décor), with all associated work required for a complete project, as shown and indicated but not limited to Sheets E1.1, E1.2, E1.3, E1.4, E2.1, E2.2, E2.3, E2.4, E3.2 and E4.0.

SECTION 01020 - ALLOWANCES

PART 1 - GENERAL

RELATED DOCUMENTS

Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 1 Specification Sections, apply to this Section.

SUMMARY

This Section includes administrative and procedural requirements governing allowances.

Types of allowances include the following:

Contingency allowances.

SELECTION AND PURCHASE

SUBMITTALS

Submit proposals for purchase of products or systems included in allowances, in the form specified for Change Orders.

Submit invoices or delivery slips to show the actual quantities of materials delivered to the site for use in fulfillment of each allowance.

CONTINGENCY ALLOWANCES

Use the contingency allowance only as directed by the Owner.

The Contractor's related costs for services, products and equipment ordered by the Owner under the contingency allowance include delivery, installation, taxes, insurance, equipment rental, and similar costs.

Work Directive Change Orders authorizing use of funds from the contingency allowance will include Contractor's related costs and reasonable overhead and profit margins.

At Project closeout, credit unused amounts remaining in the contingency allowance to the Owner by Change Order.

PART 2 - PRODUCTS (Not Applicable)

PART 3 - EXECUTION

EXAMINATION

Examine products covered by an allowance promptly upon delivery for damage or defects.

PREPARATION

Coordinate materials and their installation for each allowance with related materials and installations to ensure that each allowance item is completely integrated and interfaced with related work.

SCHEDULE OF ALLOWANCES

Allowance No. 1: Include a contingency allowance of $75,000 for use according to the Owner's instructions. The allowance shall be included in the Base Bid.

END OF SECTION 01020

SECTION 01045 - CUTTING AND PATCHING

PART 1 - GENERAL

RELATED DOCUMENTS

Drawings and general provisions of Contract, including General and Supplementary Conditions and other Division-1 Specification Sections, apply to this Section.

SUMMARY

This Section specifies administrative and procedural requirements for cutting and patching.

Refer to other Sections for specific requirements and limitations applicable to cutting and patching individual parts of the Work.

Demolition of selected portions of the courts for alterations is included in Section "Selective Demolition."

QUALITY ASSURANCE

Requirements for Structural Work: Do not cut and patch structural elements in a manner that would reduce their load-carrying capacity or load-deflection ratio.

Obtain approval of cutting and patching before cutting:

- Foundation construction.
- Bearing and retaining walls.
- Structural concrete.
- Structural steel.
- Lintels.
- Structural decking.
- Miscellaneous structural metals.
- Equipment supports.
- Piping, ductwork, vessels and equipment.

Operational and Safety Limitations: Do not cut and patch operating elements or safety related components in a manner that would result in reducing their capacity to perform as intended, or result in increased maintenance, or decreased operational life or safety.

Visual Requirements: Do not cut and patch construction exposed on the exterior or in occupied spaces, in a manner that would, in the Architect's opinion, reduce the building's aesthetic qualities, or result in visual evidence of cutting and patching. Remove and replace Work cut and patched in a visually unsatisfactory manner.

PART 2 - PRODUCTS

MATERIALS

Use materials that are identical to existing materials. If identical materials are not available or cannot be used where exposed surfaces are involved, use materials that match existing adjacent surfaces to the fullest extent possible with regard to visual effect. Use materials whose installed performance will equal or surpass that of existing materials.

PART 3 - EXECUTION

INSPECTION

Before cutting existing surfaces, examine surfaces to be cut and patched and conditions under which cutting and patching is to be performed. Take corrective action before proceeding, if unsafe or unsatisfactory conditions are encountered.

PREPARATION

Temporary Support: Provide temporary support of Work to be cut.

Protection: Protect existing construction during cutting and patching to prevent damage. Provide protection from adverse weather conditions for portions of the Project that might be exposed during cutting and patching operations.

Avoid interference with use of adjoining areas or interruption of free passage to adjoining areas.

Take all precautions necessary to avoid cutting existing pipe, conduit or ductwork serving the building, but scheduled to be removed or relocated until provisions have been made to bypass them.

PERFORMANCE

General: Employ skilled workmen to perform cutting and patching. Proceed with cutting and patching at the earliest feasible time and complete without delay.

Cut existing construction to provide for installation of other components or performance of other construction activities and the subsequent fitting and patching required to restore surfaces to their original condition.

Cutting: Cut existing construction using methods least likely to damage elements to be retained or adjoining construction. Where possible review proposed procedures with the original installer; comply with the original installer's recommendations.

In general, where cutting is required use hand or small power tools designed for sawing or grinding, not hammering and chopping. Cut holes and slots neatly to size required with minimum disturbance of adjacent surfaces. Temporarily cover openings when not in use.

To avoid marring existing finished surfaces, cut or drill from the exposed or finished side into concealed surfaces.

Cut through concrete and masonry using a cutting machine such as a carborundum saw or diamond core drill.

Comply with requirements of applicable Sections of Division-2 where cutting and patching requires excavating and backfilling.

By-pass utility services such as pipe or conduit, before cutting, where services are shown or required to be removed, relocated or abandoned. Cut-off pipe or conduit in walls or partitions to be removed. Cap, valve or plug and seal the remaining portion of pipe or conduit to prevent entrance of moisture or other foreign matter after by-passing and cutting.

Patching: Patch with durable seams that are as invisible as possible. Comply with specified tolerances.

Where feasible, inspect and test patched areas to demonstrate integrity of the installation.

Restore exposed finishes of patched areas and extend finish restoration into retained adjoining construction in a manner that will eliminate evidence of patching and refinishing.

Where removal of walls or partitions extends one finished area into another, patch and repair floor and wall surfaces in the new space to provide an even surface of uniform color and appearance. Remove existing floor and wall coverings and replace with new materials, if necessary to achieve uniform color and appearance.

Where patching occurs in a smooth painted surface, extend final paint coat over entire unbroken surface containing the patch, after the patched area has received primer and second coat.

CLEANING

Thoroughly clean areas and spaces where cutting and patching is performed or used as access. Remove completely paint, mortar, oils, putty and items of similar nature. Thoroughly clean piping, conduit and similar features before painting or other finishing is applied. Restore damaged pipe covering to its original condition.

END OF SECTION 01045

SECTION 06100 ROUGH CARPENTRY

PART 1 - GENERAL

1.1 SUMMARY

A. Related Documents: Conditions of the Contract, Division 1 - General Requirements, and Drawings apply to work of this section.

B. Section Includes:
1. Wood grounds, furring nailers and blocking.
2. Plywood.
3. Preservative treatment.
4. Fire retardant treatment.
5. Gypsum sheathing.
6. Felt building paper.
7. Fasteners.

1.2 REFERENCES

A. American Lumber Standards Committee (ALSC):
1. Softwood Lumber Standards.

B. American Plywood Association (APA):
1. E30E-85, Residential and Commercial Construction Guide.

C. American Society for Testing and Materials (ASTM):

1. E72-80, Strength Tests of Panels for Building Construction.
2. E84-84a, SurFace Burning Characteristics of Building Materials.

D. American Wood Preservative Association (AWPA0):
1. C20 1974 Structural Lumber Fire Retardant by Pressure Treatment.

2. C27 1974 Structural Plywood Fire Retardant by Pressure Treatment.

E. American Wood Preservers Bureau (AWPB)

F. Federal Specification (FS):
1. FF-B-561C, Bolts, (Screw), Lag.
2. FF-B-575C, Bolts, Hexagon and Square.
3. FF-B-584E (1), Bolts, Finned Neck; Key Head; Machine; Ribbed Neck; Square Neck; Tee Head.
4. FF-B-588C(1), Bolt, Toggle, and Expansion Sleeve Screw.
5. FF-N-105B (3), INT AMD 4, Nails, Brads, Staples and Spikes: Wire, Cut and Wrought.
6. FF-N-836D(1), Nut: Square, Hexagon, Cap, Slotted, Castle, Knurled, Welding and Single Ball Seat.
7. FF-S-11D, Screw, Wood.
8. RR-W-365A, Wire Fabric (Insect Screening).

G. Product Standards (PS):
1. 1-83, Construction and Industrial Plywood.
2. 20-70, American Softwood Lumber Standard.
3. 58-73, Basic Hardboards.

H. Southern Forest Products Association (SFPA):
1. Grading Rules.

1.3 SUBMITTALS

A. General: Submit the following items in accordance with Section 01300.

B. Certificates:
1. Fire Retardant Treated Wood: Submit certification by testing plant stating chemicals and process used, conformance with referenced standards and governing ordinances, and non-bleeding quality of the treatment.
2. Structural Values: Where materials are provided to comply with minimum allowable unit stresses, submit listing of species and grade selected for each use, in the form of a signed copy of the applicable portion of the producer's grading rules for design values.

1.4 QUALITY ASSURANCE

A. Lumber Grading: Lumber Grading Rules and Wood Species in accordance with Voluntary Product Standards. Grading rules of following associations apply to materials furnished.
1. Southern Pine Inspection Bureau (SPIB).
2. West Coast Lumber Inspection Bureau (WCLIB).
3. Western Wood Products Association (WWPA).

B. Grade Marks: Indentify lumber and plywood by official grade mark.
1. Lumber: Include symbol of grading agency, mill name, grade, species, grading rules and condition of seasoning at time of manufacturer.
2. Plywood: Include type, class identification index, and agency mark.

C. Requirements of Regulatory Agencies:
1. Preservative and Pressure Treated Lumber and Plywood: Comply with American Wood Preservers Bureau Standards.
2. Fire Retardant Treated Materials: Comply with Underwriters Laboratories Inc., and ASTM E84, for maximum flame spread of 25.

1.5 DELIVERY, STORAGE AND HANDLING

A. Deliver, store, handle, and protect products in accordance with Section 01600.

B. Store products above ground, on platforms or skids, and covered with waterproof coverings.

C. Do not store seasoned materials in damp or wet locations.

D. Support products in such a way as to prevent warping and distortion.

PART 2 - PRODUCTS

2.1 MATERIALS

A. General: Where stress rating values are given in lieu of grades, select any quality which will meet structural requirements.

B. Lumber:
1. Grading rules: PS 20.
2. Dimensions: Lumber dimensions are nominal except for posts and timber; actual dimensions

conform to industry standards established by the American Lumber Standards Committee and applicable rules writing agencies. Provide sizes as detailed.

3. Moisture content: 19% maximum moisture content at time of dressing unless noted otherwise; kiln-dry to 15% moisture content after treatments for fire retardant and preservative treated woods.
4. Surfacing: Surface four sides (S4S), unless noted otherwise.
5. Species: Southern Yellow Pine or West Coast Douglas Fir, unless noted otherwise.

C. Plywood:
1. Grading rules: PS 1, using group 1-4 species as required for rating.
2. Exposures: Provide exposure ratings as indicated.
3. Thickness: As detailed or noted, or as required to maintain span capability.
4. Uses, Grades, Ratings:
   a. Wall and Parapet Sheathing: C-D/Exposure 1-APA, Rated Sheathing 16/0 span rating.
   b. Exterior soffits: APA 303 siding, in fir species, medium density overlap in 3/4 inch thickness.

D. Gypsum Sheathing:
1. 2 x 8 foot x 1/2 inch sheathing, tongue and groove long edge, fire resistant, asphalted core, ASTM C79 treated core, with water repellent paper both sides.
2. Water absorption: 10% for two hours immersion, ASTM C 473.
3. Acceptable Products: As manufactured by US Gypsum Co., Chicago, IL, or Gold Bond Building Products Div. of National Gypsum, Charlotte, N.C.

E. Felt Building Paper: Fiberglass saturated felt, ASTM D250, Type, No. 15 unperforated.

F. Waterproof Tape: NW-75 Joint Tape by Polyguard Products Inc., Ennis, TX., or Perm-A-Barrier by W.R. Grace, Cambridge, MA.

G. Plastic Cement: ASTM D2822, asphalt base.

H. Fasteners:
1. Provide fasteners in sizes, spacings, and locations to suit applications. Hot dip galvanize unless noted otherwise.
2. Bolts: FS FF-B-575, FF-B-584 or ASTM A307.
3. Nuts: FS FF-N-836.
4. Expansion shields, lag screws, and bolts: FS FF-B-561.
5. Toggle bolts: FS FF-B-588.
6. Wood screws: FS FF-S-111.
7. Nails and staples: FS FF-N-105.
8. Metal nailing discs:
   a. Flat caps, minimum 1 inch diameter.
   b. Minimum 30 gage sheet metal.
   c. Formed to prevent dishing.
   d. Bell or cup shapes not acceptable.
9. Ply-clips: Extruded 6063-T6 aluminum alloy.
10. Spikes: Galvanized, size as required.

I. Adhesives: Waterproof, air cured type, cartridge dispensed, of strength to suit application.

2.2 WOOD TREATMENTS (SHOP PREPARED)

A. Preservative Treated Wood:
   1. Preservative treat fascia blocking, roof edging, grounds in contact with concrete, roof curbs, cants and nailers for flashing, floor screeds, sill plates, and elsewhere as noted or shown.
   2. Use waterborne salt preservatives as follows: AWPB LP-2 above ground; AWPB LP 222 ground contact. Redry lumber to maximum 19% moisture content, stamp with AWPI "Dry". Redry plywood and particle board to 15% maximum moisture content.
   3. Field treat surface cuts and holes in accordance with AWPB M4.

B. Fire Retardant Treated Wood:
   1. Use fire retardant treated wood for all wood blocking above ceilings, blocking within return air plenums, blocking within walls, and other areas required by reference building codes.
   2. Comply with AWPA C20 for lumber and AWPA C27 for sheet materials.
   3. Provide finished products with maximum flame spread rating of 25, when tested in accordance with ASTM E84.
   4. Acceptable Treatment Companies/Methods:
      a. Dricon by Koppers Company, Inc., Pittsburgh, PA.
      b. Flame-Proof by Osmose Wood Preserving Co., Griffin, GA.
   5. Where treated items are exposed to exterior or to high humidities or are to have a transparent finish applied, provide materials which show no change in fire hazard classification when subjected to standard rain test (UL790).
   6. Use fire retardant treatment which will not bleed through or adversely affect type of finish indicated and which does not require brush treatment of field-made end cuts to maintain fire hazard classification.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verify that surfaces and conditions are ready to receive work of this section. Notify Architect of any existing conditions which will adversely affect execution. Beginning of execution will constitute acceptance of existing conditions.

3.2 INSTALLATION

A. General:
   1. Discard units of material with defects which might impair quality of work, and units which are too small to fabricate work with minimum joints or optimum joint arrangement.
   2. Set carpentry work accurately to required levels and lines, with members plumb and true and accurately cut and fitted. Scribe and cope as required.
   3. Securely attach carpentry work to substrates by anchoring and to draw members into place and securely hold same. Use washers under all bolt heads.
   4. Select fasteners of size that will not penetrate members where opposite side will be exposed to view or will receive finish materials.
   5. Make tight connections between members to develop full strength of members.
   6. Install fasteners without splitting of wood.
   7. Predrill as necessary.
   8. Comply with APA E30a requirements for plywood.
   9. Install fasteners at spacings recommended by NFPA National Design Specifications for Stress Grade Lumber and Its Fastening - 1973 for lumber and APA Guide E30e.

B. Wood Grounds, Furring Nailers, and Blocking:
1. Provide where required for screeding or attachment of other work.
2. Form to shapes cut as necessary for true line and level of work to be attached.
3. Coordinate location with other work involved.
4. Attach to substrates to support applied loading.
5. Countersink bolts and nuts flush with surfaces and built into masonry work.
6. Provide permanent grounds of dressed, preservative treated, key beveled lumber not less than 1 1/2 inch wide, and of thickness required to bring face of ground to exact thickness of finish material involved.
7. Provide continuous blocking.
8. Remove temporary grounds when no longer required.

C. Parapet Sheathing:
1. Install sheets with face grain perpendicular to supports, using panel with continuous end joints over two or more spans staggered between panels and locate over supports.
2. Allow minimum space 1/8 inch between end joints and 1/4 inch at edge joints for expansion and contraction of panels.
3. Fasten 6 inches o.c. along panel edges and 12 inches o.c. at intermediate supports.

D. Gypsum Sheathing:

1. Erect horizontally, with edge butted tight and ends occurring over framing member.

2. Secure with galvanized power driven screws to each support in accordance with manufacturer's recommendations.
3. Cover sheathing with building paper, lapped and nailed with roofing nails in sheathing.

3.3 TOLERANCES

A. Framing members: 1/4 inch maximum from true position.

B. Surface flatness of walls/roofs: 1/4 inch in 10 feet maximum.

3.4 PROTECTION

A. Protect products from moisture absorption and subsequent warping or deterioration until subsequent construction can proceed.

END OF SECTION 06100

SECTION 09251 GYPSUM DRYWALL CONSTRUCTION

PART 1: GENERAL

1.0 RELATED DOCUMENTS: Drawings and General Provisions of the Contract, including General and Supplementary General Provisions, Special Conditions and Division 1 sections, apply to the work of this section.

1.1 DESCRIPTION: The work of this section consists of furnishing and installing gypsum wallboard to replace or repair demolished.

1.2 SUBM ITTALS: Submit certification from manufacturer attesting that all gypsum drywall material used is asbestos free.

1.3 PROJECT CONDITIONS:

A. Minimum temperature in space shall be 55 degrees F. Preferable minimum is 70 degrees F. Provide ventilation and heat as required to remove excess moisture.

Surfaces to which gypsum board is to be applied shall be straight, even, smooth, all in the same plane, thoroughly clean and dry, and free from all defects that might affect proper application. Report unsatisfactory surfaces to the Owner's representative or correct defective surfaces.

1.4 QUALITY ASSURANCE:

A. A copy of Gypsum Association's Recommended Specifications GA-216-85, shall be available for reference on the job site.
B. All material used under this section shall be asbestos free.
C. The products named in this section are made by the U.S. Gypsum Company (USG). Equivalent products of other manufacturers may be substituted if approved as equal by the Owner's Representative.
D. For all conditions not covered by this section, follow the recommendations in U.S. Gypsum Company's technical literature.

1.5 PRODUCT HANDLING: Stockpile gypsum board flat on raised supports in piles. Leave in original wrappings or containers until ready for actual use. Protect gypsum board from wetting.

PART 2: PRODUCTS

2.1 GYPSUM WALLBOARD: Where thickness is not specified, use 5/8-inch-thick material. Exposed finish material shall have long edges tapered and the taper shall culminate in a rounded profile characteristic of USG Smooth Wall system.

A. Regular Board: ANS I/ASTM C36-80.

2.2 FASTENERS:

A. Screws: USG Hi-Lo, bugle head, Type S. Size as recommended by USG.

2.3 JOINT TREATMENT MATERIALS:

A. Tape: USG Perf-a-Tape Reinforcement.

B. Joint Compound: USG Durabond 90.

C. Tape Bedding Compound: USG Durabond Joint Compound Taping.

D. Topping Compound: USG Crater Free Ready to Use Joint Compound All Purpose.

2.4 METAL ACCESSORIES: USG Dura-Bead for all exterior corners and USG No. 200 and No. 701 Series for metal trim. Accessories shall be hot dipped galvanized steel.

PART 3: EXECUTION

3.1 GENERAL INSTALLATION: Apply gypsum boards to walls.

3.2 INSTALLATION:

A. Install in maximum practical lengths.

B. Install fasteners no closer than 3/8 inch to end or edge.

C. Screws: Follow Gypsum Association's recommendations for fastener spacing.

3.3 METAL ACCESSORIES: Install in maximum practicable lengths.

A. Corner Bead: Reinforce all vertical and horizontal exterior corners.

B. Metal Trim: Apply over gypsum panels where partitions or ceiling terminate against dissimilar materials.

3.4 JOINT TREATMENT:

A. Embedding Tape: Center tape reinforcement and press it down into fresh tape bedding compound. Immediately after embedding apply a skim coat of compound.

B. Spotting Fastener Heads: Apply coat of tape bedding compound or joint compound over all fastener heads.

C. Second Coat Application: After embedding and covering coat has hardened, apply second coat, using topping compound, feathered approximately 2 inches beyond edges of first coat. Spot fastener heads with similar coat. Allow to dry.

D. Third Coat Application: After second coat is dry, sand lightly. Apply a thin finishing coat, using topping compound, feathered approximately 2 inches beyond edges of first coat. Spot fastener heads with a similar coat. Allow to dry.

E. Apply joint treatment to butt and end joints, feathering approximately 18 inches.

F Finishing Inside Corners: Fold tape along center crease. Butter both sides of corner with joint compound and apply tape. Apply second and third coats.

3.5 FINISHING BEADS AND TRIMS:

A. Apply joint compound to all bead and trim and properly feather out from high point to plane of surface. Allow to harden.

B Apply second coat in same manner as first coat, extending topping compound slightly beyond onto face of panel.

C. Apply finish coat to all bead and trim, extending topping compound slightly beyond the second coat and properly feathering from high point to plane of surface. Sand finish coat as necessary when dry to provide a flat, smooth surface ready for decoration.

3.6 PATCHING: Correct all surface damage and defects, leaving work smooth, uniform, without observable blemishes which will show through the surface finish, and ready for painting.

END OF SECTION 09251

SECTION 09255 GYPSUM BOARD ASSEMBLIES

PART 1- GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specifications Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes the following:

1. Non-load-bearing steel framing members for gypsum board assemblies.
2. Gypsum board assemblies attached to steel framing.

B. Related Sections: The following Sections contain requirements that relate to this Section:

1. Division 6 Section 06100 “Rough Carpentry”

1.3 DEFINITIONS

A. Gypsum Board Construction Terminology: Refer to ASTM C 11 and GA-505 for definitions of terms related to gypsum board assemblies not defined in this Section or in other referenced standards.

1.4 SUBMITTALS

A. General: Submit the following according to Conditions of the Contract and Division 1 Specification Sections.

B. Product data for each type of product specified.

C. Product certificates signed by manufacturers of gypsum board components certifying that their products comply with specified requirements.

1.5 QUALITY ASSURANCE

A. Fire-Test-Response Characteristics: Where fire-rated gypsum board assemblies are indicated, provide materials and construction identical to those of assemblies tested for fire resistance per ASTM E 119 by an independent testing and inspecting agency acceptable to authorities having jurisdiction.

1. Fire Resistance Ratings: As indicated by reference to GA File Numbers in GA-600 “Fire Resistance Design Manual” or to design designations in UL “Fire Resistance Directory” or in the listing of another testing and inspecting agency acceptable to authorities having jurisdiction.

B. Single-Source Responsibility for Steel Framing: Obtain steel framing members for gypsum board assemblies from a single manufacturer.

C. Single-Source Responsibility for Panel Products: Obtain each type of gypsum board, finish materials and other panel products from a single manufacturer.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Deliver materials in original packages, containers, or bundles bearing brand name and identification of manufacturer or supplier.

B. Store materials inside under cover and keep them dry and protected against damage from weather, direct sunlight, surface contamination, corrosion, construction traffic, and other causes. Neatly stack gypsum panels flat to prevent sagging.

C. Handle gypsum board to prevent damage to edges, ends, and surfaces. Do not bend or otherwise damage metal corner beads and trim.

1.7 PROJECT CONDITIONS

A. Environmental Conditions, General: Establish and maintain environmental conditions for applying and finishing gypsum board to comply with ASTM C 840 and with gypsum board manufacturer's recommendations.

B. Room Temperatures: For non adhesive attachment of gypsum board to framing, maintain not less than 40 deg F (4 deg C). For adhesive attachment and finishing of gypsum board maintain not less than 50 deg F (10 deg C) for 48 hours prior to application and continuously after until dry.

C. Ventilation: Ventilation building spaces, as required, for drying joint treatment materials. Avoid drafts during hot dry weather to prevent finishing materials from drying too rapidly.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Manufacturers: Subject to compliance with requirements, provide products of one of the following:

1. Steel Framing and Furring:

a. Dale Industries, Inc.
b. Dietrich Industries, Inc.
c. Marino Industries Corp.
d. Gold Bond Building Products Div., National Gypsum Co.

2. Grid Suspension Assemblies:

a. Chicago Metallic Corp.
b. National Rolling Mills Co.
c. USG Interiors, Inc.

3. Gypsum Board and Related Products:

a. Domtar Gypsum.
b. Georgia-Pacific Corp.
c. Gold Bond Building Products Div., National Gypsum Co.
d. United States Gypsum Co.

2.2 STEEL FRAMING COMPONENTS FOR SUSPENDED AND FURRED CEILINGS

A. General: Provide components of sizes indicating but not less than that required to comply

with ASTM C 754 for conditions indicated.

B. Post installed Anchors in Concrete: Anchors of type indicated below, fabricated from corrosion-resistant materials, with holes or loops for attaching hanger wires, and with capability to sustain, without failure, a load equal to 5 times that imposed by ceiling construction, as determined from testing per ASTM E 488 conducted by a qualified independent testing agency.

1. Expansion Anchor

C. Powder-Actuated Fasteners in Concrete: None allowed.

D. Wire for Hangars and Ties: ASTM A 641, Class 1 zinc coating, soft temper.

E. Hangar Rods: Mild steel and zinc-coated or protected with rust-inhibitive paint.

F. Channels: Cold-rolled steel, 0.05980-inch minimum thickness of base (uncoated) metal and 7/16 inch wide flanges, and as follows:

1. Carrying Channels: 1-1/2 inch deep, 475 lb per 1000 feet, unless otherwise indicated.
2. Furring Channels: 3/4 inch deep, 300 lb per 1000 feet, unless otherwise indicated.
3. Finish: Rust-inhibitive paint, unless otherwise indicated.

G. Steel Rigid Furring Channels: ASTM C 645, hat-shaped, depth of 7/8 inch, and minimum thickness of base (uncoated) metal as follows:

1. Thickness: 0.0179 inch, unless otherwise indicated.
2. Thickness: 0.0329 inch, unless otherwise indicated.
3. Protective Coating: Manufacturer’s standard corrosion-resistant coating.

A. Grid Suspension System for Interior Ceilings: ASTM C 645, manufacturer’s standard direct-hung grid suspension system composed of main beams and cross furring members that interlock to form a modular supporting network.

2.3 STEEL FRAMING FOR WALL AND PARTITIONS

A. Steel Studs and Runners: ASTM C 645, with flange edges of studs bent back 90 deg and doubled over to form 3/16 inch wide minimum lip (return) and complying with the following requirements for minimum thickness of base (uncoated) metal and for depth:

1. Thickness: 0.0179 inch, studs to 16' height.
2. Thickness: 0.0270 inch studs over 16' height.
3. Depth: 3-5/8 inches, unless otherwise indicated.

B. Steel Rigid Furring Channels: ASTM C 645, hat-shaped, depth and minimum thickness of base (uncoated) metal as follows:

1. Depth: 7/8 inch.
2. Thickness: 0.0179 inch, unless otherwise indicated.

2.4 GYPSUM BOARD PRODUCTS

A. General: Provide gypsum board of types indicated in maximum lengths available to minimize end-to-end butt joints.

1. Thickness: Provide gypsum board in 5/8 inch thickness to comply with ASTM C 840 for application system and support spacing indicated.

B. Gypsum Wallboard: ASTM C 36 and as follows:

1. Type: Type X for all locations; sag-resistant type for ceiling surfaces.
2. Edges: Tapered.
3. Products: Subject to compliance with requirements, provide one of the following products where proprietary gypsum wallboard is indicated:

a. Gyprock Fireguard C Gypsum Board, Domtar Gypsum.
b. Firestop Type C, Georgia-Pacific Corp.
c. Fire-Shield G, Gold Bond Building Products Div., National Gypsum Co.
d. SHEETROCK Brand Gypsum Panels, FIRECODE C Core, United States Gypsum Co.

C. Water-Resistant Gypsum Backing Board: ASTM C 630 and as follows:

1. Type: Type X for all locations where gypsum wallboard is used.

2. Thickness: 5/8 inch (15.9 mm) for all locations where this product is used.

D. Gypsum Sheathing

1. Type: Type X (Exterior Walls)

2. Thickness: 5/8 inch (15.9 mm) for all locations where this product is used.

2.5 CEMENTITIOUS BACKER UNITS:

A. Provide cementitious backer units complying with ANSI A118.9 of 5/8-inch thickness and manufacturer's standard width, but not less than 32 inches, and in maximum lengths available to minimize end-to-end butt joints.

1. Manufacturer: DUROCK Cement Board, United States Gypsum Co.

2.6 JOINT TREATMENT MATERIALS

A. General: Provide joint treatment materials complying with ASTM C 475 and the recommendations of both the manufacturers of sheet products and of joint treatment materials for each application indicated.

B. Joint Tape for Gypsum Board: Paper reinforcing tape.

C. Drying-Type Joint Compounds for Gypsum Board: Factory-packaged vinyl-based products complying with the following requirements for formulation and intended use.

1. All-purpose compound formulated for both taping and topping compounds.

2.7 MISCELLANEOUS MATERIALS

A. General: Provide auxiliary materials for gypsum board construction that comply with

referenced standards and recommendations of gypsum board manufacturer.

B. Steel drill screws complying with ASTM C 1002 for the following applications:
1. Fastening gypsum board to steel members less than 0.03 inch thick.

PART 3- EXECUTION

3.1 EXAMINATION

A. Examine substrates to which gypsum board assemblies attach or abut, installed hollow metal frames, cast-in-anchors, and structural framing with installer present for compliance with requirements for installation tolerances and other conditions affecting performance of assemblies specified in this Section. Do not proceed with installation until unsatisfactory conditions have been corrected.

3.2 PREPARATION:

A. Ceiling Anchorages: Coordinate installation of ceiling suspension systems with installation of overhead structural assemblies to ensure that inserts and other provisions for anchorages to building structure have been installed to receive ceiling hangers that will develop their full strength and at spacing required to support ceilings.

3.3 INSTALLING STEEL FRAMING, GENERAL

A. Steel Framing Installation Standard: Install steel framing to comply with ASTM C 754 and with ASTM C 840 requirements that apply to framing installation .

B. Install supplementary framing, blocking, and bracing at terminations in gypsum board assemblies to support fixtures, equipment, trim, or similar construction. Comply with details indicated and with recommendations of gypsum board manufacturer.

C. Isolate steel framing from building structure at locations indicated to prevent transfer of loading imposed by structural movement. Comply with details shown on Drawings.

1. Where building structure abuts ceiling perimeter or penetrates ceiling.
2. Where partition framing and wall furring abut structure except at floor.

a. Provide slip - or cushioned type joints as detailed to attain lateral support and avoid axial loading.

B. Do not bridge building expansion and control joints with steel framing or furring members. Independently frame both sides of joints with framing or furring members as indicated.

3.4 INSTALLING STEEL FRAMING FOR SUSPENDED AND FURRED CEILINGS

A. Suspend ceiling hangers from building structural members and as follows:

1. Install hangers plumb and free from contact with insulation or other objects within ceiling plenum that are not part of supporting structural or ceiling suspension system. Splay hangers only where required to miss obstructions and offset resulting horizontal forces by bracing, counters playing, or other equally effective means.

2. Where width of ducts and other construction within ceiling plenum produces hanger spacings that interfere with the location of hangers required to support standard

suspension system members, install supplemental suspension members and hangers in form of trapezes or equivalent devices. Size supplemental suspension members and hangers to support ceiling loads within performance limits established by referenced standards.

3. Secure wire hangers by looping and wire-tying, either directly to structures or to inserts, eyescrews, or other devices and fasteners that are secure and appropriate for substrate, and in a manner that will not cause them to deteriorate or otherwise fail due to age, corrosion, and elevated temperatures.

4. Secure flat, angle, channel, and rod hangers to structure, including intermediate framing members, by attaching to inserts, eyescrews, or other devices and fasteners that are secure and appropriate for structure as well as for type of hanger involved, and in a manner that will not cause them to deteriorate or fail due to age, corrosion, or elevated temperatures.

5. Do not connect or suspend steel framing from ducts, pipes or conduit.

B. Install suspended steel framing components in sizes and at spacings indicated but not less than that required by the referenced steel framing installation standard.

1. Wire Hangers: 0.1620-inch (8-gage) diameter, 4 feet o.c.
2. Carrying Channels (Main Runners): 1-1/2 inch, 4 feet o.c.
3. Rigid Furring Channels (Furring Members): 16 inches o.c.

C. Installation Tolerances: Install steel framing components for suspended ceiling so that cross-furring members or grid suspension members are level to within 1/8 inch in 12 feet as measured both lengthwise on each member and transversely between parallel members.

D. Wire-tie or clip furring members to main runners and to other structural supports as indicated.

E. Grid-Suspension System: Attach perimeter wall track or angle where grid suspension system meets vertical surfaces. Mechanically join main beam and cross-furring members to each other and butt-cut to fit into wall track.

3.5 INSTALLING STEEL FRAMING FOR WALLS AND PARTITIONS

A. Install runners (tracks) at floors, ceilings, and structural walls and columns where gypsum board stud assemblies abut other construction.

B. Extend partition framing full height to structural supports or substrates above suspended ceiling, except where partitions are indicated to terminate at suspended ceilings. Cut studs ½ inch short of full height. Continue framing over frames to doors and openings and frame around ducts penetrating partitions above ceiling to provide support for gypsum board.

C. Terminate partition framing at suspended ceiling where indicated.

D. Install steel studs and furring in sizes and at spacing indicated but not less than that required by the referenced steel framing installation standard to comply with maximum deflection and minimum loading requirements specified.

1. Single-and-Double-Layer Construction: Space studs at 16 inches o.c.

E. Install steel studs so that flanges point in the same direction and so that leading edges or

ends of each gypsum board can be attached to open (unsupported) edges of stud flanges first.

3.6 APPLYING AND FINISHED GYPSUM BOARD, GENERAL

A. Gypsum Board Application and Finishing Standards: Install and finish gypsum panels to comply with ASTM C 840 and GA-216.

B. Install ceiling board panels across framing to minimize the number of abutting end joints and avoid abutting end joints in the central area of each ceiling. Stagger abutting end joints of adjacent panels not less than one framing member.

C. Install wall/partition board panels to minimize the number of abutting end joints or avoid them entirely. Stagger abutting end joints not less than one framing member in alternate courses of board.

D. Install gypsum panels with face side out. Do not install imperfect, damaged, or damp panels. Butt panels together for a light contact at edges and ends with not more than 1/16 inch of open space between panels. Do not force into place

E. Edges and ends. Do not place tapered edges against cut edges or ends. Stagger vertical joints over different studs on opposite sides of partitions. Avoid joints at corners of framed openings where possible.

F. Attach gypsum panels to steel studs so that the leading edge or end of panel is attached to open (unsupported) edges of stud flanges first.

G. Attach gypsum panels to framing provided at openings and cutouts.

H. Cover both faces of steel stud partition framing with gypsum panels in concealed spaces (above ceilings, etc), except in chase walls that braced internally.

1. Fit gypsum panels around ducts, pipes and conduits.

2. Where partitions intersect open concrete coffers, concrete joists, and other structural member projecting below underside of floor/roof slabs and decks, cuts gypsum panels to fit profile formed by coffers, joists, and other structural members; allow 1/4-to- ½ inch wide joints to install sealant.

I. Isolate perimeter of non-load bearing gypsum board partitions at structural abutments, except floors, as detailed. Provide 1/4 inch to ½- inch- wide spaces at these locations and trim edges with U-bead edge trim where edges of gypsum panels are exposed. Seal joints between edges and abutting structural surfaces with acoustical sealant.

J. Space fasteners in gypsum panels according to referenced gypsum board application and finishing standard and manufacturer's recommendations.

3.7 GYPSUM BOARD APPLICATION METHODS

A. Single-Layer Application: Install gypsum wallboard panels as follows:

1. On ceiling apply gypsum panels prior to wall/partition board application to the greatest extent possible and at right angles to framing, unless otherwise indicated, and provide panel lengths that will minimize end joints.

2. On partitions/walls, apply gypsum panels vertically (parallel to framing), unless otherwise indicated, and provide panel lengths that will minimize end joints.
3. Install gypsum wallboard panels with tapered edges taped and finished to produce a flat surface except at showers, tubs, and other locations indicated to receive water-resistance panels.

B. Single Layer Fastening Methods: Apply gypsum panels to support as follows:

1. Fasten with screws.

3.8 FINISHING GYPSUM BOARD ASSEMBLIES:

A. General : Apply joint treatment at gypsum board joints (both directions); flanges of corners bead, edge trim, and control joints; penetrations; fastener heads, surface defects and elsewhere as required to prepare gypsum board surfaces for decoration and levels of gypsum board finish indicated.

B. Prefill open joints, rounded or beveled edges, and damaged areas using setting-type joint compound.

C. Apply joint tape over gypsum board joints except those with trim accessories having concealed face flanges not required taping to prevent cracks from developing in joint treatment at flange edges.

D. Levels of Gypsum Board Finish: Provide applicable levels of gypsum board finish per GA-214.

3.9 CLEANING AND PROTECTION:

A. Promptly remove any residual joint compound from adjacent surfaces.

B. Provide final protection and maintain conditions, in a manner suitable to Installer, that ensures gypsum board assemblies remain without damage or deterioration at time of Final Completion.

END OF SECTION 09255

SECTION 09510 ACOUSTICAL CEILINGS

PART 1: GENERAL

1.1 DESCRIPTION: The work of this section consists of furnishing and installing acoustical ceiling systems, including panels and metal suspension systems.

1.2 SUBMITTALS: As specified in Section 01300.

A. Shop Drawings: Complete layout of ceiling system including attachments, locations of units, intersections of members, edge conditions, and details of other items specified.

B. Samples: Furnish samples of aluminum panels to show appearance and finish, and samples of components of suspension system including moldings and hangers.

C. Manufacturer's Data: Furnish two copies of manufacturer's literature covering instructions and recommendations for installation of ceiling system.

1.3 PRODUCT HANDLING:

A. Delivery: Deliver material in original, unopened, protective packaging, with manufacturer's labels intact and legible showing brand name and materials.

B. Storage: Comply with acoustical material manufacturer's recommendations for storage of units.

1.4 PROJECT CONDITIONS: Maintain temperature of 70 degrees F during installation of system.

1.5 SCHEDULING: Install acoustical units after building is fully enclosed, components in ceiling are installed, and heating system is operating. Coordinate installation with items penetrating or supported by suspension system.

1.6 CLOSEOUT SUBMITTALS: As specified in Section 01700. Provide 3 percent additional units of each type of acoustical material supplied for future replacements.

PART 2: PRODUCTS

2.1 GENERAL: All system components shall be supplied by one manufacturer.

2.2 MATERIALS: Acoustical ceiling system in public toilets shall be "Kick -Proof Security Panels No. 2", 24 inch by 24 inch perforated type, with manufacturer's standard Kynar paint finish, of color selected by the Contracting Officer, with complete "Security" suspension system and acoustical blankets, as manufactured by the Simplex Ceiling Corp., or approved equal. Acoustical ceiling system for all other ceilings shall be "Type B - Snap Bar Indirect" suspension system as manufactured by the Simplex Ceiling Corp., or approved equal, with 24 inch by 24 inch aluminum panels, perforated with acoustical blankets at ranger station and ranger toilet, and solid aluminum panels at all other locations.

PART 3: EXECUTION

3.1 PREPARATION: Examine surfaces to receive acoustical units for unevenness, irregularities, and dampness that would affect execution of the work. Correct defective surfaces or notify Contracting Officer.

3.2 ACOUSTICAL CEILING SYSTEM: Install as recommended by manufacturer.

3.3 Touch up scratches, abrasions, voids, and other defects, as approved.

3.4 CLEANING: Clean soiled or discolored panel surfaces. Remove and replace damaged or improperly installed units.

END OF SECTION 09510

SECTION 09900 PAINTING

PART 1: GENERAL

1.1 RELATED DOCUMENTS:

A. Drawings and General Provisions of the Contract, including General and Supplementary General Provisions, Special Conditions and Division 1 sections, apply to the work of this section.

1.2 SCOPE

A. Furnish all labor, materials, scaffolding, tools and equipment necessary to complete painting, sealing and filling requirements of the project as indicated on the drawings and described in these specifications.

B. Interior Items (not limited to:)

1. Remarks and notes on Architectural drawings for general areas requiring painting.
2. Drywalls walls, bulkheads, and ceilings.
3. Access doors and panels, electrical panels, miscellaneous trim and surfaces not pre-furnished or excluded specifically.
4. Mechanical grilles, registers, diffusers, electrical panels, etc., furnished in prime coats. Paint to match adjacent surfaces.

1.3 LIST OF PROPOSED MATERIALS

A. No claim by the Contractor as to the unsuitability or unavailability of any materials specified, or his unwillingness to use same, or his inability to produce first class work with same, will be entertained.

1.4 RELATED WORK

A. The following items of related work are specified and included in other sections of these specifications:

1. Section 09251 - Gypsum Drywall

B. Painting is not required on prefinished items, finished metal surfaces, concealed surfaces, operating parts, and labels. Items not included in this specification are:

1. Fixture items, except as noted on drawings.
2. Anodized aluminum surfaces.

1.5 SUBMITTALS

A. Samples: Prepare duplicate 12" x 12" samples for each color selection for each type of paint per schedules for this section. One approved sample of each color shall be kept at the job office.

B. Manufacturer's Literature: Submit for approval manufacturer's complete descriptive data on all materials to be used.

1.6 DELIVERY AND STORAGE

A. Deliver in manufacturer's original unopened containers, labeled with product description and instructions.

B. Store flammable materials in tightly closed containers set in well ventilated spaces.

1.7 PROTECTION OF OTHER WORK

A. The Painting Contractor shall furnish and lay drop cloths in all areas where painting is being done to protect floors and other work from damage. He shall be responsible for any damage to other work and shall replace any materials which have been damaged to such an extent that they cannot be restored to their original condition. All damage must be repaired to the satisfaction of the Architect.

1.8 JOB CONDITIONS

A. Apply exterior paint only when temperature exceeds 50 degrees F. and drying conditions are good and predicted to remain so for at least 24 hours.

B. Apply interior paint only when inside temperature exceeds 60 degrees F. and will be maintained above the point until paint has dried.

C. Ventilate interior during application and drying.

D. Before painting is started in any area, the area shall be broom cleaned and excessive dust shall be removed from all areas to be painted. All painting operations begin in a given area, clean only with commercial vacuum cleaning equipment.

E. Adequate illumination shall be provided in all areas where painting operations are in progress.

1.9 INSPECTION OF SURFACES

A. Before starting any work, surfaces to receive paint finish shall be examined carefully for defects which cannot be corrected by the procedures specified herein under "Preparation of Surfaces" and which might prevent satisfactory painting results. Work shall not proceed until such damages are corrected.

B. The commencing of work in a specific area only shall be construed as acceptance of the surfaces, and thereafter this Contractor shall be fully responsible for satisfactory work as required herein.

1.10 COOPERATION WITH OTHER TRADES

A. This work shall be scheduled and coordinated with other trades and shall not proceed until other work and/or job conditions are as required to achieve satisfactory results.

B. The Contractor shall examine the specifications for the various other trades and shall thoroughly familiarize himself with all their provisions regarding painting. All surfaces that are left unfinished by the requirements of other sections except " Items not Included" in this Section, shall be painted or finished as

part of the work covered by this Section.

PART 2: PRODUCTS

2.1 PAINT SCHEDULE

A. Materials shall be manufacturer's best grade of respective types. Indicated along side of a few manufacturers are some examples of "Best Grade". Grade level shall be applicable to all types of paints specified hereinafter.

B. Interior Paint Systems:

1. Interior Gypsum Wallboard:
   1 coat Latex Wall Primer
   1 coat Latex Semi-Gloss Enamel

2. Interior Concrete a Masonry Units:
   1 coat Surface Filler
   1 coat Latex Emulsion
   1 coat Latex Semi-Gloss Enamel (Apply filler coat at a rate to ensure complete coverage with pores filled.

3. Interior Metal:
   2 coats Alkyd Satin

4. Interior Wood (painted):
   1 coat Enamel Undercoat
   2 coats Alkyd Semi-Satin Enamel

5. Cast- In- Place Concrete:
   1 coat of Latex Masonry Block Filler
   2 tinted coats of Acrylic Latex Semi-Gloss Enamel

6. Ferrous Metals:
   Touch up Prime Coat
   2 tinted coats of Alkyd Enamel Semi- Gloss

7. Concrete Floor:
   1 Coat Concrete Conditioners
   2 Coats Polyurethane Coatings

C. Exterior Paint Systems

1. Galvanized Metals:
   Touch up Prime Coat
   2 tinted coats Exterior Alkyd Enamel High-Gloss Enamel

2. Ferrous Metals:
   Touch up Prime Coat
   2 tinted coats Exterior Alkyd Enamel High-Gloss Enamel

3. Aluminum:
   1 Coat Zinc Chromatic Primes
   2 Coats High Gloss Alkyd Enamel

4. Concrete, Stucco and Masonry
   1 Coat Acrylic Emulsion
   1 Coat Acrylic Emulsion (not less than 2.5 mils day film thickness)

D. Acceptable Manufacturers are:

1. Benjamin Moore, 51 Chestnut Ridge Road, Montvale, NJ 07645
2. Devoe and Reynolds, 4000 Dupont Circle, Louisville, KY
3. Porter Paints
4. Glidden, 925 Euclid Avenue, Cleveland, OH 44115
5. Pittsburg Paints, One PPG Place, Pittsburg, PA 15272
6. Pratt & Lambert, P.O. Box 1505, Buffalo, NY 14240
7. Sherwin-Williams, Cleveland, OH 44101

E. Gloss levels for paints required are as follows (ref. National Paint & Coating Association - NPCA):

Sheen Level	Test Method	Gloss Range
Flat	85 degree meter	Below 15
Eggshell	60 degree meter	5 to 20
Satin	60 degree meter	15 to 35
Semi-Gloss	60 degree meter	30 to 65
Gloss	60 degree meter	Over 65

F. Mixing or tinting shall be done at factory.

2.2 APPLICATION EQUIPMENT

A. Provide all required ladders, scaffolding, drop cloths, maskings, scrapes, tools, sandpaper, dusters, cleaning solvents, and waste as required to perform the work and achieve the results specified herein.

PART 3: EXECUTION 3.1 METHODS:

A. It is the intent that the above brand names and types of materials will give complete coverage with uniform appearance. If any additional coat is necessary for complete coverage and appearance, it shall be done at

no additional cost to the Owner.

B. All paints, new stock, delivered to job unopened. Prepare surfaces properly for receiving paint, protect adjacent surfaces not to be painted.

C. Use of brushes, rollers or sprays is permissible, where applicable, upon approval by Architect.

D. Surfaces clean, dry, and in proper condition for painting. All work carefully done by skilled mechanics. Finished surfaces uniform in coverage, gloss, finish and color, and free from brush marks. All coats shall be thoroughly dry before applying succeeding coats.

END OF SECTION 09900

SECTION 116161 - PERFORMANCE LIGHTING POWER AND CONTROLS

PART 1 - GENERAL

1.1 SUMMARY

A. The system includes complete dimming, power, and control systems serving a Theatre.

B. Due to space restrictions, dimming equipment should be priced using Electronic Theatre Controls equipment.

C. Work in this section includes the engineering, manufacture, furnishing, coordination and installation of performance dimmers, power, and control systems for the following purposes:

1. Work Lighting
2. House Lighting
3. Performance Lighting

D. Section Includes

1. Materials, components, modifications, assemblies, equipment and services as specified herein. These include, but are not limited to:

    a. Verification of site dimensions and conditions.
    b. Submittals as required by the Contract Documents.
    c. Engineering of equipment and systems as required by the Contract Documents.
    d. Manufacture of equipment and systems as required by the Contract Documents.
    e. Scheduling, sequencing and coordination with other trades.
    f. Site supervision of equipment and systems installation specified herein and elsewhere in the Contract Documents.
    g. Testing and demonstration of equipment and systems as specified herein and elsewhere in the Contract Documents.

E. Section Consists Of the following Subsystems

1. Dimmer Racks with Phase Control Dimmers
2. DMX Driven Relays
3. DMX Driven Motorized Breaker Panels
4. Company Switches
5. Emergency Lighting Transfer Switches
6. Emergency DMX Transfer Switches
7. Architectural Lighting Controls
8. Logic Controlled Systems
9. Initial Programming
10. Lighting Control Consoles & Peripherals
11. Data Communications Systems
12. Electronics Racks

    a. Rack Panels

13. Performance Lighting Circuit and Control Faceplates & Associated Cable Assemblies.

14. Accessories.
15.
16. Data communications cable servicing control circuits connecting Performance Lighting Control faceplates specified herein to each other, to the dimmers specified herein and to the work lighting control system house lighting and architectural lighting fixtures.

F. Products Furnished for installation by others.
Unless otherwise noted installation will be by the Division 26 Contractor.

1. Back boxes for faceplates. Gang backboxes, as outlined in the contract documents, are excepted from this and are provided under Division 26.
2. Devices with 100v and above terminations including lighting receptacles, connector strips, faceplates and backboxes.
3. Dimmer Racks
4. Controlled relay panels.
5. Controlled motorized breaker panels.
6. Company Switches.
7. Emergency Lighting Transfer Switches
8. Emergency DMX Transfer Switches (Wall Mounted)
9. Backstage Running Lights (Blue lights)

1.2 RELATED DOCUMENTS

A. Division 1 Specification Sections apply to this Section.

1. Where Division 1 and this section conflict the more stringent shall apply.

B. Electrical Documents, Division 26.

1.3 DEFINITIONS

A. The term “furnish” means to supply and deliver to the job site, ready for unloading, unpacking, assembly, installation, and similar operations.

B. The term “install” is used to describe operations at the job site including the actual anchoring, applying, assembly, cleaning, curing, cutting, erection, finishing, patching, placing, protecting, pulling, terminating, unloading, unpacking, working to dimension, and similar operations that will render the systems complete and ready for the intended use.

C. The term “provide” means to furnish and install.

D. The term "primary components" refer to elements of the system which Control levels, such as dimmers, and control console.

E. Dimmer Rack: A frame and chassis accommodating dimmer modules, load and line connections, and circuit protection.

F. Dimmer Rack Chassis: A cluster of dimmer modules with a common power supply.

G. Plug-In Module: A modular unit which is installed in a standardized mounting location throughout the dimmer rack.

H. Dimmer Module: A type of Plug-In Module containing one or more dimmers.

I. Data Communications: Signals that provide control and feedback communications between devices in the system.

J. Products utilizing the "DMX512" control protocol shall comply with the rules and recommendations of the following standard: Entertainment Services & Technology Association (ESTA), ANSI E1.11 – 2008, Entertainment Technology - USITT DMX512-A, Asynchronous Serial Digital Data Transmission Standard for Controlling Lighting Equipment and Accessories.

K. Products utilizing the "ACN" control protocol shall comply with the rules and recommendations of the following standard: Entertainment Services & Technology Association (ESTA) ANSI E1.17 – 2006, Entertainment Technology - Architecture for Control Networks.

L. Products utilizing the "RDM" control protocol shall comply with the rules and recommendations of the following standard: Entertainment Services & Technology Association (ESTA) ANSI E1.20 – 2006, Entertainment Technology - RDM - Remote Device Management over USITT DMX512 Networks.

M. Products utilizing "Lightweight/Streaming ACN" control protocol shall comply with the rules and recommendations of the following standard: Entertainment Services & Technology Association (ESTA) ANSI E1.31 – 2009, Entertainment Technology – Lightweight streaming protocol for transport of DMX512 using ACN.

N. Products utilizing a "0 – 10V" control protocol shall comply with the rules and recommendations of the following standard: Entertainment Services & Technology Association (ESTA)ANSI E1.3 - 2001 (R2006), Entertainment Technology - Lighting Control Systems - 0 to 10V Analog Control Specification.

O. Products utilizing the DMX512 standard Entertainment Services & Technology Association (ESTA), ANSI E1.11 – 2008, Entertainment Technology - USITT DMX512-A, Asynchronous Serial Digital Data Transmission Standard for Controlling Lighting Equipment and Accessories shall comply with the rules and recommendations of the following standard: ANSI E1.27-1-2006, Entertainment Technology-Standard for Portable Control Cables for Use with USITT DMX512/1990 and E1.11 (DMX512-A)Products.

P. Products utilizing the DMX512 standard Entertainment Services & Technology Association (ESTA), ANSI E1.11 – 2008, Entertainment Technology - USITT DMX512-A, Asynchronous Serial Digital Data Transmission Standard for Controlling Lighting Equipment and Accessories shall comply with the rules and recommendations of the following standard: ANSI E1.27-2 – 2009, Entertainment Technology - Recommended Practice for Permanently Installed Control Cables for Use with ANSI E1.11 (DMX512-A) and USITT DMX512/1990 ProductsPOE: Power Over Ethernet - an 802.3AF compliant scheme of powering devices on an Ethernet network via the Ethernet cabling.

Q. POE: Power Over Ethernet - an 802.3AF compliant scheme of powering devices on an Ethernet

R. Control Console: A Performance Lighting Control Console is capable of controlling stage lighting, house lighting, and work lighting channels via ACN.

1.4 SYSTEM DESCRIPTIONS

A. Design Requirements

1. Standards and Regulations

a. Components must comply with applicable regulations and ANSI Standards.
b. Provide systems and components that are approved by an accredited independent testing laboratory such as Underwriters Laboratory.
c. Equipment utilizing Stage Pin Connectors must comply with ANSI E1.24-2006.
d. DMX equipment has ports able to communicate with any DMX compliant products.
e. Ethernet systems are to be ACN compliant.
f. Systems are to be RDM compliant.
g. Controlled devices must comply with either DMX or ACN standards.

2. Emerging Standards:

a. Systems must anticipate requirements of, comply with emerging standards.
b. Systems must be compliant as much as is technologically possible at the time of the systems installation.
c. Compliance will be evidenced by:

1. The utilization of updateable code.
2. Provision of basic enabling hardware.
3. The absence of hardware or non-updatable software that will disable or interfere with the function of the emerging standard.

B. Performance Requirements

1. Key Switches

a. Key switches do not interoperate with other equipment systems in the facility.

1.5 QUALIFICATIONS:

A. The Contractor shall have been authorized dealers or representatives of the manufacturers of the primary components for a minimum of five (5) years.

B. Where a manufacturer of a primary component offers factory training in the use of that component the Contractor is to have received that training.

C. The Contractor shall have been involved in Lighting Systems Contracting for Entertainment and Worship facilities for a period of five (5) years or more and shall have completed at least three (3) installations of this type and scope which have been in service for not less than two (2) years.

D. The Contractor shall provide, as part of their internal organization, the base system and not less than one (1) of the sub-systems specified. Additional Work in the Contract will be performed under their authority and responsibility as defined in the Contract Documents.

E. The Contractor shall maintain and operate shops for the integration and service of the system components.

F. The right is reserved to inspect previous equipment or systems as furnished or installed by this Contractor. In addition, the right is reserved to reject a Contractor who has failed in any respect to comply with the provisions of previous contracts.

G. No sub-contracting work is permissible, unless the Sub-Contractor is named and included as part of the bid. All terms and requirements herein apply to the Sub-Contractor. The right is reserved to reject the proposed Sub-Contractor based on the terms stated herein.

H. The Design Consultant shall be the final judge of suitability of experience.

1.6 SUBMITTALS

A. Product Data

1. Submittal shall include manufacturer’s information sheets of equipment not explicitly specified by make and model that the contractor intends to provide as part of the project. Equipment matching make and model called out in the specification need not be submitted.
2. Collect Product Data into a single submittal for each element of construction or system. Product Data includes printed information such as manufacturer's installation instructions, catalog cuts, standard color charts, roughing-in diagrams and templates, standard wiring diagrams and performance curves. Where Product Data must be specially prepared because standard printed data is not suitable for use, submit as "Shop Drawings."
3. Mark each copy to show applicable choices and options. Where printed Product Data includes information on several products, some of which are not required, mark copies to indicate the applicable information. Include the following information:

    a. Manufacturer's printed recommendations.
    b. Compliance with recognized trade association standards.
    c. Compliance with recognized testing agency standards.
    d. Application of testing agency labels and seals.
    e. Notation of dimensions verified by field measurement.
    f. Notation of coordination requirements.
    g. Material Safety Data Sheets (MSDS) for each product.
    h. Catalog or data sheets indicating all component manufacturer's names, model numbers and performance data, where applicable.

B. Shop Drawings:

1. Submittals shall be in accordance with Division 1.
2. Shop drawings shall be submitted within 90 days of award of contract unless otherwise indicated in Division 1.
3. Fabrication, Installation, and Erection shall not commence until shop drawings have been approved by the Consultant and Architect.
4. Note and maintain one of the prints returned as a "Record Document".
5. Sheets in the submittal shall be of the same size.
6. Submittal shall include a title sheet listing sheets in the submittal.
7. Drawing scales:

a. Mechanical Assembly Drawings (1/2"= 1'-0" minimum).
b. Faceplate Fabrication Drawings (6" = 1'-0" minimum)
c. Room layouts (1"=1'-0" minimum).
d. Block schematics and riser diagrams. (NTS)
e. Miscellaneous Details and Assembly Drawings. (scale as necessary)
f. Mechanical Detail Drawings. (1"=1'-0" minimum).
g. Mechanical General Layout. (1/4"= 1'-0" minimum).
h. Component Equipment Drawings. (1"=1'-0" minimum).
i. Erection Plans and diagrams. (1/4"=1'-0" minimum).
j. Wiring Diagrams showing system layout (1/4"=1'-0" minimum).
k. System assemblies, major sub-assemblies, components, cabinets and enclosures (1"=1'-0" minimum).
l. Templates and installation details (1"-1'-0" minimum).

8. Highlight, encircle, or otherwise indicate deviations from the Contract Documents.
9. Do not reproduce Contract Documents or copy standard information as the basis of Shop Drawings. Standard information prepared without specific reference to the Project is not considered Shop Drawings.
10. Shop Drawings include fabrication and installation drawings, setting diagrams, schedules, patterns, templates and similar drawings.
11. Lettering on Shop Drawings is considered part of the Drawings.
12. Show information necessary to explain fully the design features, appearance, function, fabrication, installation, and use of system components in all phases of operation. Include the following drawings as a minimum:

    a. Signal, control and power sequencing Block Diagrams detailing:

        1. Equipment
        2. Faceplates
        3. Interconnecting wires detailing the unique labels
        4. Terminating devices (Connectors or terminal strips)
        5. Where custom wiring is necessary detail each component (Switches, indicators, resistors, power supplies, relays, etc.)
        6. Multiconductor wiring
        7. Program logic and relationship to input / output points, either in logic diagrams or ladder logic diagram, or other appropriate format.

    b. Faceplate & Rack Panel Fabrication Drawings detailing:

        1. Finishes
        2. Devices
        3. Engraving

    c. Mounting Details - where custom mounting systems are employed and as required by the specifications
    d. Patch Panel Layouts detailing:

        1. Layout
        2. Labeling
        3. Normalling

    e. Rack Elevations detailing:

1. Equipment location
2. Equipment labeling
3. Security covers
4. Vent panels
5. Fans
6. Terminal points and their function
7. Field wiring chases.

f. Notation of coordination requirements.
g. Notation of dimensions established by field measurement.
h. Do NOT produce floorplans reiterating information already in the set, such as box layout and low voltage conduit. These have been issued and form part of scope of work by others.
i. DO review box layout and low voltage conduit drawings and note any areas of concern in a Request for Information.

C. Coordination Drawings:

1. Coordination drawings are a special type of Shop Drawing that show the relationship and integration of different construction elements that require careful coordination during fabrication or installation to fit in the space provided or function as intended.

a. Preparation of coordination Drawings is specified in section "Project Coordination" and may include components previously shown in detail on Shop Drawings or Product Data.
b. Submit coordination Drawings for integration of different construction elements. Show sequences and relationships of separate components to avoid conflicts in use of space.

2. Prepare and submit coordination Drawings where close and careful coordination is required for installation of products and materials fabricated off-site by separate entities.
3. Show the interrelationship of components shown on separate Shop Drawings.
4. Indicate required installation sequences.
5. Required Coordination Drawings include, but are not limited to:

a. Diagrams detailing cable and wire installation for cable and wire supplied to and installed by others. These diagrams should indicate boxes and the quantity and type of wire and cable pulled between them.
b. Dimmer room arrangement drawings.
c. Installation instructions for equipment installed by others.

D. Record Document Submittals (As Built Drawings)

1. General: Do not use record documents for construction purposes; protect from deterioration and loss in a secure, fire-resistive location; provide access to record documents for the Architect's reference during normal working hours.
2. On completion of Work and prior to final review, neatly transfer as-built notations to set of transparencies, stamp drawings in set "Certified As-Built Drawings" and submit record documents to the Architect.

3. Record Documents: Maintain a clean, undamaged set of Contract Documents, Shop Drawings and Product Data. Mark the set to show the actual installation where the installation varies substantially from the Work as originally shown. Mark whichever drawing is most capable of showing conditions fully and accurately; where Shop Drawings are used, record a cross-reference at the corresponding location on the Contract Drawings. Give particular attention to concealed elements that are concealed or cannot otherwise be readily discerned later by direct observation.
4. Include details on internal setting of components.
5. Mark record sets with red erasable pencil; use other colors to distinguish between variations in separate categories of the Work.
6. Mark new information that is important to the Owner, but was not shown on Contract Drawings or Shop Drawings.
7. Note related Change Order numbers where applicable.
8. Organize record drawing sheets into manageable sets, bind with durable paper cover sheets, and print suitable titles, dates and other identification on the cover of each set.
9. Testing Data - Include in record submittal documentation of performance tests as required in the contract documents.
10. Upon completion of the Work, submit Record Documents to the Architect for the Owner's records.
11. Record Sample Submitted: Immediately prior to the date or dates of Substantial Completion, the Contractor will meet at the site with the Architect and the Owner's personnel to determine which of the submitted Samples that have been maintained during progress of the Work are to be transmitted to the Owner for record purposes. Comply with delivery to the Owner's Sample storage area.
12. Miscellaneous Record Submittals: Refer to other Specification Sections for requirements of miscellaneous record-keeping and submittals in connection with actual performance of the Work. Immediately prior to the date or dates of Substantial Completion, complete miscellaneous records and place in good order, properly identified and bound or filed, ready for continued use and reference. Submit to the Architect for the Owner's records.

E. Maintenance Manuals

1. Organize operating and maintenance data into suitable sets of manageable size. Bind properly indexed data in individual heavy-duty 2-inch, 3-ring vinyl covered binders, with pocket folders for folded sheet information. Mark appropriate identification on front and spine of each binder.
2. Operating and Maintenance Instructions: Provide instruction manuals describing proper operation and maintenance. Include a detailed review of the following items:

    a. Cleaning.
    b. Control sequences.
    c. Copies of warranties.
    d. Emergency instructions.
    e. Fixture lamping schedule.
    f. Fuse list.
    g. Hazards.
    h. Identification systems.
    i. Inspection procedures.
    j. Lubricants.
    k. Maintenance and operation manuals.
    l. Recommended "turn around" cycles.
    m. Record documents.

n. Shop Drawings and Product Data.
o. Spare parts and materials.
p. Spare parts list.
q. Specifications for expendables.
r. Tools.
s. Warranties and bonds.
t. Wiring diagrams reflecting actual labeling in the field.
u. Maintenance agreements and similar continuing commitments.
v. As Built drawings depicting actual locations and conditions of the system design, construction and arrangement.
w. Equipment inventory with a listing for every item furnished or provided that includes the following information:

1. Item
2. Make
3. Model
4. Serial Number
5. Firmware Version (where applicable)
6. Quantity (>1 if there is no SN, IP, or MAC address)
7. MAC Address (If IP Addressable)
8. IP Address or “DHCP” (If IP Addressable)

3. As part of instruction for operating equipment, describe the following procedures:

a. Start-up.
b. Operation.
c. Shutdown.
d. Emergency operations.
e. Noise and vibration adjustments.
f. Safety procedures.
g. Economy and efficiency adjustments.
h. Effective energy use.
i. Complete Subcontractor List including names and telephone numbers of persons to contact.

4. Provide four (4) copies of console manuals.
5. Provide three (3) sets of complete as built drawings.
6. Provide three (3) sets of maintenance manuals for the system.
7. Provide three (3) hard copies of initial system configuration.
8. Provide three (3) soft copies of initial system configuration.
9. Provide three (3) binders documenting the functions of presets, submasters, groups, crossfaders, and DMX universes controlling performance and architectural lighting.

F. The Architect's review of Submittals is only for general conformance with performance systems design concept of the project and general compliance with the Contract Documents.

1. It is not a complete check on the method of assembly, engineering, erection or construction.

2. Review shall in no way be construed as: permitting any departure whatsoever from the Contract Documents, except where the Contractor, in accordance with the provisions herein, has previously notified the Owner of, and the Owner has accepted, such departure; relieving the Contractor of full responsibility for any error in quality of materials, details, dimensions, omissions or otherwise that may exist; relieving the Contractor of full responsibility for adequate field connection, erection techniques, bracing or deficiencies in strength; relieving the Contractor of full responsibility for satisfactory performance of all work and contractors; or permitting departure from additional details or instructions previously furnished by the Architect.
3. Review does not relieve the Contractor from the responsibility of errors in the Shop Drawings.
4. This Contractor is responsible for: dimensions and measurements which shall be confirmed and correlated at the job site, correct quantities, materials, fabrication processes and techniques of construction and for the coordination of his work with other trades.

G. Resubmittals

1. Make changes in the shop drawings as required, consistent with the Contract Documents. When resubmitting, notify the Consultant in writing of any revisions other than those required.
2. Action indicated is subject to the requirements of the Contract Documents.
3. Adjustments made on shop drawings are not intended to change the Contract Price. If adjustments affect the value of the Work, state such in writing prior to proceeding with the Work.

1.7 QUALITY ASSURANCE

A. Supplementary:

1. Secure equipment, except portable equipment, firmly in place. Mount components rigidly, except where resilient isolation is required. Design and provide fastenings and supports adequate to support their loads with a safety factor of at least three.
2. Clearly mark switches, jacks, outlets, cables, connectors, etc. logically and permanently during fabrication and installation.
3. Where many cables are run in close proximity color code by function in a logical manner.
4. Take necessary precautions to prevent and guard against electromagnetic, electrostatic and radio frequency interference.
5. Provide control system wiring which is continuous from the faceplates to the racks. Employ no splices for entire cable length.
6. Exercise care in wiring, so as to avoid damage to the cables and to the equipment. Between racks, cabinets, consoles or modules insure cables are well-supported, neatly laced and dressed. Make joints and connections with mechanical connectors approved by the Consultant.
7. Group terminals by signal type.
8. When cable is surface mounted and crossing through fire walls, use the equivalent Belden fire rated plenum cable to the specified cable type.
9. Run power and high level circuits on one side of the racks or cabinets, as viewed from the rear. Run other circuits on the opposite side, as viewed from the rear.
10. Label terminal strips, punch blocks, wire and cables in a permanent and logical manner with a unique number on each end of cable runs.

11. Terminate all connections with rack with mating connectors, punch blocks, or terminal strips.
12. Final location of equipment is as shown on the Drawings, located in the field by the Architect or as shown on supplementary drawings prepared by the Consultant.

1.8 SCHEDULES

A. Schedule and sequence the Work in conjunction and agreement with trades performing related, adjacent and intersecting work and the Construction Manager. Accommodate the Owner's projected time schedule for installation, particularly where coordination with other trades is required.

B. Submit preliminary progress schedule coordinated with Project construction schedule.

C. After review, revise and resubmit schedule to comply with revised project schedule.

D. During progress of Work, revise and resubmit schedules as pertinent events are recognized.

1.9 COORDINATION

A. Summary

1. The Work involving performance equipment may be performed simultaneously to general building construction occurring on site. It is incumbent on this contractor to provide necessary coordination this Work and with adjacent and intersecting work, trades and facilities.
2. This section describes administrative and supervisory requirements necessary for Project coordination including:

    a. Coordination.
    b. Administrative and supervisory personnel.
    c. General installation provisions.

B. Related areas of coordination are described elsewhere in the Contract Documents.

C. Coordinate included construction activities to assure efficient and orderly installation of each part of the Work. Coordinate construction operations included in the Project that are dependent upon each other for proper installation, connection, and operation.

D. Where installation of one part of the Work is dependent on installation of other components, either before or after its own installation, schedule construction activities in the sequence required to obtain the best results.

E. Where availability of space is limited, coordinate installation of different components to assure maximum accessibility for required maintenance, service and repair.

F. Make adequate provisions to accommodate items scheduled for later installation.

G. Where necessary, prepare memoranda for distribution to each party involved outlining special procedures required for coordination.

H. Include such items as required notices, reports, and attendance at meetings.

1. Prepare similar memoranda for the Owner and separate Contractors where coordination of their Work is required.

I. Administrative Procedures: Coordinate scheduling and timing of required administrative procedures with other construction activities to avoid conflicts and ensure orderly progress of the Work.

J. Accurately cut, fit, drill and tap Work herein to accommodate and fit work of other trades. Furnish or obtain templates and drawings to or from applicable trades for proper coordination of this Work.

K. Coordinate the Work with related trades and the Construction Manager, this includes the preparation of schedules and coordination of equipment delivery, storage and installation.

L. Coordinate the system installation with the requirements of adjacent and intersecting Work.

M. Coordinate the following areas:

1. Preparation of schedules.
2. Installation and removal of temporary facilities.
3. Delivery and processing of submittals.
4. Progress meetings.
5. Project Close-out activities.

1.10 AVAILABILITY

A. Immediately upon signing Contract, review Product delivery requirements and anticipate foreseeable supply delays for any items. If delays in supply of products are foreseeable, notify the Architect of such, in order that substitutions or other remedial action may be authorized in ample time to prevent delay in the performance of the Work.

B. In the event of failure to notify the Architect at commencement of the Work and should it subsequently appear that the Work may be delayed for such reasons, the Owner reserves the right to substitute more readily available products of similar character, at no increase in Contract Price.

1.11 WARRANTY

A. In addition to manufacturer's warranties, warrant systems and equipment to be free of defective components, faulty workmanship or improper adjustment for a period of two years from the date of Owner's acceptance. Paint and exterior finishes are excluded.

B. Replace items showing evidence of defective materials or workmanship (including installation workmanship) within thirty (30) days after notification. Make replacements without cost to the Owner.

C. Rectify conditions that might present a hazard to human life, well-being and or property within 48 hours of notification.

D. Included in warranty, and additional to the maintenance service is one visit scheduled to occur approximately thirty (30) days prior to expiration of this warranty. The contractor will contact the owner approximately sixty (60) days prior to the expiration of the warranty to arrange visits to be at a time mutually agreeable to the Owner and Contractor. During the visit the technician will thoroughly examine system components, including error logs and replace failing or failed components.

1.12 MAINTENANCE

A. Maintenance Service

1. Provide on-site maintenance service for a period of one year after final acceptance of the installation. This service shall cover the parts and labor resulting from correction of defects and/or improper installation of items specified in this section.
2. In addition to repair visits, this service consists of at least two half-yearly visits to the site for checking and adjusting of equipment. The first visit occurring six months after the system has been accepted. Arrange visits to be at a time mutually agreeable to the Owner and Contractor.
3. Provide 24 hour emergency service phone line. A field service engineer shall respond to an emergency call on this line within 30 minutes.

B. Extra Materials

1. Provide replacement spares as required and described herein.

1.13 PRODUCT HANDLING AND STORAGE

A. The Division 26 Contractor will make good or replace work, materials and equipment which have become contaminated, stolen, marred otherwise damaged, as directed by the Consultant and at no cost to the Owner once the equipment has been accepted by the Division 26 Contractor.

B. Equipment will remain the responsibility of the Division 26 Contractor until turned over to the owner.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Note that listing in this specification and its subsections does not relieve a manufacturer of compliance with the specified standards.

B. Note that listing in this specification and its subsections does not imply compliance with the specified standards.

C. A listed item found not to be in compliance with the specification will be rejected when the non-compliance is discovered.

2.2 SUPPLEMENTARY

A. Provide equipment and hardware in addition to the items specified previously that are necessary to provide a fully working system in conformance with the intent of the Contract Documents.

2.3 FABRICATION

A. Shop Assembly:

1. Workmanship: Work shall be performed by an experienced fabricator or manufacturer and installed by experienced tradesmen. Materials, methods of fabrication, fitting, assembly, bracing, supporting, fastening, operating devices and erection shall be in accordance with the Contract Documents, reviewed shop drawings and best practices of the industry, using new and clean materials specified, having structural properties sufficient to safely sustain or withstand stresses and strains to which materials and assembled work will be subjected. Assemble, fabricate and erect all work in a neat and accurate fashion.
2. Employ materials that are free of defects impairing strength, durability or appearance and of best commercial quality for the purpose specified. Employ materials with structural proportions to safely sustain and withstand stresses and strains to which they will be subjected. Fabricate true to detail, clean, straight with sharply defined profiles and, unless otherwise noted, with smooth finished surfaces.
3. Supplementary Parts: Provide as necessary to complete each item of work, even in the event that such supplementary parts are not specifically mentioned in the Contract Documents.
4. Connections:

    a. Make connections with tight joints, capable of developing full strength of the members and flush unless indicated otherwise. Locate joints where least conspicuous. Unless indicated otherwise, weld or bolt shop connections; bolt or screw field connections. Provide control joints as required to accommodate environmental variations.
    b. Employ fastening systems of appropriates sizes, ratings and quantities for the application. Where rated fasteners are employed, Provide domestically manufactured fasteners rated for anticipated loads and with approved markings indicating their rating. Provide fastener system's components of the same manufacture and equal ratings.
    c. Holes: Drill or cleanly punch holes, do not burn.
    d. In addition to all other requirements, install a hardened washer between bolt heads, nuts and materials having elongated holes.
    e. Unless specifically noted, and excepting graded, rated or otherwise certified fasteners, use nylon locking type nuts in locations subject to vibration and loosening.
    f. Unless otherwise noted, exposed bolt and screw heads shall be flat and countersunk.

5. Insofar as practicable, perform fitting and assembly of the Work in the shop. Shop assemble the Work in the largest practical sizes to minimize field work. It is the responsibility of this Contractor to assure himself that shop fabricated items properly fit the field condition. In the event that shop fabricated items do not fit the field condition, return the item to the shop for correction.

6. Cutting:

    a. Cut metal by sawing, shearing or blanking. Flame cutting is permitted only when edges are ground back to clean, smooth edges and no deformation or damage is caused to the metal by the process. Make cuts accurate, clean, sharp and free of burrs, without deforming adjacent surfaces or metals.

7. Where dimensions and characteristics have been omitted, furnish based on criteria set forth herein.

PART 3 - EXECUTION

3.1 SITE CONDITIONS

A. Sequence delivery and installation of components to protect their long term viability. Of particular concern is protecting electronic contacts from abrasive construction dust and grit and protecting devices from the accumulation of dust which can lead to early component failure.

B. If devices must be installed prior to the room being clean, dry and dust free protect connectors and internal components from the infiltration of dust and thoroughly clean the components of all dust and grit before beginning testing. Devices with evidence of abrasion on the contacts will be rejected.

C. Devices not installed but required for testing are to be brought to the site for in time for testing.

D. Devices not required for testing are to be delivered at the first training session.

3.2 INSTALLATION

A. Provide racks, furniture, consoles, etc., required for the installation and needed to provide completed systems. Only to the extent that such ancillary equipment is specified elsewhere is it excluded from these system Specifications.

B. Provide low voltage cable.

C. Terminate and install low voltage faceplates.

D. Terminate control lines.

E. Interface:

1. Coordinate work with the Division 26 Contractor in accordance with the contract documents.
2. Contract documents are diagrammatic and indicate general arrangement of systems and work included.
3. Follow drawings in laying out work and check drawings of other trades relating to work to verify spaces in which work is installed.
4. Maintain headroom and space conditions at all points.

3.3 DELIVERY

A. Materials within this contract will be delivered by the contractor to the project site.

B. Equipment furnished under Division 116161 will become the responsibility of the Division 26 Contractor at such time that the Division 26 Contractor takes possession of the equipment from the 116161 contractor.

1. At this time the Division 26 Contractor will document the exact condition, breakage or damage evident in the equipment.
2. Exact quantities will be documented.
3. Discrepancies in the quantities and damage or unsuitability of the product for the application will be provided in writing to the 116161 contractor upon transfer of the equipment.
4. Acceptance of the equipment verifies proper physical condition of the product. Electrical functionality is not implied at acceptance and is not the responsibility of the Division 26 Contractor.
5. The 116161 Contractor will be present at the time of transfer to coordinate and expedite this action. The 116161 Contractor shall be given a two week minimum lead time prior to this meeting.

3.4 SUPERVISION OF INSTALLATION

A. Provide instruction and supervision to the Division 26 Contractor as it pertains to the installation of these systems. Provide the necessary personnel for coordination meetings and site visits prior to installation of systems.

3.5 FIELD QUALITY CONTROL

A. Tests - Perform tests to ensure the following criteria and provide certification:

1. Labeling of faceplates has correct correlation of dimmer number and faceplate circuit number.
2. Polarity of circuits is correct.
3. Test voltage drop at each end of circuits with a 2Kw load and record voltage.
4. DMX and Ethernet lines for throughput, packet formation, termination, and noise.
5. Pairing of circuits is correct.

B. If final acceptance is delayed beyond two test days or visits because the system does not fulfill this specification, pay for time and expenses of the Architect’s Consultant during any extensions of the acceptance testing period.

3.6 DEMONSTRATION & INSTRUCTION

A. Create an initial configuration for test purposes which demonstrates the full capabilities of the system, demonstrates how it meets specification, and demonstrates areas in which it exceeds specification.

B. Provide Training on this equipment system to be scheduled at times mutually agreed upon with the owner. This training time is to be divided into the following sessions as a minimum:

1. Initial training
2. Follow-up training.
3. Attendance at the first cueing secession.

3.7 PROJECT CREDIT

A. In publications where this project is mentioned give credit to:

1. The Electrical Engineer
2. The Design Architect
3. Theatre Consultant: Theatre Consultants Collaborative, Inc

3.8 SCHEDULES

A. See Attached Equipment and Component Schedules for outline of major materials and components.

B. Dimmer List

C. Box Schedule.

D. System Drawings.

E. Construction Drawings

END OF SECTION 116161.00

SECTION 116161.11 - PERFORMANCE LIGHTING POWER AND CONTROLS ARCHITECTURAL CONTROLS

PART 1 - GENERAL

1.1 SUMMARY

A. Work in this section includes the engineering, manufacture, furnishing, and coordination of the Architectural Lighting Control System and accessories.

1. Controller
2. Occupancy Sensors
3. Initial Programming

1.2 SYSTEM DESCRIPTION

A. Design Requirements:

1. This system provides control of the all address in the control system.
2. This system coordinates its status with the sound system via Ethernet UDP Protocol.
3. Address the control system via ACN.

B. Performance Requirements

1. The system exhibits no perceptible lag between button push and response.

1.3 QUALITY ASSURANCE

A. Supplementary Standards:

1. Thoroughly comment code to assist in troubleshooting.

a. Include descriptions of the use of each variable.
b. Include descriptions of processes in each section.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. The following are accepted manufacturers:

1. Controller

a. Electronic Theatre Controls (ETC) Unison Paradigm
b. Electronic Theatre Controls (ETC) Nomad (software to match console) with AMX or Crestron logic Controller

2. Passive Infrared Occupancy Sensors

a. Visonic, Inc

2.2 MANUFACTURED UNITS

A. House Light / Work Light System - Architectural

1. In systems without additional capacities outlined in the Cue Light / Work Light / House Light Processor section, provide a Dedicated House Light Processor with the following minimum capabilities and equipment:

a. Standard Operating Features

1. The control console provides, but is not limited to, the following operating features:
2. Presets can mirror between stations.
3. User configurable system parameters. These parameters include, but are not limited to: current date, current time, dimmer type, high level limit, control station name, preset names, presets, mirror designation, lockout modes, dimmer assignments per channel, preset master names, station numbers, channel levels, and station names.
4. Adjustable fade times on each preset from 0 - 999 seconds.
5. Current time and date can be displayed at designated LCD stations.
6. Preset masters are available to control groups of presets throughout the system.

b. Software:

1. The programming language is a high level language.
2. Comment lines allowing documentation to be inserted into the logic code.
3. Startup routines.
4. Input recognition based on on/off status and change in state.
5. Boolean expressions.
6. Conditionals including If-Then, and While-Do conditionals.
7. Subroutines.
8. Wait commands.
9. Character processing.
10. Transmittal of character strings to output ports.

2. Control Module - Architectural

a. Employ DMX-512 or ACN protocol for communication between the Control Module and the dimmers.
b. Rack mount installation no more than five (5) rack units (8.75") in height.

3. LCD Station - Architectural

a. Provide LCD Stations with the following minimum capabilities and equipment:

1. The illuminated screen is adjustable to Two (2) intensities and off. This adjustment may be made during system operation.
2. Each station shall control a minimum of ninety nine (99) channels and fourteen (14) presets.
3. This station shall fit into a factory-supplied wall box.
4. Face plate color will be chosen by the Consultant after award of bid from Manufacturer's standard color selection.
5. Screen faceplate signage pursuant to the Contract Documents.

4. Entry Stations

a. Provide Entry Stations with the following minimum capabilities and equipment:

1. Each station shall control a single channel and a single preset.
2. This station shall fit into a standard single (1) gang wall box.
3. Face plate color is chosen by the architect after award of bid form manufacturer's standard color selection.
4. Faceplate signage is screened as per Contract Documents.

5. Associated Faceplate Control Units
6. Interface with the Performance Lighting Control.
7. Interface with existing mechanical dimming for a minimum of (1) circuit on stage.
8. Plug-In Station

a. Provide Plug-In Stations with the following minimum capabilities and equipment:

1. Each station shall accommodate one controller receptacle.
2. This station shall fit into a standard single (1) gang wall box.

b. Female Panel Mount Receptacle

1. Provide Female panel mount Receptacle with the following minimum capabilities and equipment:

a. A single industrial grade female multipin connector carrying data communications and low voltage power.
b. A minimum of 4 spare pins.
c. This Receptacle shall fit into a standard one (1) gang wall box.

9. Acceptable Work Light / House Light System - Architectural Products:

a. Electronic Theatre Controls, Middletown, WI.- “Unison - Paradigm”

B. Passive Infrared Occupancy Sensor: Wall Mounted

1. Provides a dry contact closure to indicate occupancy status to architectural control system. Normally open. Contacts are rated at 100mA resistive / 30vdc.
2. Provides remote activation of the walk light.
3. Range of up to 85’ x 100’ x 90 degrees
or 115’ x 8.2’ with curtain adapter.

4. Vertical mounting range 5'-13'
   or 5.5'- 7.5' with curtain adapter.
5. Vertical coverage adjustability of +10 degrees to – 20 degrees.
6. Centrally powered: 8-16VDC
7. 14mA energized draw, 12mA quiescent load at 12VDC.
8. Walk test LED that is remotely switchable to off.
9. Standards Compliance:
   EN50131-1 Grade 3 / Class II, EN50131-2-2, EN50131-2-4, EN300440, EN301489, EN60950.
10. Acceptable Products:

    a. Visonic Tower-10am.
    b. Long Range Curtain Adapter

       1. Curtain-10

11. Painting

    a. Where a finish other than white is specified a durable painted finish is required. Paint that is not fully bonded with the detector shell is not acceptable.
    b. Paint detectors using Krylon "Fusion" spray paint in the color indicated.

       1. Prepare the detector shell by disassembling it, masking the lens and indicators scuffing the surface to be painted with fine steel wool, and cleaning.
       2. Paint the detector so the finish is smooth and even with no underlying surface showing. Two coats may be necessary.

C. Passive Infrared Occupancy Sensor: Ceiling Mounted

1. Communicates via LON network
2. Centrally powered from LON network.
3. Walk test LED that is remotely switchable to off.
4. Standards Compliance:
   CA Title 24.
5. Coverage area: Circular

    a. Small Room: 450 sf at 8' ceiling, 800 sf at 12' ceiling (40'D)
    b. Large Room: 1,800 sf at 8' ceiling, 3,000 sf at 12' ceiling (80'D)
    c. High Bay: 350 sf at 10' ceiling, 7,000 sf at 40' ceiling (100' D)

6. Acceptable Products:

    a. Small Room: ETC P-OCC-SR
    b. Large Room: ETC P-OCC
    c. High Bay: ETC P-OCC-HCM

7. Painting

    a. Where a finish other than white or black is specified a durable painted finish is required. Paint that is not fully bonded with the detector shell is not acceptable.

b. Paint detectors using Krylon “Fusion” spray paint in the color indicated.

1. Prepare the detector shell by disassembling it, masking the lens and indicators scuffing the surface to be painted with fine steel wool, and cleaning.
2. Paint the detector so the finish is smooth and even with no underlying surface showing. Two coats may be necessary.

2.3 ACCESSORIES

A. Backup Media

1. Provide five (5) spare media for backing up the system configuration per control device.

PART 3 - EXECUTION

A. Programming Process and Expectations

1. There shall be one control system programmer who manages that portion of the project. Owner and Consultant shall be immediately notified of any changes in programming staff.
2. Contractor’s programmer shall meet with Consultant to discuss specific programming requirements and goals. At that time, sample screening for this and/or similar projects shall be provided to the contractor to establish the visual language of the system.
3. During the submittal phase, screening images shall be provided to the Consultant for review. Screens shall include anticipated navigation and functions.
4. Following initial programming, but prior to system commissioning, provide programming simulation to Consultant for review.
5. The system programmer shall be available on site for system testing and commissioning. Testing and commissioning shall not commence until the contractor provides confirmation that all programming is complete.
6. Following system acceptance, provide a minimum of one (1) on site adjustment to programming based on user feedback. Provide a minimum of three (3) off-site programming changes during the first year following acceptance.

B. Logic Outline:

1. General

a. When a portable device is plugged in: All synchronized I/O points will be set to mirror the state of the room as determined by the controller, non-synchronized I/O points will be set to their off state.
b. The all indicators are to be synchronized between control stations.
c. Indicators are to reflect the status of a change after the controlled device indicates that the command has successfully been executed.

2. Startup

a. The system will start up in a known state obtained from the Sound System. If the sound system cannot be queried the system can be forced into night mode with the "Night" preset active and all other presets and submasters off.
b. the system should be forced into night mode with the "Night" preset active and all other presets and submasters off.

3. Master

a. Master States are mutually exclusive.
b. The system may be in either Show, Rehearsal, Work or Night mode at any one moment.
c. The system will enter Night mode at the time set on the Timer Screen if the system is in Work mode and the timer is not disabled.
d. If the system is in Night mode and any zone is switched on, change to Work mode
e. If the system is in Work mode and all zones are in the off state the system will change to Night mode.
f. On entering Night Mode:

    1. Wall stations will blink continuously, and Aisle lights and on stage running lights will fade after a 5 minute delay.
    2. All house presets will be faded to off (including the Out house light preset).
    3. All Work and Show submasters will switch off.
    4. On entering Night mode a submaster associated with night mode will come on and those associated with show and work mode will go off.

g. On entering Show mode or Rehearsal Mode:

    1. A submaster associated with show mode will come on and those associated with work and night modes will go off.
    2. If the house is in Cleaning it will switch to Full.
    3. All illuminated work lights will switch to their associated Show submasters.
    4. Illuminated work lights with no associated show submaster turn off.
    5. The sound system will be informed of the status change.

h. On entering Work mode:

    1. A submasters associated with work mode will come on and those associated with show and night mode will go off.
    2. If the house is in any preset other than Off it will switch to Cleaning.
    3. All illuminated show submasters will switch to their associated Work submasters.

4. Work / House

a. Calls to the Controller are executed in the order in which they are received.
b. The house lights may be at either Cleaning, Full, Half, Glow, Out, or toggled off. These states are mutually exclusive. Only the Cleaning state may be toggled off.
c. LEDs associated with faceplates Bx are illuminated when a submaster is not active.
d. The Work/House light panels have associated buttons illuminated when a submaster is active. These buttons are to be synchronized with the Bx faceplates.

e. House light states switch with cross fades of a set duration (initially 5 seconds). Each house light state will have an associated preset.
f. Faceplate Bx buttons will cause their associated submasters to bump on (1 second fade).
The associated submaster will be dependent upon the mode the system is in. In show mode not all stations will have associated submasters in all modes. Such stations should be reset to the off state when the system is in a mode with no associated submaster.
In work or night mode a submaster will be associated with each faceplate.
g. All submasters will appear on the touch panel.
h. All buttons on the work/house lighting console will have associated submasters.
i. Master states will not inhibit the function of the buttons on the touch panel.

5. Button Behavior
Most buttons stations change function depending on whether the Show button is active or the work button is active.

a. Schedule:

1. To be coordinated with consultant prior to system commissioning.

6. Recording

a. Web based editing of presets is the preferred method. Where a web based interface does not meet the following requirements a capture system should be used for updating preset contents. Web interface requirements:

1. Securable web interface that is password protected.
2. Does not allow access to the underlying logic and configuration.

b. Capture

1. Captures the current controller output into the selected presets, filtering for allowable presets in the capture.
2. The process is:

a. Go to the preset screen by selecting Show Presets
b. Select the preset to capture
c. When selected the user will be prompted for a Capture password.
d. Press Capture
e. Press the preset again to confirm.

3. Capture filters

a. For masters ANY DMX channel may be captured
b. For Special Presets ANY DMX channel may be captured
c. For house lights only house light DMX channels may be captured
d. For Work light and running lights only channels associated with that zone are captured.

7. Settings

a. When selected the user will 1st be prompted for the Setup password. If the entry is correct the user will move to the setup screen. If it is incorrect they will receive the message “Incorrect Password” and then be returned to their previous screen.

8. Re-label Pop Up

a. When selected the user will 1st be prompted for the Setup password.
b. Next the user will be asked to select the key to relabel or exit. If the user does not select a key in 30 seconds the user will be returned to the main menu.
c. Next the user will be presented with the current label and an alpha numeric QWERTY keyboard (with left, right and backspace keys). The user will type the label (the system will limit the number of characters to what will fit on the button) and select OK to store.
d. The user will be prompted to select the next key to exit or exit. If the user does not select a key in 30 seconds the user will be returned to the main menu..
e. Special Presets and Work/Running zones may be relabeled.

9. Change Password (Setup or Capture)

a. When selected the user will 1st be prompted for the Setup password.
b. Next the user will be presented with the 6 asterisks and a numeric keyboard (with left, right and backspace keys). The user will type the new password and select OK to store.
c. The password 91753264 will always work for either password and cannot be changed.

10. Restore To Defaults

a. When selected the user will 1st be prompted for a password.
b. Next the user will be presented with the message: “Are you certain you want to change all settings on this screen and all preset labels to their default settings? The user will tap OK or Cancel.

11. Time Buttons

a. "Acquire time of day..." when selected brings up numeric pallet and allows entry of new time in HHMM format. Tells system when to reach out over internet to time server to correct its clock. 0000 Tells the system not to automatically reset it's time.
b. "Acquire Time Now" when pushed Tells system to reach out over internet to time server to correct its clock now.
c. "Manually Set Time..." when selected brings up numeric pallet and allows entry of new time in HHMM format. Tells system the current time.

12. Occupancy Sensors

a. Occupancy sensors only function when the system is in Work mode and when Override is not set On.
b. Occupancy sensors turn their associated work zone to the Off state after preset duration of inactivity, initially 20 minutes.
c. Occupancy sensors do not turn any zones On.

d. Occupancy sensor indicators display status of occupancy sensors.

13. Clean Screen Button

a. Pressing this button displays the Clean Screen for 30 seconds and then returns to the previous screen. This allows the screen to be cleaned without inadvertent button presses.

3.2 INSTALLATION

A. Provide racks, furniture, consoles, etc., required for the installation and needed to provide completed systems. Only to the extent that such ancillary equipment is specified elsewhere is it excluded from these system Specifications.

B. Provide a custom analog single fader interface assembly as required so that the system may be controlled by (1) existing mechanical dimmer handle on the original 1926 panel.

C. Provide low voltage cable.

D. Terminate control lines.

E. Setup initial configuration.

F. Assist architectural lighting designer and consultant in adjusting initial configuration.

3.3 SYSTEM TESTS AND ADJUSTMENTS.

A. Test permutations and combinations of logic inputs to ensure predictable system outputs (reactions).

B. Latency - measure time between button push and response.

C. Test occupancy sensors for coverage and maximize coverage while adjusting to minimize falsing.

END OF SECTION 116161.11.00

SECTION 116161.20 - PERFORMANCE LIGHTING POWER AND CONTROLS PERFORMANCE CONTROL CONSOLE

PART 1 - GENERAL

1.01 SUMMARY

A. Work in this section includes the engineering, manufacture, furnishing, and coordination of the Performance Lighting Control Console and accessories.

B. Section Includes

1. Lighting Control Consoles & Peripherals
2. Accessories.

a. Focus Remote.
b. Cables to connect devices.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

A. The following are accepted manufacturers:

1. Electronic Theatre Controls

2.02 MANUFACTURED UNITS

A. Two Thousand (2,000) Channel Performance Lighting Console:

1. Acceptable products:

a. GIO with 2x20 Fader wing, and Nomad Remote Dongle, Electronic Theatre Controls.

2.03 ACCESSORIES

A. Backup Media

1. Provide five (5) spare 8GB USB drives for backing up the system configuration per control device.

B. Focus Remote - WAP

1. WAP-based Focus remote provides remote control of lighting console via a secure, closed-network b/g/n Wi-Fi connection.

2. Must be commercial grade 802.11 b/g/n compatible
3. Must include $50 gift card to Apple Store or Google Play (TBD by Owner) for downloadable remote software (Mobile devices are by owner)
4. Remote functions supported include:

    a. Channel selection and level setting.
    b. Recording of levels.
    c. Recording of cues
    d. Execution of pre-recorded cues

C. Monitors

1. Provide 21” or greater LED monitors in sufficient quantity to fully populate the monitor outputs on the specified console.
2. Provide cable and interface to attach Monitor to receptacle.
3. Provide at least one (1) 19” touchscreen monitor where consoles are capable of using a touchscreen interface.

D. Provide dust cover for each console, monitor, and fader wing.

PART 3 - EXECUTION

3.01 INSTALLATION

A. Setup initial configuration.

B. Confirm that a local PC can be used as a remote video interface.

C. Assist architectural lighting designer and consultant in adjusting initial configuration.

END OF SECTION 116161.20.00

SECTION 116161.30 - PERFORMANCE LIGHTING POWER AND CONTROLS COMPANY SWITCH SUBSECTION

PART 1 - GENERAL

1.01 SUMMARY

A. Work in this section includes the engineering, manufacture, furnishing, and coordination of performance company switch for the connection of temporary equipment.

1. Company Switch furnished for installation by others:

1.02 SYSTEM DESCRIPTIONS

A. Performance Requirements

1. Operate at temperatures up to 40 degrees centigrade.
2. Breaker shunts when connection chamber is open.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

A. The following are accepted manufacturers:

1. ETC: PSP Series
2. SSRC
3. Lex Products

2.02 MANUFACTURED UNITS

A. General:

1. Provide a breaker rated for at least 65K AIC
2. Provide a breaker rated for continuous duty at 100% amperage capacity and 100% duty cycle.
3. Provide a shunt trip for the breaker that is interlocked with the connection chamber door.
4. Provide hasp for locking breaker in the off position.
5. Provide CamLok J Series connections in an enclosed connection chamber.
6. Provide lug connections for bare leads connections in an enclosed connection chamber..
7. Provide a strain relief for the lug connections.
8. Provide LED indicators on each phase indicating power from the breaker to it’s phase labeled with NEC required color codes and alphabetic names of phases.
9. Provide LED indicator showing supply to ground continuity labeled in green with alphabetic name.
10. Provide signage with the following text:

”Connection and disconnection is to be made by qualified personnel only. Connection is to be made in the following order:
1) Ground
2) Neutral
3) Hot
Disconnection is to be made in the reverse order”

11. Label each phase and neutral on the exterior of the switch at the connection points
12. Provide signage indicating the panel and breaker feeding the company switch and the amperage of the switch.
13. Color code connectors according to prevailing regulations.
    In the absence of regulations label them as follows:

    a. 480/277 Service
       Phase A – Brown
       Phase B – Orange
       Phase C – Yellow
       Neutral – White
       Ground – Green
    b. 120/208 Service
       Phase A – Black
       Phase B – Red
       Phase C – Blue
       Neutral – White
       Ground – Green

B. 400A Company Switch

1. Includes a second set of neutral connections for the feed side, the bare lead connections and the cam-lok connections.

C. Isolated Ground Company Switch

1. Provide isolated ground terminations with separate supply terminations for building ground and power ground.
2. In a system in which the isolated ground is lifted there should be no continuity between the conduit ground and the power ground.
3. Provide signage indicating “Isolated Ground Sound Power”

D. Acceptable Products:

1. ETC PSP Series
2. SSRC, Inc - DS-XXX-6W-C Series
3. Lex Products, Inc - DBM XXX-CS001 - Series

PART 3 - EXECUTION
(UNUSED)

END OF SECTION 116161.30.

SECTION 116161.40 - PERFORMANCE LIGHTING POWER AND CONTROLS DATA COMMUNICATIONS

PART 1 - GENERAL

1.01 SUMMARY

A. Work in this section includes the engineering, manufacture, furnishing, installing and coordination of the control signal distribution system.

B. Section Includes

1. DMX
    a. Optical Isolators / Splitters.
    b. Digital to analog interface.
2. Ethernet:
    a. Patch Panels.
    b. Patch Cords.
    c. Switches.
    d. Power Over Ethernet Supply
    e. ACN to DMX Gateways
    f. Fiber optic cable between distanced rack locations
    g. Console / DMX / Video Nodes.
3. Analog:
    a. Custom analog single fader interface assembly
4. Electronics Racks.
    a. Rack Panels
5. Performance Lighting Control Faceplates & Associated Cable Assemblies.
6. Accessories.
    a. Power filtration.
    b. Cables to connect devices.
    c. Uninterruptible power supply.
7. Data communications cable servicing control circuits connecting Performance Lighting Control faceplates specified herein to each other, to the motorized breaker panel specified herein and to the work lighting control system.
8. Data communications cable servicing architectural lighting fixtures connecting Performance Lighting Control system.

1.02 SYSTEM DESCRIPTIONS

A. Design Requirements

1. Standards and Regulations

a. DMX equipment has ports able to communicate with any DMX compliant products.
b. Ethernet systems are to be ACN compliant.
c. Systems are to be RDM compliant.

2. The DMX System

a. Each DMX output is electrically isolated from all other DMX outputs.
b. Systems are to be RDM compliant.
c. Concurrent DMX inputs in a single domain are run through a pile-on processor which actively merges the data streams into a single stream repeating the higher of two conflicting values.

3. The Analog System

a. Provide a custom analog single fader interface to integrate one existing mechanical dimmer handle from the original system into the new dimming and control system.
b. Cables and wiring.
c. Enclosures.

4. The Ethernet System

a. Provide Ethernet jacks that are electrically isolated from all other jacks.
b. Provide systems that are Category 5E or greater compliant.
c. Provide fiber connections on switches, where required
d. Merge multiple signals in a single domain through a partitioning hub, router, or switch.

5. The Architectural Control System

a. Provide jacks that are electrically isolated from all other jacks.
b. Provide cable per the manufacturer’s requirement. If the requirement is Ethernet follow those requirements.

B. Performance Requirements

1. DMX

a. Data transmitted by a controller is passed to the receiving devices without evidence of skipping, or jumping from each input point.
b. Fade data transmitted without skipping shall reach the receiving devices intact; without dropouts.
c. Failure on one branch of the control system will not effect other branches.

2. Ethernet:

a. The hub isolates a failure on one node from effecting other nodes.

3. The Architectural Control System

a. Inputs exhibit no perceivable latency.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

A. The following are accepted ACN, DMX, RDM signal processing manufacturers

1. Artistic License
2. Doug Fleenor Designs
3. Pathway
4. Sand Networks
5. Pathway
6. Electronic Theatre Controls (ETC)

B. The following are accepted din-rail mounted ACN, DMX, RDM signal processing manufacturers

1. Pathway

C. The following are accepted data communications cable manufacturers:

1. Belden
2. Alpha Wire & Cable

D. The following are accepted ethernet termination equipment manufacturers:

1. Hubbel Inc
2. Siemon Co
3. Lucent Technologies

E. The following are accepted ethernet hub, switch and router manufacturers

1. Bay Networks
2. Cisco Systems
3. Synoptics
4. 3 Com.

2.02 MANUFACTURED UNITS

A. DMX

1. Din-rail mounted Optical isolator / splitter:

a. Provides non-conductive isolation between incoming DMX-512 line and outgoing DMX-512 lines.
b. Provides distribution of DMX-512 lines.
c. The isolator / splitter shall accept a DMX-512 input. The DMX-512 input is terminal connector.
d. The isolator / splitter shall provide a minimum of four (4) isolated DMX-512 outputs. Each DMX-512 output is a terminal connector.
e. Passes RDM
f. Mounts in a din-rail mounted enclosure with power supply.
g. Acceptable Products:

1. Pathway #1009 DMX/RDM Din-rail Splitter

2. Din-rail mounted CAN to DMX node/gateway:

a. Provides non-conductive isolation between incoming ACN Network line and outgoing DMX-512 lines.
b. Provides distribution of DMX-512 lines converted from incoming ACN/Ethernet.
c. The isolator / splitter shall accept a DMX-512 input. The ACN input is an RJ45 Connector.
d. The isolator / splitter shall provide a minimum of four (4) isolated DMX-512 outputs. Each DMX-512 output is a terminal connector.
e. Passes RDM
f. Mounts in a din-rail mounted enclosure with power supply.
g. Acceptable Products:

1. Pathway #1014 4-port Din-rail node

B. Ethernet:

1. The Ethernet system is a 100BaseT based system wired in a star topology using switches and one node per vector.
2. Where the runs require it the contractor will provide fiber optic cabling and transceivers.
3. Provide Category 6E cable.
4. Terminate in accordance with Category 6E guidelines.
5. Use T568B cable pairing.
6. Switch

a. The switch shall isolate each port (and attached node) from all others.
b. The switch isolates a failure on one port from effecting other ports.
c. The switch limits traffic to and from a port to that which effects the nodes resident on that port.

7. Nodes/Gateways

a. A node is a point of interface between lighting system and the ethernet network.
b. A DMX node provides a point of interface with DMX channels.
c. Acceptable Products:

1. Electronic Theatre Controls Net 3 Series
2. Pathway Pathport Series

8. Patch Cables

   a. Have connectors compatible with switches and patchbays.

9. Extension Cables

   a. Have Neutrik Ethercon compatible shells for enhanced durability.

C. Installed Cable
Provide low voltage cable.

1. Non-Plenum Rated

   a. DMX: Belden 1624R
   b. Ethernet: Belden 7851A
   c. Other cables as per system requirements.

2. Plenum Rated

   a. DMX: Belden 1624P
   b. Ethernet: Belden 7852A
   c. Other cables plenum rated versions per system requirements.

D. Equipment racks and panels

1. Racks

   a. EIA 19" standard modular rack frames providing sufficient panel space to accommodate indicated equipment with room for expansion, 21" of width, and 26" of depth, minimum.
   b. Provide side panels, one pair per rack group.
   c. Provide matching ventilation panels as needed.
   d. Provide matching blank or vent panels in spare rack spaces.
   e. Approved pan or truss head type panel mounting screws with non-metallic flat washers shall be used to secure rack-mounted equipment.
   f. Provide copper bus bar in each rack for connection of ground wires.
   g. Racks shall have the same color finish (Textured Black).

2. Blank Panels

   a. 1/8", flat black aluminum blank panel in 1U through 6U heights.

3. Drawers

   a. Provide a 4-U Lockable Drawer in each equipment rack to store manuals and gateways.

4. Vent Panels

a. 16-gauge perforated steel vent panel with 5/32" diameter holes. In 1U through 3U rack heights with black baked enamel finish.

5. Signage

a. Provide a sign stating:
The installed ACN system is compliant with Category X Ethernet standard (Where X is replaced with the installed standard employed.) The installed DMX system is compliant with the DMX512-a standard

2.03 ACCESSORIES

A. Provide DMX-512 control cable.

B. Uninterruptible Power Supply

1. Provide uninterruptible power supply(ies) (UPS) to service computer equipment provided.
2. Provide a minimum of 1 for each location.
3. Size each uninterruptible power supply (UPS) sized to power its associated device(s) for a minimum of 15 minutes after the loss of power.
4. Input voltage < 132 VAC.
5. Output voltage 115 VAC +- 5%
6. Transfer voltage 103 VAC.
7. Surge energy 240 Joules.
8. Surge current 6500 Amp peak.
9. Surge response time 0 Ns (instantaneous).
10. Noise filtration, full time EMI/RFI suppression, 100 KHz to 10 MHz, > 60 db.
11. Audible low battery signal.

PART 3 - EXECUTION

(UNUSED)

END OF SECTION 116161.40.

SECTION 116161.51 - PERFORMANCE LIGHTING POWER AND CONTROLS PHASE CONTROL DIMMERS

PART 1 - GENERAL

1.01 SUMMARY

A. Work in this section includes the engineering, manufacture, furnishing, and coordination of the phase control dimmers and dimmer racks.

B. Section Includes

1. Dimmer Racks furnished for installation by others:

a. Installed Dimmer Racks
b. Electronics modules with feedback data as required.
c. One (1) backup electronics module for each type provided.
d. Dimmer modules with respective quantity of 1.2kw, 2.4kw or 6 kw or 12 kw dimmers.
e. Non-dim modules.
f. Blank modules as required.
g. Branch circuit breakers as required.

1.02 SYSTEM DESCRIPTIONS

A. Performance Requirements

1. Dimmer Characteristics:

a. Operate at temperatures up to 40 degrees centigrade.
b. Include cooling fans which remain on during thermal shutdowns.
c. Provide precisely repeatable output relative to control input.
d. Provide digital control without employing digital to analog de-multiplexing schemes or analog ramping circuits.
e. Provide response to control signals of less than 25 milliseconds.
f. Control output of dimmers to within +/- 1 volt of each other, regardless of power phase or control module.
g. Exhibit no oscillating or hunting for levels.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

A. The following are accepted dimmer manufacturers

1. Electronic Theatre Controls Sensor 3 with ThruPower Series

2.02 MANUFACTURED UNITS

A. Dimmer Rack

1. General:

a. Number individual module slots with dimmer numbers.
b. Design dimmer rack to hold dimmer modules, appropriate electronics modules as required, and space for one spare electronics module of each type employed.
c. Design system to operate on 3 phase 4 wire + ground service. Max size service:

1. For 24 modules: 400 amps 120/208 volts 60hz. AC per chassis.

d. Configure dimmer rack chassis to contain appropriately sized lugs for power and load connections and control input.
e. Distribute power within each chassis by copper buss bars to allow phase balancing. Do not put more than two consecutively numbered dimmers on the same phase.
f. Ventilate modules and control electronics by forced filtered air.
g. Provide 20 amp branch circuit breakers for dimmers where specified in the Contract Documents.
h. Unacceptable Rack Attributes:

1. Dimmer racks that do not filter cooling air.
2. Dimmer racks without thermal sensing devices.

2. Installed Racks

a. Provide a single three pole 20 amp circuit breaker fed from the same supply as the dimmer rack containing the house and work lighting in or adjacent to one of the dimmer racks to provide power loss detection on all phases to the emergency lighting system. Emergency lighting circuits and automatic transfer are provided under Division 26.
b. Emergency lighting circuits and automatic transfer are provided under Division 26.
c. Provide signage on the dimmer bank with the following attributes:

1. Material 1/8" black lamacoid.
2. Finish: black with white fill.
3. Engraving: 3/8" high characters with non-yellowing white fill.
4. Indicate the following on the sign:

a. "Project: " Project Name.
b. "Manufacturer: " Company Name city, state and service telephone number.

5. Rivet to front on one (1) dimmer rack in each dimmer room.

d. The dimmer rack is floor supported, deadfront, substantially framed and enclosed with formed panels.
e. Provide racks designed for front access.
f. Properly treat, prime and finish rack components.

g. Arrange exterior panels for conduit terminations at the top and bottom of the rack.
h. The dimmer racks must require less than 8’-0” clearance measured from finish floor to ceiling.
i. The dimmer racks must require less than 18” footprint in width due to space restrictions.
j. The dimmer racks and components must be braced for the lesser of 100,000 A.I.C. or the maximum current available on the building electrical line diagram.
k. Install dimmer racks on vibration isolation pads.
l. Terminal Sizes. Provide terminals capable of accommodating wires of the following sized ranges:

1. 10Amp-20A: #8-#14 AWG
2. 50A: #4-#10 AWG
3. 100A: #2/0-#8 AWG

3. Plug-in Modules:

a. General

1. Label each module with the manufacturer name, catalog number, and serial number.

b. Dimmer Control Modules:

1. Standard control format is DMX-512 or ACN.
2. Contains diagnostics.
3. Hold dimmer levels in the event of a control interruption.
4. Contained on one printed circuit board mounted into a formed body and have no wired connections to the dimmer rack.
5. Swappable with control modules within the same bay of racks.

c. Load Modules

1. Label modules with full load capacity and input rating (volts, amps, Hz.)
2. Provide power connections to the module via brass or copper pins mounted to the chassis.
3. Configure each module to contain one, single pole fully magnetic circuit breaker per controlled circuit.
4. Provide fully magnetic 100% switching duty circuit breakers on modules rated at the capacity of the circuit. Breakers protect components from damage caused by overloads.
5. Module is capable of withstanding a minimum inrush of 20x normal current.
6. Module can accept hot patching of a cold incandescent load up to the full capacity of the circuit.

d. Dimmer Modules:

1. Configure each dimmer to contain one or two solid state switching modules and associated filters, power and control connectors for each dimmer included in the module.

2. Regulate the dimmer output to compensate for incoming line voltage variations to +-1 volt of curve.
3. Include toroidal filters on SCR dimmers to reduce the rate of current rise time resulting from the switching of the SCRs and to limit objectionable harmonics, reduce lamp filament sing and limit the radio frequency interference on line and load conductors.

    a. Toroidal filters shall perform within 15% of rise time rating with dimmer operating at 1/2 load.
    b. Standard Noise: Toroidal filters limit current rise time to not less than 480 microseconds measured at a 90 degree conduction angle from 10%-90% of the output wave form with the dimmer operating at full rated load.

4. Dimmers that use Insulated Gate Bipolar Transistors (IGBT) in lieu of SCRs are not required to have torodial filters.
5. Provide entirely digital dimmer electronics.
6. Employ solid state switching devices.

e. Unacceptable Products:

1. Dimmers employing thermal-magnetic or hydraulic-magnetic circuit breakers.
2. Dimmers employing digital to analog conversion.
3. Modules that do not contain power related components.
4. Dimmers not employing SCR or IGBT technology.
5. Dimmers employing triac power devices, pulse transformers or other isolating devices not providing at least 2500 RMS isolation.
6. Dimmers employing current limiting fuses to provide short circuit ratings listed are not acceptable.
7. Relays employing phase control devices for switching.

4. Acceptable Products:

a. Electronic Theatre Controls Sensor3 Dimmers and Rack with ThruPower.

PART 3 - EXECUTION

3.01 FIELD QUALITY CONTROL

A. Inspection
Perform tests in the presence of the Design Consultant using equipment provided by the contractor:

1. Chokes on 6 randomly selected modules perform according to specified criteria when tested with an oscilloscope.

END OF SECTION 116161.51.

SECTION 116161.53 - PERFORMANCE LIGHTING POWER AND CONTROLS CONTROLLED MOTORIZED BREAKER PANEL

PART 1 - GENERAL

1.01 SUMMARY

A. Work in this section includes the engineering, manufacture, furnishing, and coordination of DMX or ACN controlled motorized breaker panels for the control of switched circuits.

B. The contractor has the option of substituting a DMX or ACN controlled relay panel with a factory wired breaker panel in place of the motorized breaker panel providing the connections between the breakers and the relays are prewired and the assembly is no wider than 29” and otherwise complies with this specification. If the contractor takes this option the contractor is responsible for coordinating any necessary control conduit changes with the Electrical Contractor.

C. Section Includes

1. Controlled motorized breaker panel furnished for installation by others:

1.02 SYSTEM DESCRIPTIONS

A. Performance Requirements

1. Operate at temperatures up to 40 degrees centigrade.
2. Exhibits no chatter when control signal is at switching threshold.
3. Exhibits no spurious switching or interaction between circuits.
4. Key switches do not interoperate with other equipment systems in the facility.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

A. The following are accepted assembly manufacturers:

1. LynTec
2. Benjamin Electric

B. The following are accepted motorized breaker manufacturers:

1. SquareD
2. General Electric
3. Eaton/Cuttler Hammer

2.02 MANUFACTURED UNITS

A. General

1. Provide separate connection chambers for power and control
2. Branch protection and control is provided by the motorized breaker.
    a. An acceptable substitution would be a factory wired panel board / relay panel combination where field connections are limited to one set of connections for each relay (hot and neutral plus ground) and one set of connections for the main feeders (3 hot, 1 neutral and ground).
3. Panel board / Load Center is fed by 3 phase power.
4. Main breaker is required only where specified.
5. Terminal Sizes. Provide terminals capable of accommodating wires of the following sized ranges:
    a. 10Amp-20A: #8-#14 AWG
    b. 50A: #4-#10 AWG
    c. 100A: #2/0-#8 AWG

B. Control:

1. Provide control wire termination at screw terminals.
2. Control via DMX or ACN and TCP/IP
3. Provide user configurable control addresses.
4. Each motorized breaker is able to have an individual control address.
5. Multiple motorized breakers may be configured to share the same control address.
6. Provide an indicator showing control signal present.
7. If control is via DMX, provide a user settable termination switch.
8. Provide 2 control settings: On and Off.
9. Provide an indicator showing control signal present.

C. Circuit Breakers

1. Rated for 200,000 on/off/on cycles
2. Other Rating per electrical section.
3. Basis of design:
    a. SquareD QO-HM series and Eaton GHQ Series for 15A and 20A breakers
    b. SquareD QO series and Eaton GHQ Series for 30A and above breakers

D. Multipole Contactors

1. Furnish three pole single throw contactor.
2. Furnish contactors rated for amperage as noted 277V load continuous duty at 100% amperage capacity and 100% duty cycle.
3. Furnish an indicator showing energized status of contactor.
4. Integrate control of contactor with motorized breaker panel.
5. Furnish enclosure to contain the specified contactors for each location. Once enclosure may contain multiple contactors providing they are of the same voltage.

E. Relays (If Furnished as an alternate)

1. Furnish relays in a configuration to match the specified motorized breakers.
2. Furnish relays rated for loads, and duty cycle to match the specified breakers.
3. Furnish an indicator showing energized status of relay.
4. Factory wire to matched breaker.

F. Acceptable Products – Base System

1. Benjamin Electric BCP Series
2. Lyntec RPC Series
3. Lighting Controls & Design DMX SmartBreaker Panel

G. Acceptable Manufacturers – Substitute System

1. Relay Panel Component

a. ETC
b. Intelligent Lighting Controls
c. SSRC

2. Panel Board Component

a. See specification in Division 26.

PART 3 - EXECUTION
(UNUSED)

END OF SECTION 116161.53.00

SECTION 116161.60 - PERFORMANCE LIGHTING POWER AND CONTROLS EMERGENCY LIGHTING TRANSFER SWITCH

PART 1 - GENERAL

1.01 SUMMARY

A. Work in this section includes the engineering, manufacture, furnishing, and coordination of emergency lighting transfer switch for transferring branch loads from the Performance Controls to emergency power.

B. Section Includes

1. Emergency Lighting Transfer Switch furnished for installation by others:

1.02 SYSTEM DESCRIPTIONS

A. Design Requirements

1. Additional Standards and Regulations

a. All components must comply with applicable regulations including, but not limited to:

1. NFPA 70
2. NFPA 110
3. UL 924
4. UL 1008

B. Performance Requirements

1. Operate at temperatures up to 40 degrees centigrade.
2. Load is transferred when main power partially or fully fails and emergency power is present and more complete than normal power.
3. Load is transferred when a contact closure from the fire alarm system opens.
4. Key switches do not interoperate with other equipment systems in the facility.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

A. The following are accepted additional manufacturers:

1. Electronic Theatre Controls
2. Lex Products
3. SSRC
4. Stagecraft Industries

5. Union Connector

2.02 MANUFACTURED UNITS

A. General:

1. Provide transfer switches with pole count and emergency power configuration as noted in the equipment and component schedule.
2. Provide lug connections for bare leads.
3. Accept dry contact control from fire alarm system.
4. Accept control from Remote Station
5. Provide remote status indication at remote station.

B. Transfer Panel

1. Normal power connections

   a. Accept normal continuous 3 phase power supply.
   b. Provide lug connections for bare leads.
   c. Provide LED indicators on each phase indicating normal power from the breaker to its phase labeled with NEC required color codes and alphabetic names of phases.

2. Transfer Relays

   a. Provide multi-pole transfer relays with amperage capacity as required and quantities as specified.
   b. Relays are to exhibit no arching upon operation.
   c. Relays are to be modular and easily replaceable by qualified maintenance personnel.

3. Emergency power connections

   a. Where emergency power branch protection is required:

      1. Provide emergency power main connections phase configuration and amperage as required.
      2. Provide an emergency main power breaker rated for at least 65K AIC
      3. Provide emergency power branch breakers rated for continuous duty at 100% amperage capacity and 100% duty cycle.

   b. Provide lug connections for bare leads.
   c. Provide LED indicators on each phase indicating emergency power from the breaker to its phase labeled with NEC required color codes and alphabetic names of phases.

4. Load Connections

   a. Provide lug connections for bare leads.

5. Provide a lockable door.
6. Provide hasp for locking the emergency main power breaker in the off position.

7. Provide LED indicator showing transfer status

C. Remote Switch / Status Station

1. Provide a key switch which throws emergency transfer switch.
2. Provide LED indicator showing transfer status

PART 3 - EXECUTION

(UNUSED)

END OF SECTION 116161.60

SECTION 116161.61 - PERFORMANCE LIGHTING POWER AND CONTROLS DMX EMERGENCY BYPASS CONTROLLER

PART 1 - GENERAL

1.01 SUMMARY

A. Work in this section includes the engineering, manufacture, furnishing, and coordination of emergency lighting transfer switch for transferring branch loads from the Performance Controls to emergency power.

B. Section Includes

1. DMX512 Emergency Bypass Controller:

1.02 SYSTEM DESCRIPTIONS

A. Design Requirements

1. Additional Standards and Regulations

a. DMX512 compliant.
b. All components must comply with applicable regulations including, but not limited to:

1. UL 924

B. Performance Requirements

1. Operate at temperatures up to 40 degrees centigrade.
2. DMX512 control stream is replaced with a prerecorded preset when trigger switches to bypass setting.
3. Utilizes Universe #7
4. Acts on all channels in at least one (512 channel) universe of DMX512.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

A. The following are accepted additional manufacturers:

1. Electronic Theatre Controls
2. Phillips

2.02 MANUFACTURED UNITS

A. Common Attributes

1. Functional

a. Overrides a single universe of DMX512 control signals from “Normal” to “Bypass” when a trigger signal is detected via a two pin trigger input
b. Polls the bypass trigger input after a power loss and reacts upon start up
c. Does not process DMX512 input in Normal mode (pass through)
d. Records a single DMX512 preset (snapshot) of 512 channels for recall during “Bypass” mode
e. Recalls default or recorded sequence immediately on restart if the trigger is also applied at restart

2. Mechanical

a. Enclosure constructed of 18gauge, formed steel panels with a removable front cover finished in gray, fine textured powder coat paint
b. Internal voltage barrier provides separate wiring compartments for power and control wiring
c. LED indicator visible from the exterior of the enclosure.

1. Normal state with a “green” color light when Power is present
2. Bypass state with a “red” color light when active

d. Test button accessible from the front of the enclosure without removing any panels
e. The test button shall be recessed to prevent accidental triggering
f. Internally accessible, labeled DIP switches for configuration of:

1. DMX512 Record Mode
2. Contact input type
3. Wait Time for Restore incoming DMX512 (bypass trigger removed)

g. Internally accessible button for DMX512 Record (snapshot) with an indicator LED for record action

3. Electrical

a. Supports 100 to 277 volt input power, 50/60 Hz, 0.2 amp maximum current
b. Bypass Contact Input supports two, 12 AWG low voltage wires with two modes:

1. +12VDC sent from the DEBC through a remote contact (dry)
2. +12VDC to +24VDC sent from the remote device to the DEBC contact (wet)

c. Bypass input configurable as Maintained Normally Open (default) or Maintained Normally Closed
d. Supports one Universe (512 channels) of DMX512

1. DMX512 Output and DMX512 Input terminals for Belden 9729 cable or equivalent

2. Socketed DMX512 transceiver chip with onboard spare

e. Nonvolatile memory for storage of a single recorded sequence of 512 channels.
f. UL and cUL 924 Listed for Emergency Lighting applications.

4. Thermal

a. Ambient room temperature: 40°C / 104°F
b. Ambient humidity: 90% non-condensing

2.03 RACK MOUNT CONFIGURATION

1. Mechanical

a. Rack mounted in 6 rack units or less

2. Electrical

a. Power Input via a corded grounded Edison plug.

2.04 WALL MOUNT CONFIGURATION

1. Mechanical

a. Designed for Wall mount applications

2. Electrical

a. Power Input terminals accept two 24 – 10 AWG solid or stranded wires
b. Grounding Lug accepts 142 AWG solid or stranded ground wire

PART 3 - EXECUTION

(UNUSED)

END OF SECTION 116161.61

SECTION 116161.62 - PERFORMANCE LIGHTING POWER AND CONTROLS EMERGENCY BYPASS DETECTION KIT

PART 1 - GENERAL

1.01 SUMMARY

A. Work in this section includes the engineering, manufacture, furnishing, and coordination of emergency lighting transfer switch for transferring branch loads from the Performance Controls to emergency power.

B. Section Includes

1. Emergency Bypass Detection Kit furnished for installation by others:

1.02 SYSTEM DESCRIPTIONS

A. Design Requirements

1. Additional Standards and Regulations

a. All components must comply with applicable regulations including, but not limited to:

1. UL 924
2. cUL 924

B. Performance Requirements

1. Operate at temperatures up to 40 degrees centigrade.
2. Provides a central location to detect power loss, fire alarm, and panic button.
3. Bypass trigger is thrown when one or more of the following occurs:

a. Main power partially or fully fails.
b. A contact closure from the fire alarm system opens.
c. Test switch is triggered.

4. Key switches do not interoperate with other equipment systems in the facility.
5. Phase Loss Detection circuitry shall provide 0.5 second delay to prevent nuisance tripping.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

A. The following are accepted additional manufacturers:

1. Electronic Theatre Controls

2.02 MANUFACTURED UNITS

A. General:

1. Provide detection kit with pole count as noted in the equipment and component schedule.
2. Provide lug connections for bare leads.
3. Accept dry contact control from fire alarm system.

B. Panel

1. Normal power connections

a. Accept normal continuous 3 phase power supply.
b. Provide lug connections for bare leads.
c. Provide LED indicators on each phase indicating normal power from the breaker to its phase labeled with NEC required color codes and alphabetic names of phases.

2. Transfer Relays

a. Provide three (3) sets of output dry contacts capable of accepting 12 to 22 gage wire.
b. Each set includes Normally Open pole, Normally Closed pole and a common pole.

PART 3 - EXECUTION

(UNUSED)

END OF SECTION 116161.62

SECTION 116161.71 - PERFORMANCE LIGHTING POWER AND CONTROLS CONTROL FACEPLATES

PART 1 - GENERAL

1.01 SUMMARY

A. Work in this section includes the engineering, manufacture, providing, and coordination of the control faceplates.

B. Section Includes

1. Control faceplates

C. Products Furnished but Not Installed Under This Section:

1. Back boxes for faceplates furnished to the Division 26 Contractor. Deliver backboxes for installation by the Division 26 Contractor on a mutually agreed upon date. Gang backboxes, as outlined in the contract documents, are excepted from this and are provided under Division 26.

1.02 SYSTEM DESCRIPTIONS

A. Design Requirements

1. Faceplates are fabricated to match their mounting conditions.
2. Faceplates have labels with circuit numbers that match their termination points.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

A. The following are accepted faceplate manufacturers:

1. Electronic Theatre Controls
2. SSRC
3. Thomas Engineering
4. Union Connector
5. Lex Products
6. Pathway
7. Whirlwind
8. RCI
9. Wireworks

B. The following are accepted data communications cable manufacturers:

1. Belden

2. Alpha Wire & Cable

C. The following are accepted connector manufacturers:

1. Neutrik

2.02 MANUFACTURED UNITS

A. Faceplates, backboxes and junction boxes:

1. Furnish faceplates, backboxes and junction boxes as specified in the Contract Documents.
2. Backboxes

a. Clearly mark backboxes with box number on the rear “INTERIOR” of the backbox.
b. Protect this marking from destruction by other trades subsequent work.

3. Cable on Faceplates:

a. In boxes with pigtails or multiconductor cable is type SO sized to accommodate the maximum load of the terminating connector.
b. Cable is to be black in color.

4. For surface mounted conditions faceplate and back box dimensions are equal.
5. Where faceplates are installed in flush mount conditions the edges of the faceplate are to extend a minimum of 3/8" beyond the edges of the back boxes.
6. Remove sharp edges and burrs on faceplates.
7. Faceplate Finishes

a. Unless otherwise noted the finish is flat.
b. Where no finish color is noted a custom color is required, which will be selected by the architect.

8. Provide cover screws with slotted holes to accommodate back boxes mounted out of vertical. The slots will be fabricated such that the horizontal clearance is equal to twice the vertical clearance.
9. Material: 1/8" aluminum.
10. Finish: 120 Grit, horizontally brushed anodized aluminum color as noted.
11. Reinforce faceplate as needed to minimize deflection.
12. Directly engrave into pre anodized aluminum.
13. Ethernet receptacles are labeled with the maximum portable cable length. This is calculated by subtracting the installed cable length from 328'. Mechanically fasten this label to the faceplates with revits.
14. Label Color: Natural (silver) or white fill.

a. Legends shown on detail drawings are typical. Refer to drawings and submit proposed circuit numbers to Consultant for review. Faceplate title is typically labeled with the appropriate signal. Individual connectors are labeled with the corresponding circuit number.
b. Legend size shall be 0.125" high characters of medium weight unless otherwise noted.

15. Grid Iron Junction Box:

    a. Material: 16 gauge steel.
    b. Exterior finish: baked flat enamel color as noted.
    c. Provide terminals of sufficient quantity to accommodate circuits as specified in the contract documents.
    d. Provide bushing type strain relief on cable exitway.
    e. Additional Labeling Requirements

        1. Label so labels are readily visible when box is installed

B. Portable Cable

1. General

    a. Each cable shall be color coded by length using a heat-shrink polyolifin sleeve near the male end of the cable. Exempted from this requirement are patch cables.
    b. This sleeve shall be hot-stamped with the name of the facility, or as directed by the Owner. Exempted from this requirement are patch cables.
    c. One to three bands of color code with the most significant digit closest to the connector. Color coding is as follows:

        white = 9
        gray = 8
        violet = 7
        blue = 6
        green = 5
        yellow = 4
        orange = 3
        red = 2
        brown = 1
        black = 0

    d. For example a 50 would be Green / Black with Green closest to the connector and 25 would be Red /Green with Red closest to the connector.

2. Ethernet Cables

    a. Cables for signal distribution are to terminate in Ethercon Connectors. Exempted from this requirement are patch cables.

3. DMX Cables

    a. Are to terminate in 5-Pin XLR connectors unless otherwise noted.

PART 3 - EXECUTION

3.01 (UNUSED)

END OF SECTION 116161.71

SECTION 116161.72 - PERFORMANCE LIGHTING POWER AND CONTROLS POWER FACEPLATES

PART 1 - GENERAL

1.01 SUMMARY

A. Work in this section includes the engineering, manufacture, furnishing, and coordination of the line voltage faceplates.

B. Work in this section includes the coordination of existing architectural lighting circuits.

C. Section Includes

1. Circuit distribution devices.

D. Products Furnished but Not Installed Under This Section:

1. Back boxes for faceplates furnished to the Division 26 Contractor. Deliver backboxes for installation by the Division 26 Contractor on a mutually agreed upon date. Gang backboxes, as outlined in the contract documents, are excepted from this and are provided under Division 26.
2. Devices with 100v and above terminations including lighting receptacles, connector strips, faceplates and backboxes.

1.02 SYSTEM DESCRIPTIONS

A. Design Requirements

1. Faceplates are fabricated to match their mounting conditions.
2. Faceplates have labels with circuit numbers that match their termination points.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

A. The following are accepted manufacturers:

1. Electronic Theatre Controls
2. SSRC
3. Thomas Engineering
4. Union Connector
5. Lex Products

B. The following are accepted data communications cable manufacturers:

1. Belden

2. Alpha Wire & Cable

2.02 MANUFACTURED UNITS

A. Faceplates, backboxes and junction boxes:

1. Furnish faceplates, backboxes and junction boxes as specified in the Contract Documents.
2. Attributes common to all faceplates

a. Cable on Faceplates:

1. In boxes with pigtails or multiconductor cable is type SO sized to accommodate the maximum load of the terminating connector.
2. Cable is to be black in color.
3. Multiconductor:

a. Shared ground conductors are acceptable. Provide at least one ground conductor for every 3 circuits.

b. For surface mounted conditions faceplate and back box dimensions are equal.
c. Where faceplates are installed in flush mount conditions the edges of the faceplate are to extend a minimum of 3/8" beyond the edges of the back boxes.
d. Remove sharp edges and burrs on faceplates.
e. Faceplate Finishes

1. Unless otherwise noted the finish is flat.
2. Where no finish color is noted a custom color is required, which will be selected by the architect.

f. Provide cover screws with slotted holes to accommodate back boxes mounted out of vertical. The slots will be fabricated such that the horizontal clearance is equal to twice the vertical clearance.
g. Backboxes

1. Size backbox to accommodate termination with the maximum wire design wire size.
2. Clearly mark backboxes with box number on the rear “INTERIOR” of the backbox.
3. Protect this marking from destruction by other trades subsequent work.

h. Terminal Sizes. Provide terminals capable of accommodating wires of the following sized ranges:

1. 10Amp-20A: #8-#14 AWG
2. 50A: #4-#10 AWG
3. 100A: #2/0-#8 AWG

i. Connectors:

1. 20A Stage Circuit

a. Stage Pin
b. Color: Black

2. PowerCon

a. True1

3. 20A General Service

a. 5-20
b. Hospital Grade
c. Color: Black

3. All Faceplates:

a. Material: 16 gauge steel.
b. Exterior finish: baked enamel color as noted.
c. Provide terminal strips as needed for connection of wiring to connectors without screw connections.
d. Reinforce faceplates as needed where deflection may occur under heavy use.
e. Labels:

1. Number circuits as per Contract Documents.
2. Material 1/8" black lamacoid.
3. Finish: black with white fill.
4. Engraving: 1/2" high characters with non-yellowing white fill.
5. Apply labels rivets.
6. Label faceplates for duplicate circuits located onstage as follows:

a. Material 1/8" OSHA safety yellow lamacoid.
b. Finish: OSHA safety yellow with black fill.
c. Engraving: 1/2" high characters with black fill.
d. Apply labels with rivets.

7. Label connectors as follows, unless otherwise indicated:

a. Engraving: 1/2" high characters with non-yellowing white fill.

4. Connector Strip:

a. Material: 16 gage steel or extruded aluminum.
b. Exterior finish: baked enamel color as noted.
c. Rigged Connector Strip Hangars

1. Connect directly to rigging system lines at the top, enclose the connector strip in the middle and support a lighting pipe at the bottom.
2. Are engineered to support a load equal to 30#/ per linear foot of pipe between rigging lines with safety margins as required by appropriate engineering standards.
3. Are rated for overhead hanging
4. Center the pipe and the connector strip under the hanging point.

5. Do not employ U-bolts.
6. Have additional supports midspan to support the connector strip from the pipe as necessary.

d. Connector Strip With Control Signal:

1. Includes a partitioned low voltage section continuous over the length of the connector strip for the distribution of control signals.

5. Clamp Mounted Box:

a. Material: 16 gage steel.
b. Exterior finish: baked flat enamel color as noted.

6. Grid Iron Junction Box:

a. Material: 16 gauge steel.
b. Exterior finish: baked flat enamel color as noted.
c. Provide terminal strips of sufficient quantity to accommodate circuits as specified in the contract documents.
d. Provide bushing type strain relief on multiconductor exitway.
e. Secure multiconductor to surrounding structure with a looped eye wire mesh strain relief.
f. Provide a cable cradle for installation by rigging contractor on each multiconductor feed.
g. Additional Labeling Requirements

1. Label so labels are readily visible when box is installed

7. Faceplates comprised of performance track with on-board data:

a. Material: Black Powder coated extruded aluminum
b. Provide terminal ends of sufficient quantity to accommodate circuits and data as specified in the contract documents.
c. Provide bushing type strain relief on terminal end exitway.
d. Provide end caps for dead-end of track.
e. Provide multiple options for mounting per contract documents.

B. Portable Cable

1. General

a. Each cable shall be color coded by length using a heat-shrink polyolifin sleeve near the male end of the cable. This sleeve shall be hot-stamped with the name of the facility, or as directed by the Owner.
b. One to three bands of color code with the most significant digit closest to the connector. Color coding is as follows:

white = 9
gray = 8

violet = 7
blue = 6
green = 5
yellow = 4
orange = 3
red = 2
brown = 1
black = 0

c. For example a 50 would be Green / Black with Green closest to the connector and 25 would be Red /Green with Red closest to the connector.

2. MultiConductor Cable:
Provide multiconductor cable to be labeled to match faceplates as indicated on the drawings.

a. Acceptable Multi-circuit Connectors

1. Veam VSC Series
2. Socapex SL419 series
3. LEX LSC19 Series
4. LK Connectors LKS series with the set screw option.

b. Terminate as per USITT Recommended Practice RP-1 "Contact Function Assignments For Multi-Circuit Circular Pin Connectors Used For The Distribution of Multiple Lighting Circuits"

c. Multiconductor Fan-Out
Provide 6 circuit, 20 amp, type SO or Procable, fan-out with male multiconnector and 20 amp grounded stage female connectors as per the contract documents.

d. Multiconductor Breakout
Provide 6 circuit 20 amp, type SO or Procable, breakout with male multiconnector and 20 amp grounded stage female connectors as per the contract documents.

PART 3 - EXECUTION

3.01 INSTALLATION

A. On split pin connectors adjust all pins on all receptacles to the same diameter, causing them to present uniform resistance to a single plug. Adjust all pins on all plugs to the same spread. Plugs should fit securely in any receptacle with enough resistance to prevent the plug from slipping out, but not so much resistance to inhibit the plugs from being easily and completely mated.

END OF SECTION 116161.60

SECTION 116161.80 - PERFORMANCE LIGHTING POWER AND CONTROLS STAGE EDGE MARKING SYSTEM

PART 1 - GENERAL

1.01 SUMMARY

A. A dimmable LED based stage edge marking system providing actively illuminated marker lights visible to the performer, but not the audience.

B. Work in this section includes the engineering, manufacture, furnishing, coordination and installation of the system.

C. Section Includes

1. Low Voltage Fixture
2. DMX driven dimming power supply
3. Low Voltage Cable

D. Coordination

1. Flooring Contactor provides the slot in the floor per the manufacturer's requirements under Division 09.
2. Conduit and Gang backboxes are provided under Division 26.
3. Line voltage cable and terminations are provided under Division 26.
4. Zone switching relay is provided by Lift Contractor under 116139. Fixtures and control signal from fixture power supply are terminated to relay under this contract.

1.02 RELATED DOCUMENTS

A. Division 1 Specification Sections apply to this Section.

1. Where Division 1 and this section conflict the more stringent shall apply.

B. Base Building Documents, Division 26.

1.03 SYSTEM DESCRIPTIONS

A. Control system will perform according the DMX standard and per criteria defined in 116161.40

PART 2 - PRODUCTS

2.01 MANUFACTURERS

A. Future Light - North Olmsted, Ohio

B. Batts Audio, Video & Lighting – Denison, TX

2.02 MANUFACTURED UNITS

A. Lighting Fixture

1. Common attributes:

a. Is no more than 0.5” deep x 0.75” wide.
b. Is powered from a dedicated low voltage power supply .
c. Uses amber LEDs except as noted..
d. LEDs are spaced no more than 12” O.C.
e. Leds are recessed to minimized off axis visibility.
f. Is black
g. Can be painted.
h. Is water resistant
i. Is capable of withstanding rolling loads typically found on stage, such as a concert grand piano, riser carts, man lifts, etc.
j. Is capable of withstanding point loads typically found on stage, such as a stiletto heeled shoes.
k. Can accept a 1,000# load.
l. Is installed using friction fit.
m. Can be bent to a radius of 15’-6” or greater.

2. Perpendicular

a. LEDs are mounted to be visible by a person viewing it from one side looking down at a 45 degree angle.
b. The center stage edge and lift edge strip have a red LED on centerline and at ¼ points (measured at the proscenium opening).
c. All other LEDs are amber.

3. Parallel

a. LEDs are mounted to be visible by a person viewing it from one end looking down at a 45 degree angle.

4. Vertical :

a. LEDs are mounted to be visible by a person viewing it from above.

5. Acceptable Products:

a. EdgeLyte by Future Light
b. 4th Wall by Batts Audio, Video & Lighting

B. Power Supply / DMX Controller

1. Mounts in a backbox no larger than 12x12x6.
2. Accepts 120-230vAC power input

3. Accepts DMX control input and dims the fixture based on the DMX level.
4. Has user a configurable DMX address.
5. Uses 1 DMX Address
6. Has a user configurable minimum DMX level that takes precedence over the received DMX level.
7. Turns the fixture to full intensity if DMX is lost.
8. May be set to Manual mode.
9. Powers Connections are via screw terminals.
10. Powers a minimum of 100’ of fixture.
11. Acceptable Products:

    a. EdgeLyte DMX Controller by Future Light
    b. 4th Wall by Batts Audio, Video & Lighting

PART 3 - EXECUTION

3.01 INSTALLATION

A. Field verify the length of the fixtures and the locations of the center and ¼ point markers prior to creating shop drawings.

B. Install the fixtures. Install filler rail in floor to create an appearance of a continuous fixture with no gaps.

C. Provide low voltage cable.

D. Terminate and install low voltage faceplates.

E. Terminate control lines.

F. Configure DMX addresses.

G. Interface:

1. Coordinate the conduit infrastructure with the Division 26 contractor.
2. Coordinate the floor accommodation with the owner.
3. Contract documents are diagrammatic and indicate general arrangement of systems and work included.
4. Follow drawings in laying out work and check drawings of other trades relating to work to verify spaces in which work is installed.

END OF SECTION 116161.60

SECTION 116161.91 - PERFORMANCE LIGHTING POWER AND CONTROLS
DIMMER AND CIRCUIT LIST

Tampa Theatre

Circuit	Type	Branch Circuit Breakers	Item	Fixtures
1-48	Dimmer Rack A - Dimmers		Stage Lighting Circuits	Various
49-96	Dimmer Rack B - Dimmers		Stage Lighting Circuits	Various
97-Above	20A Motorized Breakers/DMX Controlled Relays		House Lighting, Work and Non Dim, Aisle Lighting, Architectural Lighting	

END OF SECTION 116161.91

Item #	Name	Unit	Theatre
	Dimmer Racks		
1	Installed Rack with 24 Modules	Each	2
	Modules		
	Electronics Module		
	Standard Noise		
2	2.4 kw ThruPower (2/Module):	Dimmer/Relay	50
	Controlled Relay Panel		
3	Pan with slots for 40 relays and DMX interface cards	Each	3
	Company Switches		
4	400A Company Switch W/ Connection Chamber	Each	1
5	200A Company Switch - Isolated Ground W/ Connection Chamber	Each	1
	Emergency Transfer Switches		
6	ELTS 6 @ 20A Circuit Phase and Voltage Configuration As Required Emergency Power With Branch Protection	Each	2
7	DMX Emergency Bypass - Wall Mount	Each	2
8	Emergency Bypass Detection Kit	Each	2
	Architectural Lighting Controller		
	House / Work Light - Architectural	Each	
	Entry Station - B1	Each	AR
	Entry Station - B5	Each	AR
9	Portable Architectural Touchscreen	Each	2
	Console		
	Main Consoles		
10	Main Console - 2,000 Channel GIO w/ Fader Wing per specs	Each	1
	Console Accessories		

Item #			Name	Unit	Theatre
11			Main Console hook up cable set 25'	Each	1
12			Monitor - 21" Flatpanel, One is Touchscreen	Each	2
13			Power Filtration / UPS	Each	1
14			Wireless Focus Remote WAP	Each	1
15			Stand w/Monitor Supports	Each	1
			Console Dust Cover	Each	AR
	Data Communications				
		DMX			
			DMX Optical isolator / splitter Per Drawings	Each	AR
16			Custom Analog Single Fader Interface	Each	1
			DMX Patch Cables	Each	AR
		Ethernet			
17			Ethernet Patch Bay - 24 Port	Each	2
18			Ethernet Switch 24 port with POE and Fiber	Each	2
19			Ethernet Octo 8 port Gateway RackMount With 8 @ DMX	Each	4
			DinRail Enclosures/Power Supply with DinRail Mount 4-port Gateway	Each	AR
	Electronics Racks				
20			Electronics Rack	Each	2
21			Power Filtration / UPS	Each	2
	Misc Accessories				
			Ethernet Cable - 3'-0" - Black	Each	AR
			Ethernet Cable - 3'-0" - Red For Critical Patches	Each	AR
22			12"x12" Box Truss (10'section and rated hardware)	Each	3
22			1/2 Ton Chain Motor (CM, Stagemaster) with chain bag, 2 motor Pickle, 50' extension	Each	2

Item #			Name	Unit	Theatre
			New 1.9" OD Lighting Pipe positions per drawing TPR01. Field Verify all dimensions.	Lot	AR
	Faceplates				
			A2 PER DRAWINGS	Each	AR
			VA6 PER DRAWINGS	Each	AR
			EN2 PER DRAWINGS	Each	AR
			ET2 PER DRAWINGS	Each	AR
			D1 PER DRAWINGS	Each	AR
			UL3 PER DRAWINGS	Each	AR
			UL6 PER DRAWINGS	Each	AR
			VT2 PER DRAWINGS	Each	AR
			VT12 PER DRAWINGS	Each	AR
			JBX PER DRAWINGS	Each	AR
			JBD PER DRAWINGS	Each	AR
			GRID IRON JB	Each	AR
	Installed Cable				
23			DMX Cable	Lot	1
24			Architectural Cable	Lot	1
25			Ethernet Cable	Lot	1
26			Analog Cable	Lot	1
	Supplemental				
27			Control wire & Terminations for Architectural Fixtures	Lot	1
28			Materials, devices, and labor required to complete the system in addition to those items outlined above.	Lot	1
29					
30					
31					
32			AR=AS REQUIRED PER PLANS AND SPECS		

SECTION 116164 - PERFORMANCE LIGHTING INSTRUMENTS AND ACCESSORIES

PART 1 - GENERAL

1.01 SUMMARY

A. Work in this section includes manufacture and providing of performance lighting instruments and accessories, and architectural lighting fixtures and accessories.

B. Equipment in this section shall be bid as 4 packages:

1. Package 1 - Conventional Instruments and Accessories
2. Package 2 – LED Instruments and Accessories
3. Package 3 - Automated Instruments and Accessories
4. Package 4 – Architectural Fixtures and Accessories

C. Section Includes:

1. Materials, components, modifications, assemblies, equipment and services as specified herein. These include, but are not limited to:

a. Stage lighting instruments.
b. Stage lighting accessories.
c. Architectural lighting fixtures
d. Rewiring and cleaning of existing historical architectural fixtures
e. Loose electrical distribution.

1.02 SYSTEM DESCRIPTION

A. Design Requirements

1. Standards and Regulations

a. Components must comply with applicable regulations.
b. Provide systems and components that are approved by an accredited independent testing laboratory such as Underwriters Laboratory.
c. Provide rewired historical architectural lighting fixtures and obtain a fixture listing by an accredited independent testing laboratory such as Underwriters Laboratory.
d. Equipment utilizing Stage Pin Connectors must comply with ANSI E1.24-2006, Entertainment Technology - Dimensional Requirements for Stage Pin Connectors.

B. Performance Requirements:

1. Provide electrical equipment listed and labeled for use as indicated by UL or other independent test agency acceptable to the Code Authority or jurisdiction.
2. Provide lamps and lighting instruments to operate from 120 volt 60Hz AC, unless otherwise stated.
3. Performance Lighting Instruments:

a. Provide each performance lighting instrument with a C-clamp, safety cable, specified lamp, power cable fitted with the specified grounded stage plug and two color frames, unless otherwise stated.
b. Provide lighting instruments with operating knobs and handles safe to touch for precise operation at all times.
c. Provide instruments allowing a simple method of lamp replacement without dismantling lighting instrument. No tools are required for lamp replacement.
d. Provide space for fitting up to two color filters in removable frames in each lighting instrument.
e. Provide a slot on ellipsoidal spotlights for insertion of an iris or template holder.
f. Provide focus adjustment of ellipsoidal spotlights from a sharp edge beam to a soft edge beam without stray light rays or extraneous internal reflections from the lens tube.
g. Provide each lighting instrument with a standard length of not less than three (3) feet, 3 conductor cable and grounded stage connector as specified.
h. Securely ground metalwork of lighting instruments.
i. Unless specified herein fans for forced ventilation of lighting instruments are not acceptable in any lighting instruments except effects projectors, follow spots, or special units and then only with written agreement from the Owner.

4. Architectural Lighting Fixtures:

a. Catalog each historical architectural lighting fixture with current condition photographs and mounting location.
b. Coordinate with section 260961 to remove each historical architectural lighting fixture.
c. Refurbish/Repair any missing glass, shades, beads, or other missing or damaged fixture parts or accessories for each historical architectural lighting fixture.
d. Provide each historical architectural lighting fixture with new wiring and replace lamp base.
e. Clean each historical architectural lighting fixture to be dust and grime free. DO NOT REMOVE PATINA.
f. Coordinate with section 260961 to reinstall each historical architectural lighting fixture in the same location from which it was removed .
g. Relamp each historical architectural lighting fixture with approved LED lamp source.
h. Provide new architectural lighting fixtures as specified.

1.03 DEFINITIONS

A. The term “furnish” means to supply and deliver to the job site, ready for unloading, unpacking, assembly, installation, and similar operations.

B. The term “install” is used to describe operations at the job site including the actual anchoring, applying, assembly, cleaning, curing, cutting, erection, finishing, patching, placing, protecting, pulling, terminating, unloading, unpacking, working to dimension, and similar operations that will render the systems complete and ready for the intended use.

C. The term “provide” means to furnish and install.

D. Data Communications: Signals that provide control and feedback communications between devices in the system.

E. Historical Architectural Lighting Fixtures: Any existing installed original architectural lighting fixture as called out in the contract documents.

F. Products utilizing the "DMX512" control protocol shall comply with the rules and recommendations of the following standard: Entertainment Services & Technology Association (ESTA), ANSI E1.11 – 2008, Entertainment Technology - USITT DMX512-A, Asynchronous Serial Digital Data Transmission Standard for Controlling Lighting Equipment and Accessories.

G. Products utilizing the "ACN" control protocol shall comply with the rules and recommendations of the following standard: Entertainment Services & Technology Association (ESTA) ANSI E1.17 – 2006, Entertainment Technology - Architecture for Control Networks.

H. Products utilizing the "RDM" control protocol shall comply with the rules and recommendations of the following standard: Entertainment Services & Technology Association (ESTA) ANSI E1.20 – 2006, Entertainment Technology - RDM - Remote Device Management over USITT DMX512 Networks.

I. Products utilizing "Lightweight/Streaming ACN" control protocol shall comply with the rules and recommendations of the following standard: Entertainment Services & Technology Association (ESTA) ANSI E1.31 – 2009, Entertainment Technology – Lightweight streaming protocol for transport of DMX512 using ACN.

J. Products utilizing a "0 – 10V" control protocol shall comply with the rules and recommendations of the following standard: Entertainment Services & Technology Association (ESTA)ANSI E1.3 - 2001 (R2006), Entertainment Technology - Lighting Control Systems - 0 to 10V Analog Control Specification.

K. Products utilizing the DMX512 standard Entertainment Services & Technology Association (ESTA), ANSI E1.11 – 2008, Entertainment Technology - USITT DMX512-A, Asynchronous Serial Digital Data Transmission Standard for Controlling Lighting Equipment and Accessories shall comply with the rules and recommendations of the following standard: ANSI E1.27-1-2006, Entertainment Technology-Standard for Portable Control Cables for Use with USITT DMX512/1990 and E1.11 (DMX512-A)Products.

L. Products utilizing the DMX512 standard Entertainment Services & Technology Association (ESTA), ANSI E1.11 – 2008, Entertainment Technology - USITT DMX512-A, Asynchronous Serial Digital Data Transmission Standard for Controlling Lighting Equipment and Accessories shall comply with the rules and recommendations of the following standard: ANSI E1.27-2 – 2009, Entertainment Technology - Recommended Practice for Permanently Installed Control Cables for Use with ANSI E1.11 (DMX512-A) and USITT DMX512/1990 Products POE: Power Over Ethernet - an 802.3AF compliant scheme of powering devices on an Ethernet network via the Ethernet cabling.

M. POE: Power Over Ethernet - an 802.3AF compliant scheme of powering devices on an Ethernet

N. Individuals, organizations and companies involved in designing, manufacturing and/or using aluminum trusses, towers and associated aluminum structural components such as head blocks,

sleeve blocks, bases, and corner blocks in the entertainment industry shall comply with the rules and recommendations of the following standard. ANSI E1.2 - 2006, Entertainment Technology - Design, Manufacture and Use of Aluminum Trusses and Towers Maintenance.

O. Individuals, organizations and companies involved in the design, manufacture and/or installation of boom and base assemblies, simple ground-support devices for lighting equipment and accessories shall comply with the rules and regulations of the following standard. ANSI E1.15 - 2006, Entertainment Technology--Recommended Practices and Guidelines for the Assembly and Use of Theatrical Boom & Base Assemblies.

P. Products utilizing Metal Halide Ballast Power Cables shall comply with the rules and recommendations of the following standard: ANSI E1.16 - 2002 (R2007), Entertainment Technology - Configuration Standard for Metal Halide Ballast Power Cables.

Q. Products utilizing Stage Pin Connectors shall comply with the rules and recommendations of the following standard: ANSI E1.24 – 2006, Entertainment Technology - Dimensional Requirements for Stage Pin Connectors.

R. Photometric product documentation for stage and studio luminaires used in the live entertainment and performance industries shall comply with the rules and recommendations of the following standard: Entertainment Services & Technology Association (ESTA) ANSI E1.9-2007, Entertainment Technology - Reporting Photometric Performance Data for Luminaires Used in Entertainment Lighting.

S. Lens quality documentation for pattern projecting luminaires intended for entertainment use shall comply with the rules and recommendations of the following standard: Entertainment Services & Technology Association (ESTA) ANSI E1.35 – 2007, Standard for Lens Quality Measurements for Pattern Projecting Luminaires Intended for Entertainment Use

T. Maintenance Service:

1. Provide maintenance service for a period of one year after final acceptance of the installation. This service shall cover the parts and labor resulting from correction of defects of items specified in this section. Specifically excluded from the scope of this service are expendables (lamps, color media, etc.) and changes in the location or focus of the equipment from the initial setup.
2. This service consists of at least two half-yearly visits to the site for checking and adjusting of equipment. The first visit occurring six months after the system has been accepted.
3. Arrange visit to be at a time mutually agreeable to the Owner and Contractor.

U. Products Furnished but Not Installed Under This Section:

1. Provide six (6) additional C-clamps to electrical contractor for use with stage work lights.

1.04 SUBMITTALS

A. Product Data

1. Submittal shall include manufacturer’s information sheets of equipment not explicitly specified by make and model that the contractor intends to provide as part of the project. Equipment matching make and model called out in the specification need not be submitted.
2. Collect Product Data into a single submittal for each element of construction or system. Product Data includes printed information such as manufacturer's installation instructions, catalog cuts, standard color charts, roughing-in diagrams and templates, standard wiring diagrams and performance curves. Where Product Data must be specially prepared because standard printed data is not suitable for use, submit as "Shop Drawings."
3. Mark each copy to show applicable choices and options. Where printed Product Data includes information on several products, some of which are not required, mark copies to indicate the applicable information. Include the following information:

    a. Manufacturer's printed recommendations.
    b. Compliance with recognized trade association standards.
    c. Compliance with recognized testing agency standards.
    d. Application of testing agency labels and seals.
    e. Notation of dimensions verified by field measurement.
    f. Notation of coordination requirements.
    g. Material Safety Data Sheets (MSDS) for each product.
    h. Catalog or data sheets indicating all component manufacturer's names, model numbers and performance data, where applicable.

B. Shop Drawings:

1. Submittals shall be in accordance with Division 1.
2. Shop drawings are only required for custom components.
3. Shop drawings shall be submitted within 90 days of award of contract unless otherwise indicated in Division 1.
4. Fabrication, Installation, and Erection shall not commence until shop drawings have been approved by the Consultant and Architect.
5. Note and maintain one of the prints returned as a "Record Document".
6. Sheets in the submittal shall be of the same size.
7. Submittal shall include a title sheet listing sheets in the submittal.
8. Drawing scales:

    a. Mechanical Assembly Drawings (1/2"= 1'-0" minimum).
    b. Faceplate Fabrication Drawings (6" = 1'-0" minimum)
    c. Room layouts (1"=1'-0" minimum).
    d. Block schematics and riser diagrams. (NTS)
    e. Miscellaneous Details and Assembly Drawings. (scale as necessary)
    f. Mechanical Detail Drawings. (1"=1'-0" minimum).
    g. Mechanical General Layout. (1/4"= 1'-0" minimum).
    h. Component Equipment Drawings. (1"=1'-0" minimum).
    i. Erection Plans and diagrams. (1/4"=1'-0" minimum).
    j. Wiring Diagrams showing system layout (1/4"=1'-0" minimum).
    k. System assemblies, major sub-assemblies, components, cabinets and enclosures (1"=1'-0" minimum).
    l. Templates and installation details (1"-1'-0" minimum).

9. Highlight, encircle, or otherwise indicate deviations from the Contract Documents.

10. Do not reproduce Contract Documents or copy standard information as the basis of Shop Drawings. Standard information prepared without specific reference to the Project is not considered Shop Drawings.
11. Shop Drawings include fabrication and installation drawings, setting diagrams, schedules, patterns, templates and similar drawings.
12. Lettering on Shop Drawings is considered part of the Drawings.
13. Show information necessary to explain fully the design features, appearance, function, fabrication, installation, and use of system components in all phases of operation. Include the following drawings as a minimum:

    a. Custom Fabrication Drawings detailing:

        1. Finishes
        2. Devices
        3. Engraving
        4. Construction

    b. Notation of coordination requirements.
    c. Notation of dimensions established by field measurement.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

A. The components (make and model) form the basis of design of the system.

    1. Where other manufacturers are known to be capable of providing equipment that meets the functional requirements specified products they are listed.

B. Substitutions may not be made without prior written approval by the owner.

    1. Other models by listed or alternate manufacturers will be considered for acceptance providing they meet or exceed the requirements and functional qualities specified.
    2. Requests for Architect's approval and complete technical data for evaluation must be received at least 14 days prior to bid due date. These requests must include:

        a. Complete data on the proposed substitute.
        b. A listing of deviations from specified quantities required/enabled by the proposed substitution or a statement that no deviations in quantities are proposed.
        c. A detailed listing of deviations from specified connected components required/enabled by the proposed substitution or a statement that no deviations in connected equipment will be required.
        d. A detailed listing of changes to the architecture, electrical, conduit, mechanical or structural system required by the substitution or a statement that the substitution will require no adjustments to the building or infrastructure.
        e. The architect may require a sample to be provided as a condition for approval.

    3. Substitutions accepted will be issued by Addendum.

C. Conventional Lighting Fixtures:

1. Electronic Theatre Controls, Inc., Middleton, WI

D. LED Lighting Fixtures:

1. Electronic Theatre Controls, Inc., Middleton, WI
2. Lumenpulse, Boston, MA
3. Rosco Labs, Stamford, CT
4. Gantom Lighting, Valencia, CA
5. Prism Projections, El Cajon, CA
6. GDS by ETC, Middleton, WI
7. GLP, Germany
8. SGM, Denmark
9. The Light Source, Charlotte, NC
10. TMB
11. Chauvet Professional, Sunrise, FL

E. Architectural House Lighting Fixtures:

1. RLED (Canto USA), Atlanta GA
2. Lumenpulse, Boston, MA
3. Gantom Lighting, Valencia, CA
4. GDS by ETC, Middleton, WI
5. GLP, Germany

F. Running Lights:

1. GDS Blues by ETC, Middleton, WI

G. Follow spots:

1. Lycian Stage Lighting, Sugar Loaf, NY
2. Canto USA, Atlanta, GA
3. Strong International, Omaha, NE
4. Robert Juliat, Wallingford, CT

H. Moving Lights

1. Clay Paky
2. VariLite
3. Robe
4. High End Systems
5. Martin

I. DMX distribution, testing and analysis equipment

1. Swisson
2. Goddard Design
3. Doug Fleenor Designs
4. Pathway

J. Lamps:

1. Cree
2. Phillips
3. GDS
4. General Electric
5. Sylvania
6. Osram
7. USHIO
8. Phillips

K. Data Cable:

1. Lex Products, Stamford, CT
2. TMB Proplex, Los Angeles, CA

L. Extension Cable Assemblies:

1. Altman Stage Lighting Co., Yonkers, NY
2. SSRC, Greer, SC
3. TMB Proplex, Los Angeles, CA
4. Lex Products, Stamford, CT

M. Wireless Data Assemblies:

1. RC4 Wireless, Raleigh, NC
2. SSRC, Greer, SC
3. Lumen Radio, Sweden
4. W-DMX, Sweden

N. Instrument Accessories and Rigging Accessories:

1. Altman Stage Lighting Co, Yonkers, NY
2. City Theatrical, New York
3. The Light Source, Charlotte, NC

2.02 POWER CONNECTOR

A. 20A

1. Two (2) pin and ground stage connector of an amperage appropriate for anticipated loads.

B. Six Circuit Multiconductor

1. Socapex Compatible Connector

2.03 EQUIPMENT

A. General:

1. Supply all Pipe Hung devices other than cable with:

    a. 30” Safety Cable:

        1. 0.125" 7x19 Wire rope with compression sleeve eye on both ends and one (1) Snap Hook (Mcmaster-Carr 3716T31).

    b. Clamp: The Light Source Mega Clamp or Equal
    c. Black Finish

2. Supply All Conventional Lighting Instruments

    a. Lamp
    b. Color Frame

3. Supply All pipe mounted powered devices

    a. Power connector

B. Ellipsoidal Framing Spotlight

1. Supply with pattern holder

C. Cyc Lighting Instruments:

1. Supply with Floor Trunnions and Hanging Arm with clamp.

D. Follow spots:

1. Iris
2. Manual dimming control.
3. Horizontal masking shutter control.
4. Mechanical dimmer shutters.
5. Built-in manual color changer for minimum of six different color frames.
6. Elapsed lamp time meter.
7. Provide power supply for light source in self-contained unit with appropriate locking connector.
8. Supply plug on cord to unit & ballast.
9. Provide mounting yoke and heavy duty stable floor base for units.

2.04 ACCESSORIES

A. Cable Bins:

1. 16 Bushel Hamper
2. Heavy Duty Canvas Basket Covering.
3. 4" Heavy Duty Rubber Swivel Casters
4. Snap and Chain Fasteners
5. 1/2" Plywood Lid with Caster donuts
6. I. Weiss 082016A or Equal

2.05 CABLE

A. General

1. Portable Cable Labeling

a. Each cable shall be color coded by length using a heat-shrink polyolifin sleeve near the male end of the cable. This sleeve shall be hot-stamped with the name of the facility: “Tampa Theatre”, or as directed by the Owner.
b. One to three bands of color code with the most significant digit closest to the connector. Color coding is as follows:

white = 9
gray = 8
violet = 7
blue = 6
green = 5
yellow = 4
orange = 3
red = 2
brown = 1
black = 0

c. For example a 50 would be Green / Black with Green closest to the connector and 25 would be Red /Green with Red closest to the connector.

B. LED Fixture Power Cable

1. All connectors are Neutrik Powercon connectors of appropriate ampacity.
2. Jumper Cable - 20amp
Provide 20 amp cables with 3 core, No. 12, type SO, with 20 amp stage male connector at one end and matching female connector at the other end. Lengths as specified.

C. Stage Cable:

1. Jumper Cable - 20amp
Provide 20 amp cables with 3 core, No. 12, type SO, with 20 amp stage male connector at one end and matching female connector at the other end. Lengths as specified.
2. TwoFer
Provide 20 amp male connector and two (2) 20 amp female connectors wired with 3'-0" No. 12 type SO cables.

D. 3 Phase Feeder Cable Sets:

1. Cam-Lok J Series Connectors One end male, one end female
2. Type SC Cable
3. Connector Colors

a. Hot – Red, Blue, Black
b. Neutral – White
c. Ground - Green

4. 400A Set

    a. Employ 4/0 AWG
    b. Cable Quantities per set Provide 3 Hot (1 each color), 2 Neutrals, 1 Ground

5. 200A Set

    a. Employ 2/0 AWG
    b. Cable Quantities per set Provide 3 Hot (1 each color), 1 Neutral, 1 Ground

6. 100A Set

    a. Employ #2 AWG
    b. Cable Quantities per set Provide 3 Hot (1 each color), 1 Neutral, 1 Ground

7. Lengths As specified

E. MultiConductor:

1. Employ 19 conductor stranded multicable.
2. Acceptable Multi-circuit Connectors

    a. Veam VSC Series
    b. Socapex SL419 series
    c. LEX LSC19 Series
    d. LK Connectors LKS series with the set screw option.

3. Multiconductor extension:
   Provide 6 circuit, 20 amp, type SO or Procable multicable with offset eye, closed mesh, single weave support grips, uniquely numbered ends and Veam VSC male/female multiconnnectors as per contract documents.
4. Multiconductor Fan-Out
   Provide 6 circuit, 20 amp, type SO or Procable, fan-out with Veam VSC male multiconnector and 20 amp grounded stage female connectors as per the contract documents.
5. Multiconductor Fan-In
   Provide 6 circuit, 20 amp, type SO or Procable, fan-in with Veam VSC female multiconnector and 20 amp grounded stage male connectors as per the contract documents.

F. DMX-512 extension cables.

1. Provide cables with Neutrik connectors.
2. Terminate both pair of conductors and shield at connectors.
3. Employ Proplex style rugged use cable.

G. Ethernet Category 5 extension cables.

1. Provide cables with Neutrik Ethercon connectors.
2. Terminate all 4 pair of conductors at connectors.
3. Employ Proplex style rugged use cable.

2.06 SPARES

A. Lamps:

1. Provide 20% spare lamps for each type of instrument with a minimum of 1 spare lamp per type in addition to those specified in the component schedule.

B. Color Frames:

1. Provide 10% spare color frames for each type of instrument with a minimum of 1 spare frame per type.

C. Safety Cable:

1. Provide 10% spare safety cables for each type of safety cable.

D. C-clamp:

1. Provide 10% spare C-clamps for each type of instrument.

2.07 SUPPLEMENTARY

A. Furnish equipment and hardware in addition to the items specified previously that are necessary to provide a fully working system in conformance with the intent of the Contract Documents.

PART 3 - EXECUTION

3.01 INSTALLATION

A. Terminate data connections as necessary at house lighting and atmospheric wall fixtures.

B. Aid consultant, 116161 & 260961 contractors, and owner in configuration as necessary.

C. Furnish house lighting fixtures to 260961 for installation.

D. Unpackage, install lamps, clamps, safeties, and frames on all fixtures

E. Hang and circuit all performance fixtures per owner-issued lighting plot.

F. Remove all packing materials from theatre after installation.

3.02 EQUIPMENT AND COMPONENT SCHEDULES

A. See Attached Equipment and Component Schedule.

END OF SECTION 116164

Item #			Manufacturer	Model	Description	Unit	Theatre
	Lighting Instruments:						
		Ellipsoidal					
1			ETC	Source 4 LED	26 Degree LED Studio HD Tungsten EDLT	Each	4
2			ETC	Source 4 LED	36 Degree LED Studio HD Tungsten EDLT	Each	4
3			ETC	Source 4 LED S2	10 Degree LED Lustr +	Each	6
4			ETC	Source 4 LED S2	14 Degree LED Lustr +	Each	12
5			ETC	Source 4 LED S2	19 Degree LED Lustr + With EDLT	Each	12
6			ETC	Source 4 LED S2	26 Degree LED Lustr + With EDLT	Each	6
7			ETC	Source 4 LED S2	36 Degree LED Lustr + With EDLT	Each	12
		Wash					
8			ETC	ETC D40 Lustr+	7 color LED wash with clamp, safety, Frame	Each	15
		Misc./House Lighting Fixtures					
8			GDS	Chandelier ARCLamp	As required at all A-lamp dimmable locations in house. Centralize power supply. At back side of wall or in ceiling.	Each	AR
9			GDS	BLUES	Running Light, Dome/Eyelid	Each	22
10			GDS	Blues	6-zone Power Supply (mounts in Data rack)	Each	1
10			GDS	ARC-CT	Commissioning Tool	Each	1
10			GDS	ARC-Pro8	Pro-Cell 8 - Yoke Mount Black with clamp, Wireless Archmesh	Each	8

Item #			Manufacturer	Model	Description	Unit	Theatre
11			GDS	TX-1	Master Transmitter	Each	2
12			Fiber Optics Technology, Inc.	Fiber Optic Star Ceiling - replaces existing holes	Star Ceiling Fiber Optics Generator with multi-sized strands, DMX-controlled.	Each	5
13			Misc.	Custom	Rewire all existing house lighting. UL list all historical fixtures per specs. Clean and replace. Do NOT remove patina. Replace switched fixtures with LED lamps to match existing style/color. Refurbish per specs.	Lot	1
14			Rosco	Braq	RGBW Mini Fixture - Eutrac Mount Black	Each	12
15			Rosco	Braq UV	UV Mini Fixture - Eutrac Mount	Each	9
16			Lumenpulse	LCS2 120 48 RGB HO DMX 1FT FR WH	Lumencove Cove lighting fixture rings ceiling for sky lighting. 4' sections.	Each	90
8			Gantom	One Pinspot	4w LED Pinspot	Each	12
17			Gantom	IQ x	Micro Projector w/ DMX	Each	10
18			RC4	4-DIM	4-Channel Wireless Dimmer w/ Meanwell power supply for LED Fixtures.	Each	12
19			LiteGear	60-X1 RGB	LiteGear LiteRibbon LED RGB 5 Meter Roll.	Each	5
19			SSRC	Switchbrick Duo	2-circuit DMX with wireless Lumen Radio Receiver	Each	4
20			Lumen Radio	CRMX-Nova FX RDM	CRMX NOVA FX DMX Transmitter	Each	1

Item #			Manufacturer	Model	Description	Unit	Theatre
		StripLight / Cyc Lighting					
21			Chauvet	Ovation C-640FC Cyc	5 Color LED: RGBWA	Each	9
					Strip MR-16 - 4 Circuit	Each	
		Followspot					
			Lycian	1266	400w Arc	Each	
22			Canto USA	Canto 2000 FF	2000w HMI	Each	1
		Automated					
23			High End Systems	High End SolaSpot Pro CMY LED	LED Spot	Each	2
24			Martin	Mac Aura XB	Wash LED	Each	4
	Effects						
20			GAM	FilmEFX	EFX Film Device with Fluffy Clouds Film for ETC Source4	Each	4
	Accessories:						
		Equipment Trucks					
25					Cable Bins - 16 Bushel heavy duty Canvas Bins with solid lids, 4" casters and caster doughnuts	Each	1
		Elipsoidal Instrument Accessories					
26			City Theatrical	Stacker Series	Top hats for Source Four Ellipsoidal 14 degree equipment	Each	12
27			City Theatrical	Stacker Series	Top hats for Source Four Ellipsoidal 19-50 degree equipment	Each	36
28			City Theatrical	Stacker Series	Half hats for Source Four 19-50 degree Ellipsoidal equipment	Each	12

Item #			Manufacturer	Model	Description	Unit	Theatre
29			City Theatrical	Doughnut	Doughnut for Source Four 19-50 degree Ellipsoidal	Each	6
30			ETC	400PH-A	Template holders A-Size for Source Four Ellipsoidal	Each	12
31			ETC	400RS	Iris kits for Source Four Ellipsoidal	Each	2
		Common Instrument Accessories					
32			Generic		30" Safety Cable	Each	12
33			The Light Source	Mega	Sidearms 18" Single T	Each	36

Item #			Manufacturer	Model	Description	Unit	Theatre
	Cable:						
		Adapters					
					Track Adapter	Each	
34					2PG to Edison	Each	6
35					Edison to 2PG	Each	6
		Breakouts					
					50 amp to 20 amp protected branchoff	Each	
		Jumper Stage Cable, 120V, 20A					
36			Lex	Powerflex	Twofer	Each	12
			Lex	Powerflex	Threefer - 20 amp - 120V	Each	
					Fourfer - series, 20 amp, For ACL	Each	
37			Lex	Powerflex	Jumper cable - 5'	Each	12
38			Lex	Powerflex	Jumper cable - 10'	Each	15
39			Lex	Powerflex	Jumper cable - 15'	Each	12
40			Lex	Powerflex	Jumper cable - 25'	Each	12
41			Lex	Powerflex	Jumper cable - 50'	Each	6
42			Lex	Powerflex	Jumper cable - 100'	Each	4
		Jumper Powercon, 120V, 20A					
43					Twofer	Each	24
44			Lex	Powerflex	Jumper cable - 10'	Each	24
		Feeder 3ph, 400A					
45					Feeder cable - 25' - Per specs	Sets	2
		Multicable					
46			Lex	Powerflex	Multiconnector Breakout to 20 amp connectors as per drawing "MB" 3'-0" Leader, 2'-0" Drops	Each	14

Item #			Manufacturer	Model	Description	Unit	Theatre
47			Lex	Powerflex	6 Circuit Multicable extension as per drawing "MC" - 5'	Each	2
48			Lex	Powerflex	6 Circuit Multicable extension as per drawing "MC" - 10'	Each	8
49			Lex	Powerflex	6 Circuit Multicable extension as per drawing "MC" - 25'	Each	6
50			Lex	Powerflex	6 Circuit Multicable extension as per drawing "MC" - 50'	Each	6

Item #			Manufacturer	Model	Description	Unit	Theatre
		Data Communications Cable - DMX					
51			Lex	DMX-5P-5	DMX-512 cable 5'	Each	24
52			TMB	DMX-5P-15	DMX-512 cable 15'	Each	48
53			TMB	DMX-5P-25	DMX-512 cable 25'	Each	24
54			TMB	DMX-5P-50	DMX-512 cable 50'	Each	10
55			TMB	DMX-5P-100	DMX-512 cable 100'	Each	2
		Data Communications Cable - Ethernet					
56			Proplex		Ethernet cable 5'	Each	6
57			TMB	Proplex	Ethernet cable 15'	Each	6
58			TMB	Proplex	Ethernet cable 25'	Each	6
59			TMB	Proplex	Ethernet cable 50'	Each	1
60			TMB	Proplex	Ethernet cable 100'	Each	1
	Cable Accessories						
61					Stagepin Splitter	Each	1
62					2P&G Tester and Cable Tester 20A - Gamcheck	Each	1
63					Socapex Tester Lex LT-19P	Each	1
	Spare Lamps:						

Item #			Manufacturer	Model	Description	Unit	Theatre
	DMX Signal Devices						
		DMX Testers					
64			Swisson	XMT-350	RDM/DMX Tester	Each	1
	Supplemental:						
					Unpacking, Disposal/Recycle of Packaging	Hour	8
65					Maintenance Training	Hour	4
					Focus/Configuration Assistance	Hour	8
76			AR=AS REQUIRED				

SECTION 26 00 80
TESTS AND PERFORMANCE VERIFICATION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. General: Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification sections, apply to work specified in this section.

1.2 DESCRIPTION

A. Time: Perform verification work as required to show that the System is operating correctly in accordance with contract documents and manufacturers literature. All verification shall be done after 3-day full operational period.

B. Submission: Submit check out memos and completed testing results of all systems, cable, equipment, devices, etc., for acceptance prior to being energized or utilized.

1.3 QUALITY ASSURANCE

A. Compliance: Testing shall comply to the following standards;

1. NEMA
2. ASTM
3. NETA
4. ANSI C2
5. ICEA
6. NFPA

PART 2 - TESTS

2.1 EQUIPMENT

A. Instruments: Supply all instruments required to read and record data. Calibration date shall be submitted on test reports. All instruments shall be certified per NETA standards.

B. Adjustments: Adjust system to operate at the required performance levels and within all tolerances as required by NETA Standards.

2.2 APPLICATIONS

A. Panelboards and Dimming System Feeders: After feeders are in place, but before being connected to devices and equipment, test for shorts, opens, and for intentional and unintentional grounds.

B. Ratings 600 Volts or Less: Cables 600 volts or less in size #1/0 AWG and larger shall be meggered using an industry approved "megger" with 500 internal generating voltage. Readings shall be recorded and submitted to the Engineer, for acceptance prior to energizing same. Submit 5 copies of tabulated megger test values for all cables.

2.3 GROUNDS

A. Electrode Ground: The resistance of electrodes (main service) shall not exceed 10 ohms and shall be measured by The Contractor before equipment is placed in operation. Testing shall be performed on all grounding electrode installations. Testing shall be 3 point method in accordance with IEEE Standard 81. Submit all ground test readings to the Engineer in tabulated format at substantial completion.

PART 3 - EXECUTION

3.1 SUBMITTALS

A. Cable Test Report: Submit Cable Test Report in Triplicate.

B. Check Out Memos: Complete all information on forms at the end of this specification, project information, and certificate of completed demonstration memo. Submit data for examination and acceptance prior to final inspection request.

C. Tabulated Data: Submit data on 8-1/2 x 11 inch sheets with names of the personnel who performed the test.

D. Final: Submit accepted memos before a request for final inspection.

3.2 QUANTITIES

A. Quantity: Submit 5 copies of the check out memo on each major item of equipment. Insert accepted memos in each brochure with the performance verification information and submittal data.

END OF SECTION 26 0080

TABULATED DATA

VOLTAGE AND AMPERAGE READINGS

SWITCHGEAR OR PANELBOARD

FULL LOAD AMPERAGE READINGS:

DATE

TIME

PHASE A.

B.

C.

N.

FULL LOAD VOLTAGE READINGS:

DATE

TIME

PHASE A TO N _____ A TO B

B TO N _____ A TO C

C TO N _____ B TO C

NO LOAD VOLTAGE READINGS

DATE

TIME

PHASE A TO N _____ A TO B

B TO N _____ A TO C

C TO N _____ B TO C

_____ENGINEERS REPRESENTATIVE

_____CONTRACTORS REPRESENTATIVE

SECTION 26 05 00
BASIC ELECTRICAL REQUIREMENTS

PART 1 - GENERAL

1.1 GENERAL

A. Basic Requirements: The Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification sections, apply to work of this section.

B. General Provisions: Provide all labor, materials, equipment, and incidentals required to make ready for use complete electrical systems as specified herein and shown on the drawings.

C. Provide and Install: The word "provide" where used on the Drawings or in the Specifications shall mean "furnish, install, mount, connect, test, complete, and make ready for operation". The word "install" where used on the Drawings or in the Specifications shall mean "mount, connect, test, complete, and make ready for operation". Perform work required by, and in accordance with, the Contract Documents.

D. Installation: Provide and place in satisfactory condition, ready for proper operation, raceways, wires, cables, and other material needed for all complete electrical systems required by the Contract Documents. Additional raceways and wiring shall be provided to complete the installation of the specific equipment provided. Include auxiliaries and accessories for complete and properly operating systems. Provide electrical systems and accessories to comply with the NEC, state and local codes and ordinances. It is the intent of these Specifications that the electrical systems be suitable in every way for the use intended. Material and work which is incidental to the work of this Contract shall be provided at no additional cost to the Contract.

E. Field Connections: Provide field connections to remote equipment and control panels provided under other Divisions of these Specifications. Provide raceway, wire, and interconnections between equipment, transmitters, local indicators, and receivers. Provide 120V and low voltage surge protection equipment in accordance with Section 26 4313 at equipment as required. Install field connections to "packaged" equipment provided under other Divisions of these Specifications.

1.2 SCOPE OF WORK

A. General: Provide labor, materials, permits, inspections and re-inspection fees, tools, equipment, transportation, insurance, temporary protection, temporary power and lighting, supervision and incidental items essential for proper installation and operation of the Electrical systems indicated in the Contract Documents. Provide materials not specifically mentioned or indicated but which are usually provided or are essential for proper installation and operation of the Electrical systems indicated in the contract documents.

B. Notices: Give notices, file Plans, pay fees, and obtain permits and approvals from authorities having jurisdiction. Include all fees in the Bid Price.

1.3 INTERPRETATION OF DRAWINGS

A. General: The Drawings are diagrammatic and are not intended to show exact locations of Raceway runs, outlet boxes, junction boxes, pull boxes, etc. The locations of equipment, appliances, fixtures, Raceways, outlets, boxes and similar devices shown on the Drawings are approximate only. Exact locations shall be determined and coordinated in the field. The right is reserved to change, without additional cost, the location of any outlet within the same room or general area before it is permanently installed. Obtain all information relevant to the placing of electrical work and in case of interference with other work, proceed as directed by the Architect.

B. Discrepancies: Notify the Architect of any discrepancies found during construction of the project. The Architect will provide written instructions as to how to proceed with that portion of work. If a conflict exists between the Contract Documents and an applicable code or standard, the most stringent requirement shall apply.

C. Wiring: Each three-phase circuit shall be run in a separate Raceway unless otherwise shown on the Drawings. Unless otherwise accepted by the Architect, Raceway shall not be installed exposed. Where circuits are shown as "home-runs" all necessary fittings, supports, and boxes shall be provided for a complete raceway installation.

D. Layout: Circuit layouts are not intended to show the number of fittings, or other installation details. Connections to equipment shall be made as required, and in accordance with the accepted shop and manufacturer's setting drawings.

E. Coordination: Coordinate final equipment locations with drawings or other disciplines. Layout before installation so that all trades may install equipment in available space. Provide coordination as required for installation in a neat and workmanlike manner.

1.4 EQUIPMENT SIZE AND HANDLING

A. Coordination: Investigate each space in the structure through which equipment must pass to reach its final location. If necessary, ship the equipment in sections of specific sizes to permit the passing through the necessary areas within the structure.

B. Handling: Equipment shall be kept upright at all times. When equipment has to be tilted for ease of passage through restricted areas during transportation, the manufacturer shall be required to brace the equipment suitably, to insure that the tilting does not impair the functional integrity of the equipment.

1.5 RECORD DRAWINGS

A. Production: The Contractor shall provide two (2) sets of black or blue line on white drawings to maintain and submit record "As-Built Documents". Label each sheet of the Record Document set with “Project Record Documents” with company name of the installing contractor in stamped or printed letters. One set shall be maintained at the site and at all times be accurate, clear, and complete. These drawings shall be available at all times to the Architect's field representatives.

B. Recording: Record information concurrent with construction progress. Make entries within 24 hours upon receipt of information. The "As-Built" drawings shall accurately reflect installed electrical work specified or shown on the Contract Documents.

C. Completion: At the completion of the Work, transfer changes with a colored pencil onto the second set and submit to the Architect. The "As-Built" drawings shall be made available to the Architect to make the substantial completion punch list.

D. Final: Upon Contractor's completion of the Engineer's final punch list, transfer all "As-Built" conditions and all requirements by the Engineer to a reproducible set of drawings and CAD files. Submit drawings and CAD disks for review and acceptance. The Contractor shall provide updated disks which include final As-Built conditions.

1.6 ABBREVIATIONS

A. Abbreviations: The following abbreviations or initials may be used:

A/C	Air Conditioning
AC	Alternating Current
ABV CLG	Above Ceiling
ADA	Americans with Disabilities Act
AF	Ampere Frame
AFF	Above Finished Floor
AFG	Above Finished Grade
AHU	Air Handler Unit
AIC	Amps Interrupting Capacity
AL	Aluminum
AMP	Ampere
ANSI	American National Standards Institute
ASA	American Standards Association
AT	Ampere Trip
ATS	Automatic Transfer Switch
AUX	Auxiliary
AWG	American Wire Gauge
BC	Bare Copper
BIL	Basic Impulse Level
BMS	Building Management System
BRKR or BKR	Breaker
CAB	Cabinet
C	Conduit or Raceway
CB	Circuit Breaker
CBM	Certified Ballast Manufacturers
CCTV	Closed Circuit Television
CKT	Circuit
CLEC	Clock Equipment Cabinet
CLG	Ceiling
CO	Conduit or Raceway Only
COAX	Coaxial Cable
COND	Conductor
CONN	Connection
CPU	Central Processing Unit
CRT	Cathode Ray Terminal (Video display terminal)
CT	Current Transformer
CU	Copper
CW	Cold Water
DC	Direct Current
DDC	Direct Digital Control
DEG	Degree
DISC	Disconnect
DO	Draw Out
DN	Down
DPST	Double Pole Single Throw
EMT	Electrical Metallic Tubing
EO	Electrically Operated

EOL	End of Line Resistor
EWC	Electric Water Cooler
FAAP	Fire Alarm Annunciator Panel
FACP	Fire Alarm Control Panel
FCU	Fan Coil Unit
FLA	Full Load Amperes
FM	Factory Mutual
GF	Ground Fault
GFCI	Ground Fault Circuits Interrupter
GND	Ground
HOA	Hand-Off-Automatic
HORIZ	Horizontal
HP	Horsepower
IC	Intercom
ICU	Intensive Care Unit
IEEE	Institute of Electrical and Electronic Engineers
IES	Illuminating Engineering Society
IMC	Intermediate Metallic Raceway
IN	Inches
IT	Instantaneous Trip
IPCEA	Insulated Power Cable Engineers Association
JB	Junction Box
KCMIL	Thousand Circular Mills
KV	Kilovolt
KVA	Kilo-Volt-Amps
KW	Kilowatts
LBS	Pounds
LED	Light Emitting Diode
LT	Light
LTD	Long Time Delay
LTT	Long Time Trip
LTG	Lighting
MAX	Maximum
MCB	Main Circuit Breaker
MCC	Motor Control Center
MCP	Motor Circuit Protector
MIC	Microphone
MIN	Minimum
MLO	Main Lugs Only
MTD	Mounted
MTG	Mounting
MUX	Multiplex (Transponder) Panel
MVA	Mega Volt Amps
N	Neutral
NC	Normally Closed
NEC	National Electrical Code
NECA	National Electrical Contractors Association
NEMA	National Electrical Manufacturers Association
NFPA	National Fire Protection Association
NIC	Not in Contract
NF	Non Fused
NL	Non Linear
NO	Number or Normally Open
#	Number
Ø	Phase
OL	Overload
OSHA	Occupational Safety and Health Administration

P	Pole
PB	Pullbox
PIV	Post Indicator Valve
PNL	Panel
PR	Pair
PWR	Power
PF	Power Factor
PRI	Primary
PT	Potential Transformer
PVC	Polyvinylchloride
REF	Refrigerator
RGC or GRC	Rigid Galvanized Raceway
RMS	Root-Mean-Square
RPM	Revolutions Per Minute
RECPT	Receptacle
SCA	Short Circuit Amps
SD	Smoke Detector
SEC	Secondary
S/N	Solid Neutral
SPKR	Speaker
SPST	Single Pole Single Throw
SST	Solid State Trip
ST	Short Time Trip
STD	Short Time Delay
SW	Switch
SWGR	Switchgear
SWBD	Switchboard
TEL	Telephone
TTB	Telephone Terminal Board
TTC	Telephone Terminal Cabinet
TVEC	Television Equipment Cabinet
TYP	Typical
UL	Underwriters Laboratories
UON	Unless Otherwise Noted
V	Volt
VFD	Variable Frequency Drive
VSD	Variable Speed Drive
W	Wire
WP	Weatherproof
XFMR	Transformer

1.7 CODES, FEES, AND STANDARDS

A. Application: The codes, standards and practices listed herein generally apply to the entire project and specification sections. Other codes, standards or practices that are more specific will be referenced within a particular specification.

B. Requirements: All materials and types of construction covered in the specifications will be required to meet or exceed applicable standards of manufacturer, testing, performance, and installation according to the requirements of UL, ANSI, NEMA, IEEE, and NEC referenced documents where indicated and the manufacturer's recommended practices. Requirements indicated on the contract documents that exceed but are not contrary to governing codes shall be followed.

C. Compliance and Certification: The installation shall comply with the governing state and local codes or ordinances. The completed electrical installation shall be inspected and certified by applicable agencies that it is in compliance with codes.

D. Applicability: The codes and standards and practices listed herein, and their respective dates are furnished as the minimum latest requirements.

1. National Electrical Code (NEC).
2. National Fire Protection Association (NFPA)
3. Underwriters Laboratories (UL).
4. National Electrical Manufacturers Association (NEMA).
5. American National Standards Institute (ANSI).
6. Federal Specifications (Fed. Spec).
7. Insulated Cable Engineers Association (ICEA).
8. International Building Code (IBC).
9. Institute of Electrical and Electronics Engineers (IEEE).
10. American society for Testing and Materials (ASTM).
11. Occupational Safety and Health Act of 1970 (OSHA).
12. American with Disabilities Act (ADA).
13. Florida Administration Requirement Manual (FARMS).
14. FAA Advisory Circular Number 150/5210-7C.
15. FAA Advisory Circular Number 150/5210-15.
16. Florida Building Code
17. Southwest International Airport Standards.

E. Utility Company: Comply with latest utility company regulations.

F. State Statutes: Florida Statutes

1. 4A3, The State Fire Prevention Code
2. 4A47, The Uniform Fire Safety Standards for Elevators.

G. Building Code: Standard Building Code (1997).

H. Standards: American Society of Mechanical Engineers

1. ASME-A17.1 Elevator Code, plus Interpretations to Date.

I. Florida Americans with Disabilities Accessibility Implementation Act (October 1, 1993) as described in Florida Accessibility Code for Building Construction, Department of Community Affairs (October 1997).

J. Manuals: Accessibility Requirements Manual Florida Department of Community Affairs.

K. Labels: Materials and equipment shall be new and free of defects, and shall be U.L. listed, bear the U.L. label or be labeled or listed with an approved, nationally recognized Electrical Testing Agency. Where no labeling or listing service is available or desired for certain types of equipment, test data shall be submitted to validate that equipment meets or exceeds available standards.

L. NFPA: Latest edition of the following National Fire Protection Association (NFPA) Standards:

NFPA-13 Installation Of Sprinkler Systems.
NFPA-37 Installation And Use Of Stationary Combustion Engines And Gas Turbines.
NFPA-54 National Fuel Gas Code.
NFPA-70 National Electrical Code.
NFPA-72 Installation, Maintenance And Use Of Fire Alarm Systems.
NFPA-90A Installation of Air Conditioning And Ventilation Systems.
NFPA-101 Life Safety Code.
NFPA-780 Standard for the Installation of Lightning Protection System.

1.8 INVESTIGATION OF SITE

A. Site Renovation: Verify and coordinate existing site raceways and pipes at any excavation on site. Provide hand-digging and required rerouting in areas of existing Raceways and pipes within bid price.

1.9 SUPERVISION OF THE WORK

A. Supervision: Provide one field superintendent who has had a minimum of four (4) years previous successful experience on projects of comparable sizes, type and complexity. The Superintendent shall be present at all times when work is being performed. At least one member of the Electrical Contracting Firm shall hold a State Master Certificate of Competency.

1.10 COORDINATION

A. General: Compare drawings and specifications with those of other trades and report any discrepancies between them to the Architect. Obtain from the Architect written instructions to make the necessary changes in any of the affected work. Work shall be installed in cooperation with other Trades installing interrelated work. Before installation, Trades shall make proper provisions to avoid interferences in a manner approved by the Architect.

B. Provide all required coordination and supervision where work connects to or is affected by work of others, and comply with all requirements affecting this Division. Work required under other divisions, specifications or drawings to be performed by this Division shall be coordinated with the Contractor and such work performed at no additional cost to Owner including but not limited to electrical work required for:

C.

1. Architectural Lighting
2. Theatrical Lighting
3. Signage
4. Concession Equipment
5. Interior design drawings
6. Millwork design drawings and shop drawings

D. Contractor shall carefully coordinate all electrical work included in theatrical lighting, architectural and systems drawings and provide all labor and material required to perform required work.

E. Obtain set of Contract Documents from Owner's Authorized Representative or Contractor for all areas of work noted above and include all electrical work in bid whether included in Division 16 Contract Documents or not.

F. Secure approved shop drawings from all required disciplines and verify final electrical characteristics before roughing power feeds to any equipment. When electrical data on approved shop drawings differs from that shown or called for in Construction Documents, make adjustments to the wiring, disconnects, and branch circuit protection to match that required for the equipment installed.

G. Damage from interference caused by inadequate coordination shall be corrected at no additional cost to the Owner.

H. Adjustments: Locations of raceway and equipment shall be adjusted to accommodate the work with interferences anticipated and encountered. Determine the exact routing and location of systems prior to fabrication or installation.

I. Priorities: Lines which pitch shall have the right of way over those which do not pitch. For example, plumbing drains shall normally have the right of way. Lines whose elevations cannot be changed shall have the right of way over lines whose elevations can be changed.

J. Modifications: Offsets and changes of direction in raceway systems shall be made to maintain proper headroom and pitch of sloping lines whether or not indicated on the drawings. Provide elbows, boxes, etc., as required to allow offsets and changes to suit job conditions.

K. Replacement: Work shall be installed in a way to permit removal (without damage to other parts) of other system components provided under this Contract requiring periodic replacement or maintenance. Raceway shall be arranged in a manner to clear the openings of swinging overhead access doors as well as ceiling tiles.

L. Layout: The Contract Drawings are diagrammatic only intending to show general runs and locations of raceway and equipment, and not necessarily showing required offsets, details and accessories and equipment to be connected. Work shall be accurately laid out with other Trades to avoid conflicts and to obtain a neat and workmanlike installation, which will afford maximum accessibility for operation, maintenance and headroom.

M. Contract Conflicts: Where discrepancies exist in the Scope of Work as to what Trade provides items such as starters, disconnects, flow switches, etc. such conflicts shall be coordinated between the divisions involved. It is the intent of the Contract Documents that all work shall be provided complete as one bid price.

N. Drawing Conflicts: Where drawing details, plans or specification requirements are in conflict and where sizes of the same item run are shown to be different within the contract documents, the most stringent requirement shall be included in the Contract. Systems and equipment called for in the specification or as shown on the drawings shall be provided as if it was required by both the drawings and specifications. Prior to ordering or installation of any portion of work, which appears to be in conflict, such work shall be brought to Architect's attention for direction as to what is to be provided.

O. It is the responsibility of this Contractor to coordinate the exact required location of floor outlets, floor ducts, floor stub-ups, etc. with Owner’s Authorized Representative and Designer (and receive their approval) prior to rough-in. Locations indicated in Contract Documents are only approximate locations.

P. The Contract Documents describe specific sizes of switches, breakers, fuses, Raceways, conductors, motor starters and other items of wiring equipment. These sizes are based on specific items of power consuming equipment (heaters, lights, motors for fans, compressors, pumps, etc.). Coordinate the requirements of each load with each load’s respective circuitry shown and with each load’s requirements as noted on its nameplate data and manufacturer’s published electrical criteria. Adjust circuit breaker, fuse, Raceway, and conductor sizes to meet the actual requirements of the equipment being provided and installed and change from single point to multiple points of connection (or vice versa) to meet equipment requirements. Changes shall be made at no additional cost to the Owner.

Q. Working Clearances: Minimum working clearances about electrical equipment shall be as referenced in the applicable edition NEC Article 110, and shall include equipment installed in ceiling spaces.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Specified Method: Where several brand names, make or manufacturers are listed as acceptable each shall be regarded as equally acceptable, based on the design selection but each must meet all specification requirements. Where a manufacturer's model number is listed, this model shall set the standard of quality and performance required. Where no brand name is specified, the source and quality shall be subject to Engineer's review and acceptance. Where manufacturers are listed, one of the listed manufacturers shall be submitted for acceptance. No substitutions are permitted.

B. Certification: When a product is specified to be in accordance with a trade association or government standard requested by the Engineer, Contractor shall provide a certificate that the product complies with the referenced standard. Upon request of Engineer, Contractor shall submit supporting test data to substantiate compliance.

C. Basis of Bid: Each bidder represents that his bid is based upon the manufacturer's, materials, and equipment described in the Contract Documents.

D. Space Requirements: Equipment or optional equipment shall conform to established space requirements within the project. Equipment which does not meet space requirements, shall be replaced at no additional expense to the Contract. Modifications of related systems shall be made at no additional expense to the Contract. Submit modifications to the Architect/Engineer for acceptance.

2.2 SHOP DRAWINGS

A. General: Shop drawings shall be submitted for every item listed within the Submittals section each individual specification section. One copy shall be submitted to the engineer prior to ordering equipment. Refer to Basis of approval paragraph.

B. Responsibility: It is the Contractors responsibility to provide material in accordance with the plans and specifications. Material not provided in accordance with the plans and specifications shall be removed and replaced at the Contractors expense.

C. Official Record: The shop drawing submittal shall become the official record of the materials to be installed. If materials are installed which do not correspond to the record submittal they shall be removed from the project without any additional cost or delays in construction completion.

D. Information: The shop drawing record submittal shall include the following information to the extent applicable to the particular item;

1. Manufacturer's name and product designation or catalog number.
2. Standards or specifications of ANSI, ASTM, ICEA, IEEE, ISA, NEMA, NFPA, OSHA, UL, or other organizations, including the type, size, or other designation.
3. Dimensioned plan, sections, and elevations showing means for mounting, Raceway connections, and grounding, and showing layout of components.
4. Materials and finish specifications, including paints.
5. List of components including manufacturer's names and catalog numbers.
6. Internal wiring diagram indicating connections to components and the terminals for external connections.
7. Manufacturer's instructions and recommendations for installation, operation, and maintenance.
8. Manufacturer's recommended list of spare parts.
9. Provide 1/2” = 1’-0” enlarged electrical room layout drawings for all electrical rooms. All equipment shall be indicated at actual size of equipment being provided. All dimensions and required working clearances shall be shown.

E. Preparation: Prior to submittal, shop drawings shall be checked for accuracy and contract requirements. Shop drawings shall bear the date checked and shall be accompanied by a statement that the shop drawings have been examined for conformity to Specifications and Drawings. This statement shall also list discrepancies with the Specifications and Drawings. Shop drawings not so checked and noted shall be returned to Contractor unreviewed.

F. Basis of Review: Approval is only for general conformance with the design concept of the project and general compliance with the information given in the contract documents. Contractor is responsible for quantities, dimensions, fabrication processes, and construction techniques.

G. Responsibility: The responsibility that dimensions are confirmed and correlated with proper coordination of other trades shall be included as part of the Contract Documents. The responsibility and the necessity of providing materials and workmanship required by the Specifications and Drawings which may not be indicated on the shop drawings shall be included as part of the Contract Documents. The Contractor is responsible for any delays in job progress occurring directly or indirectly from late submissions or re-submissions of shop drawings, product data, or samples.

H. Ordering Equipment: No material shall be ordered or shop work started until the Engineer's has officially received the shop drawings record submittal and has formally released the Contractor for submittal requirements.

I. Brochure Requirements: Submit Technical Information Brochures at the start of construction or no later than 30 days after Award of the Contract. Each brochure shall consist of an adequately sized, hardcover, 3-ring binder for 8-1/2" X 11" sheets. Provide correct designation on outside cover and on end of brochure. When one binder is not enough to adequately catalog all data, an additional binder shall be submitted.

J. Brochure Contents: First sheet in the brochure shall be a photocopy of the Electrical Index pages in these specifications. Second sheet shall be a list of Project Addresses for this project. Third sheet shall list Project Information. Provide reinforced separation sheets tabbed with the appropriate specification reference number and typed index for each section in the Electrical Schedule. Technical Information consisting of marked catalog sheets or shop drawings shall be inserted in the brochure in proper order on all items specified and shown on drawings. At the end of the brochure, provide and insert a copy of the specifications for this Division and all addenda applicable to this Division.

K. Contractor's Review: Review the brochures before submitting to the Engineer. No request for payment shall be considered until the brochure has been reviewed, stamped and submitted for review.

L. Cost: Submit cost breakdown on work in the Technical Information Brochures. The cost of material and labor for each item shall be indicated. The cost of fittings and incidentals are not required.

M. Title Drawings: Title drawings to include identification of project and names of Architect-Engineer, Engineer, Contractors, and/or supplier, data, number sequentially and indicate in general;

1. Fabrication and Erection dimensions.
2. Arrangements and sectional views.
3. Necessary details, including complete information for making connections with other work.
4. Kinds of materials and finishes.
5. Descriptive names of equipment.
6. Modifications and options to standard equipment required by the contract.
7. Leave blank area, size approximately 4 by 2-1/2 inches, near title block (for Engineer's stamp imprint).

8. In order to facilitate review of shop drawings, they shall be noted, indicating by cross-reference the contract drawings, notes, and specification paragraph numbers where items occur in the contract documents.
9. See specific sections of specifications for further requirements.

N. Technical Data: Submit technical data verifying that the item submitted complies with the requirements of the specifications. Technical data shall include manufacturer's name and model number, dimensions, weights, electrical characteristics, and clearances required. Indicate optional equipment and changes from the standard item as called for in the specifications. Provide drawings, or diagrams, dimensioned and in correct scale, covering equipment, showing arrangement of components and overall coordination.

O. Same Manufacturer: In general, relays, contactors, starters, motor control centers, switchboards, panelboards, dry type transformers, disconnect switches, circuit breakers, manual motor starter switches, etc., shall be supplied and manufactured by the same manufacturer. This requirement shall apply to same type of electrical components specified in other Divisions.

2.3 EQUIPMENT, MATERIALS, AND SUPPORTS

A. General: Each item of equipment or material shall be manufactured by a company regularly engaged in the manufacturer of the type and size of equipment, shall be suitable for the environment in which it is to be installed, shall be approved for its purpose, environment, and application, and shall bear the UL label.

B. Installation Requirements: Each item of equipment or material shall be installed in accordance with instructions and recommendations of the manufacturer, however, the methods shall not be less stringent than specified herein.

C. Required Accessories: Provide all devices and materials, such as expansion bolts, foundation bolts, screws, channels, angles, and other attaching means, required to fasten enclosures, raceways, and other electrical equipment and materials to be mounted on structures which are existing or new.

D. Protection: Electrical equipment shall at all times during construction be adequately protected against mechanical injury or damage by the elements. Equipment shall be stored in dry permanent shelters. If apparatus has been damaged, such damage shall be repaired at no additional cost or time extension to the Contract. If apparatus has been subject to possible injury, it shall be thoroughly cleaned, dried out and put through tests as directed by the Manufacturer and Engineer, or shall be replaced, if directed by the Engineer, at no additional cost to the Contract.

2.4 IDENTIFICATION OF EQUIPMENT

A. General: Electrical items shall be identified as specified in the Contract Documents. Such identification shall be in addition to the manufacturer's nameplates and shall serve to identify the item's function and the equipment or system, which it serves or controls. Refer to Identification Section of the specifications for additional information.

2.5 CONCRETE PADS

A. General: Provide reinforced concrete pads for floor mounted electrical equipment. Unless otherwise noted, pads shall be nominal four (4) inches high and shall exceed dimensions of equipment being set on them, including future sections, by six (6) inches on all sides, except when equipment is flush against a wall, then the side or sides against the wall shall be flush with the equipment. Chamfer top edges 1/2". Trowel surfaces smooth. Reinforce pads with #5 reinforcing bars at 24" centers each way, unless specifically detailed on drawings.

2.6 SURFACE MOUNTED EQUIPMENT

A. General: Surface mounted fixtures, outlets, cabinets, panels, etc. shall have a factory-applied finish or shall be painted as accepted by Engineer. Raceways and fittings, where allowed to be installed surface mounted, shall be painted to match the finish on which it was installed. Paint shall be in accordance with other applicable sections of these specifications.

2.7 CUTTING AND PATCHING

A. Core Drilling: The Contractor shall be responsible for core drilling as required for work under this section, but in no case shall the Contractor cut into or weld onto any structural element of the project without the written approval of the Architect.

B. Cutting and Patching: Cutting, rough patching and finish patching shall be provided as specified in the contract documents. Cutting and patching shall be performed in a neat and workmanlike manner. Upon completion, the patched area shall match adjacent surfaces.

C. Openings and Sleeves: Locate openings required for work performed under this section. Provide sleeves, guards or other accepted methods to allow passage of items installed under this section.

D. Roof Penetration: Provide roofer with pitch pans, fittings, etc., required for electrical items which penetrate the roof. Roof penetrations are to be waterproofed in such a manner that roofing guarantees are fully in force. Roof penetrations shall be coordinated with other Trades to ensure that roof warranty is not invalidated.

2.8 SLEEVES AND FORMS FOR OPENINGS

A. Sleeves: Provide sleeves for Raceways penetrating floors, walls, partitions, etc. Locate necessary slots for electrical work and form before concrete is poured. Watertight sleeves shall be line seal type WS. Fire rated partition sleeves shall be mild steel. Size shall be one standard diameter larger than pipe being installed or of a larger diameter to below 1/4" minimum clearance.

B. Forms: Provide boxed out forms for Raceway penetrations only where allowed by the Architect. Fill opening after Raceway installation, with equivalent material.

2.9 OPERATING AND MAINTENANCE INSTRUCTIONS

A. General: Thoroughly instruct the Owner’s Representative, to the complete satisfaction of the Architect and Engineer, in the proper operation of all systems and equipment provided. The Contractor shall make all arrangements, via the Architect, as to whom the instructions are to be given in the operation of the systems and the period of time in which they are to be given. The Architect shall be completely satisfied that the Owner’s Representative has been thoroughly and completely instructed in the proper operation of all systems and equipment before final payment is made. If the Architect determines that complete and thorough instructions have not been given by the Contractor to the Owner's Representative, then the Contractor shall be directed by the Architect to provide whatever instructions are necessary until the intent of this paragraph of the Specification has been complied with.

B. Submittals: Submit to the Architect for approval five (5) typed sets, bound neatly in loose-leaf binders, of instructions for the installation, operation, care and maintenance of equipment and systems, including instructions for the ordering and stocking of spare parts for equipment installed under this contract. The lists shall include part number and suggested suppliers. Each set shall also include an itemized list of component parts that should be kept on hand and where such parts can be purchased.

C. Information Requirements: Information shall indicate possible problems with equipment and suggested corrective action. The manuals shall be indexed for each type of equipment. Each section shall be clearly divided from the other sections. A sub index for each section shall also be provided.

D. Instructions: The instructions shall contain information deemed necessary by the Architect, Engineer and Owner and include but not limited to the following:

1. Introduction:
   a. Explanation of Manual and its use.
   b. Summary description of the Electrical Systems.
   c. Purpose of systems.

2. System:
   a. Detailed description of all systems.
   b. Illustrations, schematics, block diagrams, catalog cuts and other exhibits.

3. Operations:
   a. Complete detailed, step by step, sequential description of all phases of operation for all portions of the systems, including start up, shutdown and balancing. Include posted instruction charts.
4. Maintenance:
   a. Parts list and part numbers.
   b. Maintenance and replacement charts and the Manufacturer's recommendations for preventive maintenance.
   c. Trouble shooting charts for systems and components.
   d. Instructions for testing each type of part.
   e. Recommended list of on-hand spare parts.
   f. Complete calibration instructions for all parts and entire systems.
   g. General and miscellaneous maintenance notes.

5. Manufacturer's Literature:
   a. Complete listing for all parts.
   b. Names, addresses and telephone numbers.
   c. Care and operation.
   d. All pertinent brochures, illustrations, drawings, cuts, bulletins, technical data, certified performance charts and other literature with the model actually furnished to be clearly and conspicuously identified.
   e. Internal wiring diagrams and Engineering data sheets for all items and/or equipment furnished under each Contract.
   f. Guarantee and warranty data.

PART 3 - EXECUTION

3.1 WORKMANSHIP

A. General: The installation of materials and equipment shall be performed in a neat, workmanlike and timely manner by an adequate number of craftsmen knowledgeable of the requirements of the Contract Documents. They shall be skilled in the methods and craftsmanship needed to produce a quality level of workmanship. Personnel who install materials and equipment shall be qualified by training and experience to perform their assigned tasks.

B. Acceptable Workmanship: Acceptable workmanship is characterized by first-quality appearance and function, conforming to applicable standards of building system construction, and exhibiting a high degree of quality and proficiency which is judged by the Architect as equivalent or better than that ordinarily produced by qualified industry tradesmen.

C. Performance: Personnel shall not be used in the performance of the installation of material and equipment who, in the opinion of the Architect, are deemed to be careless or unqualified to perform the assigned tasks. Material and equipment installations not in compliance with the Contract Documents, or installed with substandard workmanship and not acceptable to the Architect, shall be removed and reinstalled by qualified craftsmen, at no change in the contract price.

3.2 PROTECTION AND CLEAN UP

A. Protection and Restoration: Suitably protect equipment provided under this Division during construction. Restore damaged surfaces and items to "like new" condition before a request for substantial completion inspection.

B. Handling: Materials shall be properly protected and Raceway openings shall be temporarily closed by the Contractor to prevent obstruction and damage. Post notice prohibiting the use of systems provided under this Contract, prior to completion of work and acceptance of systems by the Owner's representative. The Contractor shall take precautions to protect his materials from damage and theft.

C. Safeguards: The Contractor shall furnish, place and maintain proper safety guards for the prevention of accidents that might be caused by the workmanship, materials, equipment or systems provided under this contract.

D. Cleanup: Keep the job site free from debris and rubbish. Remove debris and rubbish from the site and leave premises in clean condition on a daily basis.

3.3 SYSTEMS GUARANTEE

A. General: Provide a one-year guarantee. This guarantee shall be by the Contractor to the Owner for any defective workmanship or material, which has been provided under this Contract at no cost to the Owner for a period of one year from the date of substantial completion of the System. The guarantee shall include lamps, for ninety days after date of Substantial Completion of the System. Explain the provisions of guarantee to the Owner at the "Demonstration of Completed System".

3.4 FINAL OBSERVATION

A. General: Work shall be completed, and forms and other information shall be submitted for acceptance one week prior to the request for final observation of the installation.

3.5 SPECIAL CONSIDERATIONS

A. Comply with special requirements imposed at site by Owner. This may include badging of employees, prohibition of smoking, special working hours, or special working conditions.

END OF SECTION 26 0500

CERTIFICATE OF COMPLETED DEMONSTRATION MEMO

Note to Contractor: Do not submit this form at the time Technical Information Brochure is submitted. Submit five copies of information listed below for checking at least one week before scheduled completion of the building. After information has been accepted and inserted in each brochure, give the Owner a Demonstration of the Completed Electrical Systems and have the Owner sign five copies of this form. Provide one signed copy for each brochure. After this has been done, a written request for a final inspection of the System shall be made.

Re: _____
(Name of Project)
_____
_
(Division Number and Name)

This memo is for the information of all concerned that the Owner has been given a Demonstration of the Completed Electrical Systems on the work covered under this Division. This conference consisted of the system operation, a tour on which all major items of equipment were pointed out, and the following items were given to the Owner;

(a) Owner's copy of Technical Information Brochure containing approved submittal sheets on all items, including the following; (To be inserted in the Technical Information Brochure after the correct tab).
(1) Maintenance Information published by manufacturer on equipment items.
(2) Printed Warranties by manufacturers on equipment items.
(3) Performance verification information as recorded by the Contractor.
(4) Check-out Memo on equipment by manufacturer's representative.
(5) Written operating instructions on any specialized items.
(6) Explanation of the one-year guarantee on the system.

(b) "As-Built" conditions as described in the record drawing specifications.
(c) A demonstration of the System in Operation and of the maintenance procedures which shall be required.

_____
(Name of General Contractor)

By: _____
(Authorized Signature, Title & Date)

_____
(Name of SubContractor)

By: _____
(Authorized Signature, Title & Date)

Brochure, Instruction, Prints, Demonstration & Instruction in Operation Received:
_____
(Name of Owner)

By: _____
(Authorized Signature, Title, Date)

cc: Owner, Architect, Engineer, Contractor, Sub Contractor and General Contractor
(List names as stated in cc: above)

SECTION 26 05 19
WIRES AND CABLES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. General: Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification sections, apply to work specified of this section.

1.2 WIRES AND CABLES

A. Description: Provide a complete and continuous system of conductors as specified herein. All conductors shall be in accordance with the latest edition of the NEC.

1.3 QUALITY ASSURANCE

A. Qualifications: Manufacturers shall be regularly engaged in the manufacture of wire systems and fittings of types and sizes required, and whose products have been in satisfactory use in similar service for not less than 5 years in the USA.

B. Compliance: Materials shall comply with the following standards as they apply to the different wire types specified herein.

1. UL:

a. 44 - Rubber insulated wire and cables.
b. 83 - Thermoplastic insulated wires.
c. 486-A-80 - Wire connectors and soldering lugs for use with copper.
d. 486B - Splicing wire connectors
e. 493 - Thermoplastic insulated underground feeder and branch circuit cables.

2. NFPA:

a. 70 NEC

1.4 SUBMITTALS

A. General: Submit product data on all different types of conductors specified.

1.5 FLEXIBLE WIRING SYSTEMS

A. General: Provide a flexible wiring system used to supply power to lighting fixtures, poke-thru power outlets and wall receptacles as shown on the contract documents.

B. Description: The prefabricated system shall be complete with all 120 and 4 wire power getaway boxes, fixture adapters, jumper cable sets, wall switch boxes, wall power boxes, poke-thru power outlets etc.

C. Compliance: The system and its components shall comply with the requirements of Underwriters Laboratories, Inc. and shall be U.L. listed or labeled for intended use on this project and UL listed and labeled for use in return air plenum and rated to make and break under rated load. All work and materials shall comply with the National Electrical Code and applicable state and local building codes.

D. Final Condition: The system shall be of construction such that when installation is complete all system components shall be metal enclosed, in a locked mode and shall comprise a fully grounded system.

PART 2 - PRODUCTS

2.1 GENERAL

A. Conductors: Branch circuit and feeder conductors for electric power shall be copper type. Utilize THHN/THWN insulation for branch circuits and THWN/XHHW insulation for feeders, unless specifically noted otherwise. Conductors #10 AWG and smaller shall be solid, #8 AWG and larger shall be stranded. No aluminum wiring shall be permitted. All wire shall be sized as shown on the drawings. If no size is shown, wire shall be #12 AWG, except for branch circuits over 100 ft. in length shall be #10 AWG and branch circuits over 165 ft. shall be #8 AWG for 120/208V circuits. Wire in vicinity of heat-producing equipment shall be type XHHW insulation. All wiring shall be manufactured in the USA and of 98 percent resistivity. #14 AWG minimum size conductors shall be used for fire alarm system.

B. Taps and Splices: All copper taps and splices in #8 AWG or smaller wire shall be fastened together by means of "wirenut" connectors (Ideal or accepted substitution). All taps and splices in wire larger than #8 AWG shall be made with compression type connectors and taped to provide insulation equal to wire. All taps and splices in manholes or in ground pull box shall be made with compression type connectors and covered with Raychem heavywall cable sleeves (type CTE or WCS) with type "S" sealant coating. Provide sleeve kits as per manufacturer's installation instructions.

C. Color Coding, General: All power feeders, grounding conductors and branch circuits #6 AWG and smaller shall be installed with color-coded wire with the same color used for a system throughout the building. Conductors above #6 AWG shall either be fully color-coded or shall have black insulation and be similarly color-coded with tape in all junction boxes and panels in accordance with NEC 310-12. Tape shall cover the conductor insulation within the box or panel in such a manner so as to allow standard markings to be readily observed.

D. Colors: Unless otherwise accepted, color-code shall be as indicated in the Identification section of the specifications. All switchlegs, other voltage system wiring, control and interlock wiring shall be color-coded other than those listed in the Identification Section of these specifications.

E. Submittals: Submit cut sheets on all major types of wires and cables including splicing tape, and terminating/splicing lugs or connectors and cable sleeves.

F. MC Cable may be utilized for lighting and receptacle branch circuit wiring only, where not restricted by NEC. MC cable shall not be used for branch circuit homeruns.

G. Construction: MC Cable shall have galvanized steel armor. Conductors shall be THHN or XHHW type. A green insulated grounding conductor shall be included in all MC Cables. Where circuiting on drawings calls for dedicated neutrals and/or isolated ground conductors, MC Cables, if used for these circuits, shall have dedicated neutrals and/or isolated ground conductors.
H. MC Cable shall be color-coded for cable type (standard, oversized neutral, isolated ground), conductor configuration, and circuit voltage

2.2 MANUFACTURERS

A. General: Branch circuit and feeder conductors shall be manufactured by one of the following: General Cable Co., Anaconda, Pirelli, Rome Cable Corporation, or American Insulated Wire Corporation.

B. MC Cable shall be manufactured by AFC Cable Systems.

PART 3 - EXECUTION

3.1 EXECUTION

A. General: All wiring shall be installed in conduit (power, low voltage and control wiring), unless otherwise indicated or specified under other Sections of this specification. All wiring shall be installed per the latest edition of the NEC.

B. Connections: Conductors #10 and #12 AWG shall be connected with pre-insulated spring connectors incased in a steel shell and rated at not less than 105 degrees C. A minimum of 3/8 inch skirt shall cover the bare wires. The connector shall meet with UL approval for fixture and pressure work, and shall be "Scotch Lok" Type Y, R and B electrical spring connectors as manufactured by the 3M Company or approved equal.

C. Connector Manufacturers: Lugs and wire connectors shall be one of the following: Burndy Corporation, Thomas & Betts, Co., Appleton or ILSCO.

D. Equipment Installations: Neatly form, train and tie the cables in panelboards, cabinets, wireways, switches and equipment assemblies.

END OF SECTION 26 0519

SECTION 26 05 26
GROUNDING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. General: Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification sections, apply to work specified in this section.

1.2 GROUNDING ELECTRODES

A. General: Provide a grounding electrode system, as described in NEC 250, as specified herein and as indicated on plans.

B. Ground Field / Ground Rods: The ground field shall consist of three 20 ft long vertically driven ground rods arranged in a triangular pattern spaced 20 feet apart. Additional ground rods shall be added as necessary to achieve the desired resistance.

C. Main Metallic Water Pipe: The building's main metallic underground water piping shall be utilized as a grounding electrode, provided the metal pipe is installed in direct contact with the earth for a minimum of 10 feet. Bond the main metallic water service within 5 ft. of the entrance of the water pipe into the building.

D. Building Steel: The building steel shall be utilized as a grounding electrode, provided the steel is in direct contact with the earth or is otherwise effectively grounded.

E. Resistance: Grounding electrode resistance shall not exceed 10 ohms. Overall resistance of the entire grounding electrode system shall not exceed 5 ohms. Provide additional grounding electrodes as required to meet this value. Refer to Section 26 0080 for testing requirements.

1.3 GROUNDING ELECTRODE CONDUCTOR

A. Grounding Electrode Conductor: A main grounding electrode conductor, bare copper, sized per NEC, shall be run in PVC conduit from main service equipment to the grounding electrodes. This conductor shall also be bonded to the following:

1. Telecommunications service ground within 20' of the electrical service
2. Gas and other interior metal piping – refer to NEC.

1.4 SEPARATELY DERIVED GROUNDING SYSTEMS

A. Description: Provide a separately derived grounding system where indicated herein and as required by the National Electrical Code. Bond neutral and ground busses together.

B. Services: Provide a separately derived grounding system for all building electrical services and step-down transformers.

C. Multiple Buildings: Multiple buildings fed from the same electrical service shall be provided with separate grounding electrode systems, as required by the NEC and specified herein.

1.5 BONDING AND EQUIPMENT GROUNDING

A. Description of System: In general, all electrical equipment (metallic conduit, motor frames, panelboards, etc.) shall be bonded together with a green insulated copper system grounding conductor in accordance with specific rules of Article 250 of the NEC Equipment grounding conductors through the raceway system shall be continuous from main switch ground bus to panel

ground bar of each panelboard, and from panel grounding bar of each panelboard to branch circuit equipment and devices.

B. Equipment Grounding Conductors: All raceways shall have an insulated copper system ground conductor run throughout the entire length of circuit installed within conduit in strict accordance with NEC. Grounding conductor shall be included in total conduit fill when determining conduit sizes, even though not included or shown on drawings.

C. Redundant Grounding: In general all branch circuits shall be provided with a redundant grounding system through the use of grounding conductors and metallic conduit.

D. Bonding: In addition to connections to grounding electrodes, the main service ground shall be bonded to the lightning protection system and other underground metal piping.

E. Bushings: Provide insulated grounding bushings on all metallic feeder conduits terminated within panelboards, switchboards or enclosed overcurrent devices. Provide insulated grounding bushings on all branch circuit conduits where concentric knockouts are used.

F. Connection to Other Systems: Provide all required grounding and bonding connections as specified herein and as required by the National Electrical Code.

1.6 SUBMITTALS

A. General: Submit product data on ground rods, ground wire, ground connectors, ground bars, and data on exothermic welds.

1.7 QUALITY ASSURANCE

A. Compliance: The entire ground system shall meet or exceed the minimum requirements NEC 250 and IEEE Std. 142 (green book).

PART 2 - PRODUCTS

2.1 GROUNDING ELECTRODE AND BONDING CONDUCTORS

A. General: Except as specified in C below, provide UL and NEC approved types of copper with THWN, THHN, or XHHW with green insulation or green tape on black insulation the entire length of conductor not in conduit.

B. Size: Grounding electrode conductors shall be sized as specified herein and on the drawings, but in no case shall be smaller than required by NEC 250.

C. Insulation: Conductors above ground shall be insulated, conductors run below grade shall be bare.

2.2 GROUNDING ELECTRODES

A. Ground Rods: Provide copper clad steel, 5/8 inch diameter by 20 feet long vertically driven ground rods. Use of multiple 10 feet sectional ground rods is acceptable.

2.3 CONNECTIONS

A. Bonding: One piece mechanical lugs or wire terminals, properly sized and approved by the local authority having jurisdiction shall be used to bond ground wires together or to junction boxes and panel cabinets.

B. Underground: All connections and bonds made underground and to building steel shall be exothermic weld type-connections.

2.4 GROUND BAR

A. Location: Provide a ground bar connected to the main service ground via a #4/0 grounding conductor in all electrical rooms with step-down transformers and in all communications rooms, or rooms with telephone distribution equipment or network electronics equipment.

B. Description: Ground bar shall be 12" x 2" x ¼" (minimum) copper bus mounted to wall 24" AFF via insulated standoffs. All connections to ground bar shall be made via approved mechanical connections.

C. Interconnection: In addition to the main service ground, all ground bars shall be interconnected to each other via #4/0 insulated grounding conductor. Each ground bar shall also be bonded to local metallic water piping and building steel via #6 insulated grounding conductor.

PART 3 - INSTALLATION

3.1 INTERIOR

A. Installation: Equipment grounding conductors shall be installed as follows:

1. Where installed in metal conduit, both conductor and conduit shall be bonded at each end.
2. Have connections accessible for inspection and made with approved solderless connectors brazed (or bolted) to the equipment or structure to be grounded.
3. Shall in NO case be a current carrying conductor.
4. Have green insulation, except that grounding electrode conductors may be bare.

B. Water Meter: Provide properly sized bonding shunt around water meter and/or dielectric unions in the water pipe.

C. Bushings: Bond all grounding bushings to the equipment ground bus of the panel or switchboard, or overcurrent device in which it is located. Bond shall be made via an insulated bonding conductor of same size as equipment ground conductor run in the circuit.

3.2 TESTING

A. Testing: Provide testing as required in other sections of this specification, including but not limited to sections 26 0500 and 26 0080.

B. Reports: Submit impedance test reports for all separately derived services to the Engineer prior to project completion.

3.3 CONNECTIONS

A. Preparation: All contact surfaces shall be thoroughly cleaned before connections are made, to ensure good metal to metal contact.

END OF SECTION 26 0526

SECTION 26 05 29
HANGERS AND SUPPORTS FOR ELECTRICAL SYSTEMS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes the following:

1. Hangers and supports for electrical equipment and systems.
2. Construction requirements for concrete bases.

B. Related Sections include the following:

1. Section 260548 "Vibration and Seismic Controls for Electrical Systems" for products and installation requirements necessary for compliance with seismic criteria.

1.3 DEFINITIONS

A. EMT: Electrical metallic tubing.

B. IMC: Intermediate metal conduit.

C. RMC: Rigid metal conduit.

1.4 PERFORMANCE REQUIREMENTS

A. Delegated Design: Design supports for multiple raceways, including comprehensive engineering analysis by a qualified professional engineer, using performance requirements and design criteria indicated.

B. Design supports for multiple raceways capable of supporting combined weight of supported systems and its contents.

C. Design equipment supports capable of supporting combined operating weight of supported equipment and connected systems and components.

D. Rated Strength: Adequate in tension, shear, and pullout force to resist maximum loads calculated or imposed for this Project, with a minimum structural safety factor of [**five**] <**Insert number**> times the applied force.

1.5 ACTION SUBMITTALS

A. Product Data: For the following:

1. Steel slotted support systems.
2. Nonmetallic slotted support systems.

B. Shop Drawings:[**Signed and sealed by a qualified professional engineer.**] Show fabrication and installation details and include calculations for the following:

1. Trapeze hangers. Include Product Data for components.
2. Steel slotted channel systems. Include Product Data for components.
3. Nonmetallic slotted channel systems. Include Product Data for components.
4. Equipment supports.

1.6 INFORMATIONAL SUBMITTALS

A. Welding certificates.

1.7 QUALITY ASSURANCE

A. Welding: Qualify procedures and personnel according to AWS D1.1/D1.1M, "Structural Welding Code - Steel."

B. Comply with NFPA 70.

1.8 COORDINATION

A. Coordinate size and location of concrete bases. Cast anchor-bolt inserts into bases. Concrete, reinforcement, and formwork requirements are specified together with concrete Specifications.

B. Coordinate installation of roof curbs, equipment supports, and roof penetrations. These items are specified in Section 077200 "Roof Accessories."

PART 2 - PRODUCTS

2.1 SUPPORT, ANCHORAGE, AND ATTACHMENT COMPONENTS

A. Steel Slotted Support Systems: Comply with MFMA-4, factory-fabricated components for field assembly.

1. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
2. Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

a. Allied Tube & Conduit.
b. Cooper B-Line, Inc.; a division of Cooper Industries.
c. ERICO International Corporation.
d. Thomas & Betts Corporation.

3. Metallic Coatings: Hot-dip galvanized after fabrication and applied according to MFMA-4.

4. Nonmetallic Coatings: Manufacturer's standard PVC, polyurethane, or polyester coating applied according to MFMA-4.
5. Painted Coatings: Manufacturer's standard painted coating applied according to MFMA-4.
6. Channel Dimensions: Selected for applicable load criteria.

B. Raceway and Cable Supports: As described in NECA 1 and NECA 101.

C. Conduit and Cable Support Devices: Steel and malleable-iron hangers, clamps, and associated fittings, designed for types and sizes of raceway or cable to be supported.

D. Support for Conductors in Vertical Conduit: Factory-fabricated assembly consisting of threaded body and insulating wedging plug or plugs for non-armored electrical conductors or cables in riser conduits. Plugs shall have number, size, and shape of conductor gripping pieces as required to suit individual conductors or cables supported. Body shall be malleable iron.

E. Structural Steel for Fabricated Supports and Restraints: ASTM A 36/A 36M, steel plates, shapes, and bars; black and galvanized.

F. Mounting, Anchoring, and Attachment Components: Items for fastening electrical items or their supports to building surfaces include the following:

1. Powder-Actuated Fasteners: Threaded-steel stud, for use in hardened portland cement concrete, steel, or wood, with tension, shear, and pullout capacities appropriate for supported loads and building materials where used.

    a. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

        1) Hilti Inc.
        2) ITW Ramset/Red Head; a division of Illinois Tool Works, Inc.
        3) MKT Fastening, LLC.
        4) Simpson Strong-Tie Co., Inc.; Masterset Fastening Systems Unit.

2. Mechanical-Expansion Anchors: Insert-wedge-type, stainless steel, for use in hardened portland cement concrete with tension, shear, and pullout capacities appropriate for supported loads and building materials in which used.

    a. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

        1) Cooper B-Line, Inc.; a division of Cooper Industries.
        2) Empire Tool and Manufacturing Co., Inc.
        3) Hilti Inc.
        4) ITW Ramset/Red Head; a division of Illinois Tool Works, Inc.

3. Concrete Inserts: Steel or malleable-iron, slotted support system units similar to MSS Type 18; complying with MFMA-4 or MSS SP-58.
4. Clamps for Attachment to Steel Structural Elements: MSS SP-58, type suitable for attached structural element.
5. Through Bolts: Structural type, hex head, and high strength. Comply with ASTM A 325.
6. Toggle Bolts: All-steel springhead type.
7. Hanger Rods: Threaded steel.

2.2 FABRICATED METAL EQUIPMENT SUPPORT ASSEMBLIES

A. Description: Welded or bolted, structural-steel shapes, shop or field fabricated to fit dimensions of supported equipment.

B. Materials: Comply with requirements in Section 055000 "Metal Fabrications" for steel shapes and plates.

PART 3 - EXECUTION

3.1 APPLICATION

A. Comply with NECA 1 and NECA 101 for application of hangers and supports for electrical equipment and systems except if requirements in this Section are stricter.

B. Maximum Support Spacing and Minimum Hanger Rod Size for Raceway: Space supports for EMT, IMC, and RMC as required by NFPA 70. Minimum rod size shall be 1/4 inch in diameter.

C. Multiple Raceways or Cables: Install trapeze-type supports fabricated with steel slotted [**or other**]support system, sized so capacity can be increased by at least [**25**] <**Insert number**> percent in future without exceeding specified design load limits.

1. Secure raceways and cables to these supports with two-bolt conduit clamps or single-bolt conduit clamps or single-bolt conduit clamps using spring friction action for retention in support channel.

D. Spring-steel clamps designed for supporting single conduits without bolts may be used for 1-1/2-inch and smaller raceways serving branch circuits and communication systems above suspended ceilings and for fastening raceways to trapeze supports.

3.2 SUPPORT INSTALLATION

A. Comply with NECA 1 and NECA 101 for installation requirements except as specified in this Article.

B. Strength of Support Assemblies: Where not indicated, select sizes of components so strength will be adequate to carry present and future static loads within specified loading limits. Minimum static design load used for strength determination shall be weight of supported components plus 200 lb.

C. Mounting and Anchorage of Surface-Mounted Equipment and Components: Anchor and fasten electrical items and their supports to building structural elements by the following methods unless otherwise indicated by code:

1. To Wood: Fasten with lag screws or through bolts.
2. To New Concrete: Bolt to concrete inserts.
3. To Masonry: Approved toggle-type bolts on hollow masonry units and expansion anchor fasteners on solid masonry units.
4. To Existing Concrete: Expansion anchor fasteners.
5. Instead of expansion anchors, powder-actuated driven threaded studs provided with lock washers and nuts may be used in existing standard-weight concrete 4 inches thick or

greater. Do not use for anchorage to lightweight-aggregate concrete or for slabs less than 4 inches thick.
6. To Steel: Spring-tension clamps.
7. To Light Steel: Sheet metal screws.
8. Items Mounted on Hollow Walls and Nonstructural Building Surfaces: Mount cabinets, panelboards, disconnect switches, control enclosures, pull and junction boxes, transformers, and other devices on slotted-channel racks attached to substrate.

D. Drill holes for expansion anchors in concrete at locations and to depths that avoid reinforcing bars.

3.3 INSTALLATION OF FABRICATED METAL SUPPORTS

A. Comply with installation requirements in Section 055000 "Metal Fabrications" for site-fabricated metal supports.

B. Cut, fit, and place miscellaneous metal supports accurately in location, alignment, and elevation to support and anchor electrical materials and equipment.

C. Field Welding: Comply with AWS D1.1/D1.1M.

3.4 CONCRETE BASES

A. Construct concrete bases of dimensions indicated but not less than 4 inches larger in both directions than supported unit, and so anchors will be a minimum of 10 bolt diameters from edge of the base.

B. Use 3000-psi, 28-day compressive-strength concrete.

C. Anchor equipment to concrete base.

1. Place and secure anchorage devices. Use supported equipment manufacturer's setting drawings, templates, diagrams, instructions, and directions furnished with items to be embedded.
2. Install anchor bolts to elevations required for proper attachment to supported equipment.
3. Install anchor bolts according to anchor-bolt manufacturer's written instructions.

3.5 PAINTING

A. Touchup: Clean field welds and abraded areas of shop paint. Paint exposed areas immediately after erecting hangers and supports. Use same materials as used for shop painting. Comply with SSPC-PA 1 requirements for touching up field-painted surfaces.

B. C.Galvanized Surfaces: Clean welds, bolted connections, and abraded areas and apply galvanizing-repair paint to comply with ASTM A 780. Retain first paragraph below if a painting Section is in Project Manual.

END OF SECTION 260529

SECTION 26 0532 – PULL AND JUNCTION BOXES

PART 1 -GENERAL

1.1 WORK INCLUDED

A. Comply with the provisions of Section 26 0500.

B. Provide pull and junction boxes of appropriate size and depth as indicated on the drawings and as specified hereinafter.

1.2 RELATED WORK

A. Section 26 0539: Raceways and Conduit Systems.

B. Section 26 0529: Supporting Devices and Hangers.

1.3 SUBMITTALS

A. Submittal of products furnished under this Section is not required.

PART 2 -PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS

A. For interior work, provide galvanized sheet metal boxes of code thickness with lapped and welded joints, 3/4" flanges and screw covers.

B. For exterior work, provide galvanized sheet metal boxes of code thickness with lapped and welded joints, 3/4" flanges, bolted covers with full gaskets forming a completely raintight assembly, equal to Keystone 19000, and 37900 series.

C. For exterior work in graded areas outside the building, provide heavy duty sidewalk junction boxes externally flanged for flush mounting. Covers shall be fully gasketed, watertight and secured with plated screws or bolts equal to Quazite type PC.

PART 3 -EXECUTION

3.1 INSTALLATION REQUIREMENTS

A. Provide junction boxes as shown on drawings and otherwise where required, sized according to number of conductors in box or type of service to be provided. Minimum junction box size 4" square and 2-1/8" deep. Pull box sized for telecommunications riser raceway shall meet ANSI/TIA/EIA-569-A (Section 5.2.3) sizing requirement.

B. Provide screw covers for junction boxes.

C. Install boxes in conduit runs wherever necessary to avoid excessive runs or bends. Do not exceed 100' runs without pull boxes.

D. Rigidly secure boxes to walls or ceilings. Conduit runs will not be considered as adequate support.

E. Install boxes with covers in accessible locations. Size boxes in accordance with Articles 370 and 373 of the National Electric Code.

F. Do not install pull or junction boxes for joint use of line voltage and signal or low voltage controls unless all conductors are insulated for the highest voltage being used in the same box.

G. Pull and junction boxes for emergency circuits shall be spot painted so they will be readily identified as a component of an emergency circuit as called for in Section 26 0500.

H. Identify branch circuit j-boxes and pull boxes with designation of panelboard and the circuit number of each circuit contained therein, with Kroy type (or other) label.

I. Identify feeder j-boxes and pull boxes with designation of panelboard/switchboard source as "FROM" and load served as "TO" with permanent labels as described in 26 0500.

END OF SECTION

SECTION 26 05 33
OUTLET BOXES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. General: Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification sections, apply to work specified of this section.

1.2 DESCRIPTION

A. General: Outlet boxes shall be of such form and dimensions as to be adapted to the specific use and location, type of device or fixtures to be used, and number and size of conductors and arrangement, size and number of conduits connecting thereto.

B. Ceiling Size: Ceiling outlet boxes shall be 4 inch octagonal or 4 inch square by 1-1/2 inches deep or larger as required for number and size of conductors and arrangement, size and number of conduits terminating at them.

C. Wall Size: Switch, wall receptacle, telephone and other wall outlet boxes in drywall shall be 4 inch square by 1-1/2 inches deep. For exposed masonry, provide one piece 4 inch square by 1-1/2 inches deep wall boxes with appropriate 4 inches square cut tile wall covers Steel City series #52-C-49/52-C-52 or accepted substitution. For furred-out block walls, provide 4 inch square box with required extension for block depth and required extension for drywall depth.

1.3 QUALITY ASSURANCE

A. Qualifications: Manufacturers shall be regularly engaged in the manufacture of conduit systems and fittings of types and sizes required, and whose products have been in satisfactory use in similar service for not less than 5 years in the USA.

B. Compliance: Materials shall comply with the following standards as they apply to the different raceway types specified herein.

1. UL-50 & UL-514
2. NEC 70

1.4 FLOOR OUTLETS

A. General: Provide floor outlet boxes as shown on the plans. Installation shall be in accordance with the National Electrical Code, and shall be complete with service fittings as indicated. Equipment shall be listed by Underwriters' Laboratories, Inc.

1.5 SPECIAL PURPOSE OUTLETS

A. Location: Locate special purpose outlets as indicated on the drawings for the equipment served. Location and type of outlets shall be coordinated with appropriate trades involved. The securing of complete information for proper electrical roughing-in shall be included as work required under this section of specifications.

1.6 SUBMITTALS

A. Submittals: Submit product data on all different types of outlet boxes and associated trim/plaster rings.

PART 2 - PRODUCTS

2.1 GENERAL PURPOSE BOXES

A. General: Provide standard galvanized one-piece steel outlet boxes at all concealed outlets for electric lights, switches, convenience receptacles, telephone outlets, etc. Acceptable manufacturers shall be T&B, Steel City, Raco. Surface outlet boxes and conduit bodies shall be the heavy cast aluminum or iron with external raised hubs - Appleton, Crouse Hinds or Steel City or accepted substitution. Trim rings shall also be of one piece construction.

2.2 FLOOR OUTLET BOXES

A. Construction: All assemblies shall be designed and installed to maintain grounding continuity, fireproofing and watertight integrity. Connections to boxes in slabs on grade shall be made tight or sealed to prevent entrance of moisture.

B. Accessories: Box trim, service fittings and accessories shall be as required to provide a complete installation.

C. Manufacturer: Approved manufacturer is Walker, Raco, Steel City or Hubbell.

PART 3 - EXECUTION

3.1 INSTALLATION OF OUTLET BOXES

A. Installation: All flush outlets shall be mounted so that covers and plates shall finish flush with finished surfaces without the use of shims, mats or other devices not submitted or accepted for the purpose. Add-a-Depth ring or switch box extension rings (Steel City #SBEX) are not acceptable. Plates shall not support wiring devices. Gang switches with common plate where two or more are indicated in the same location. Wall-mounted devices of different systems (switches, thermostats, etc.) shall be coordinated for symmetry when located near each other on the same wall. Outlets on each side of walls shall have separate boxes. Through-wall type boxes shall not be permitted. Back-to-back mounting shall not be permitted. Trim rings shall be extended to within 1/8 inch of finish wall surface.

B. Stud Walls: Outlet boxes mounted in metal stud walls, shall be supported to studs with 2 screws inside of outlet box to a horizontal stud brace between vertical studs.

C. Blank Covers: All outlet boxes that do not receive devices in this contract are to have blank plates installed matching wiring device plates.

3.2 MOUNTING HEIGHT

A. Mounting Height: Height of wall outlets to center or bottom of box above finished floor shall be as follows, unless specifically noted otherwise. Verify all heights with the architectural plans and shop drawings for installation. The following dimensions are a guide only. Specific heights required by governing institutions and laws shall apply.

Switches & Dimmers	4 foot 0 inches to centerline
Receptacles	1 foot 6 inches to centerline
Branch Panelboards	6 foot 6 inches top of panel trim
Telephone & Data Outlets	1 foot 6 inches to centerline

B. Counter Tops: Bottoms of outlets above counter tops or base cabinets shall be minimum 2 inches above counter top or backsplash, whichever is highest. Outlets may be raised so that bottom rests on top of concrete block course, but all outlets above counters in same area shall be at same height. It is the responsibility of this Contractor to secure cabinet drawings and coordinate outlet locations in relation to all cabinets as shown on Architectural plans, prior to rough-in, regardless of height shown on documents.

C. Wall Outlets: Height of wall-mounted fixtures shall be as shown on the drawings or as required by Architectural plans and conditions. Fixture outlet boxes shall be equipped with fixture studs when supporting fixtures.

3.3 FLOOR OUTLET BOXES

A. Adjustment: Where floor or fill depth is 3 inches or more, adjustable boxes with maximum vertical and angular adjustment for after concrete pour shall be used. After pour is complete, boxes shall be set and readjusted to provide a smooth surface conforming to the elevation and slope of the surrounding finished floor.

END OF SECTION 26 0533

SECTION 26 05 53
ELECTRICAL IDENTIFICATION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. General: Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification sections, apply to work specified of this section.

1.2 DESCRIPTION

A. Extent: Electrical identification work as required by the Contract Documents or other specifications.

B. Types: Electrical identification work specified in the Contract Documents include the following;

1. Electrical power, control and communication conductors.
2. Operational instructions and warnings.
3. Danger signs.
4. Conduits, boxes, etc.
5. Distribution Equipment.
6. Cabinets.
7. Equipment/system identification signs and tags.

1.3 QUALITY ASSURANCE

A. Manufacturers: Firms regularly engaged in manufacturer of electrical identification products of types required, whose products have been in satisfactory use in similar service for not less than 3 years.

B. NEC Compliance: Comply with NEC as applicable to installation of identifying labels and markers for wiring and equipment.

C. UL Compliance: Comply with applicable requirements of UL Standard 969, "Marking and Labeling Systems", pertaining to electrical identification systems.

D. ANSI Compliance: Comply with applicable requirements of ANSI Standard A13.1, "Scheme for the Identification of Piping Systems", and ANSI Standard Z53.1 "Color Designation."

E. NEMA Compliance: Comply with applicable requirements of NEMA Standard No's. WC-1 and WC-2 pertaining to identification of power and control conductors.

F. ADA Compliance: All signage shall meet ADA standards. Identification for maintenance purposes shall be as specified herein.

1.4 SUBMITTALS

A. General: Submit shop drawings of all identification materials to be used for this project. Submit one sample of each item with the shop drawings.

PART 2 - PRODUCTS

2.1 ACCEPTABLE SUPPLIERS OR MANUFACTURERS

A. General: Subject to compliance with requirements, manufacturers offering electrical identification products which may be incorporated in the work include, but not limited to, the following:

1. Ideal Industries, Inc.
2. Panduit Corp.
3. Thomas and Betts Co.
4. Carlton Industries, Inc.

2.2 LANGUAGE

A. General: Provide all products in this section in English.

2.3 ELECTRICAL IDENTIFICATION MATERIALS

A. General: Except as otherwise indicated, provide manufacturer's standard products of categories and types required for each application. Where more than one single type is specified for an application, selection shall be at the installer's option, however, provide a single selection for each application.

B. Conduit System Markers: Provide manufacturer's standard pre-printed, flexible, permanent, conduit markers, extending 360 degrees around conduits. Markers shall be designed for attachment to conduit by adhesive, adhesive lap joint, matching adhesive plastic tape at each end of marker, or pre-tensioned snap-on. Color shall match system printing requirements.

C. Voltage Marking: Except as otherwise indicated, provide lettering which indicates voltage of the conductor(s) in conduit. Provide 4 inch minimum length with 7/8 inch minimum lettering for 2 inch and smaller conduit. Provide 8 inch minimum length with 1-1/4 inch minimum lettering for larger than 2 inch conduit. Provide one marker for each 20' section of conduit. Color shall match system printing requirements.

D. Plasticized Tags: Manufacturer’s standard preprinted or partially preprinted accident prevention and operation tags, of plasticized card stock with matt finish suitable for writing, approximately 3-1/4 x 5-5/8 inch, with brass grommets and wire fasteners, and with appropriate pre-printed wording including large size primary wording, e.g., DANGER, CAUTION, DO NOT OPERATE.

E. Baked Enamel Danger Signs: Provide manufacturer's standard "DANGER" signs of baked enamel finish on 20 gauge steel; of standard red, black and white graphics; 14 x 10 inch size except where 10 x 7 inch is the largest size which can be applied where needed, and except where larger size is needed for adequate vision; with recognized standard explanation wording, and subsequent directive e.g. HIGH VOLTAGE, KEEP OUT; BURIED CABLE, DO NOT DIG; LIVE PARTS, DO NOT TOUCH SWITCH.

F. Engraved Plastic Laminate Nameplates: Provide engraving phenolic plastic laminate, in sizes and thicknesses indicated, engraved with 1/16 inch thick lines with square standard pica lettering and wording as specified herein, black face and white core plies (letter color) for normal systems, kelly green and white for equipment, bright orange and white for critical, bright yellow and black for life safety, and red and white for fire alarm and where noted in the specifications. Punch for mechanical fastening, except where adhesive mounting is necessary because of substrate. Material thickness shall be 1/16 inch. Provide beveled edge in order to eliminate sharp corners. Provide self-tapping stainless steel round head screws. Provide contact type permanent adhesive where screws cannot or shall not penetrate the substrate. Adhesive nameplate shall be permanently installed. Titles shall be 1/2 inch high and all other lettering shall be 1/4 inch high.

G. Junction Box Identification: Provide neat indelible felt tip, stenciled marking on junction box and pullbox covers indicating panel and circuit numbers contained in the box. Letter sizes shall be 1 inch high minimum. Provide non-stenciled markings inside the junction box and on the exterior edge to match the cover markings.

2.4 LETTERING AND GRAPHICS

A. General: Coordinate names, abbreviations, and other designations used in electrical identification work, with corresponding designations specified or scheduled. Provide numbers, lettering and wording as indicated or, if not otherwise indicated, as recommended by the manufacturer and as required for proper identification and operation/maintenance of the electrical system equipment. Comply with ANSI A13.1 pertaining to minimum sizes for letters and numbers.

B. Size: System identification labeling consists of providing minimum 1/2 inch high stenciled black letters for raceway systems.

PART 3 - EXECUTION

3.1 APPLICATION AND INSTALLATION

A. Installation: Install electrical identification products as indicated, in accordance with manufacturer's written instructions, as required by the NEC and as specified herein.

B. Coordination: Where identification is to be applied to surfaces which require a field finish application, install identification after completion of such application.

C. Regulations: Comply with governing regulations and requests of governing authorities for the identification of electrical work.

D. Hazards: Identify all rooms, spaces, and equipment that house potential electrical hazards, and label with appropriate signage or indicators.

3.2 RACEWAY SYSTEM IDENTIFICATION

A. Color Coding: All electrical conduit shall be identified by color-coding. Apply color-coded identification on electrical conduit in a neat and workmanlike manner. Utilize a stencil for application of paint.

B. Identification: Identify all raceways provided or utilized as part of this project as follows;

1. Apply bands 10 feet on center along the raceway system and at each side of walls or floors, and at branches from mains.
2. Identify the following services:

	Service	Label
a.	Low Voltage	120/208 Voltage
b.	Fire Alarm	Fire Alarm
c.	Telephone	Telephone
d.	Computer	Computer
e.	Telephone/computer	Telephone/computer

3. Spot Painting on Rough-in:

a. Conduit, raceways, boxes, backboxes, panelboards, etc. shall be spot painted. Conduit shall be identified within 6 inches of the box or enclosure. The entire box and coverplate shall be painted.

b. Use following colors for color bands and for color coding:

	System	Color
(1)	Normal Power	Royal Blue

(2)	Emergency Power	Purple
(3)	Miscellaneous Communications	Brown
(4)	Fire Alarm	Red
(5)	Telephone\Computer	Black

3.3 CABLE/CONDUCTOR IDENTIFICATION

A. General: Apply cable/conductor identification, including voltage, phase and feeder number, on each cable/conductor in each box/enclosure/cabinet where conductors of more than one circuit or communication (such as color coded conductors) is provided. Match identification with marking system used in panelboards, shop drawings, contract documents, and similar previously established identification for the project's electrical work.

B. Color Coding: Color code all power and lighting cable. Use wire colored by integral pigmentation, making the wire 100 percent colored. Where not practicable or available (in larger conductor sizes), color code the wire by using colored plastic tape, painting the ends accessible at junction or pull boxes, or other method acceptable to the Engineer. Use the following chart as applicable;

3.4 OPERATIONAL IDENTIFICATION AND WARNINGS

A. General: Provide identification and warning wherever reasonably required to ensure safe and efficient operation and maintenance of the electrical systems. Provide identification and warning identification if necessary for signage to help prevent misuse of electrical facilities by unauthorized personnel.

B. Plasticized signs: Install self-adhesive plastic signs or similar equivalent identification, instruction or warnings on switches, outlets and other controls, devices and covers of electrical enclosures. Where detailed instructions or explanations are needed, provide plasticized tags with clearly written messages adequate for the intended purposes.

C. Locations: In addition to installation of danger signs required by governing regulations and authorities, install appropriate danger signs at locations indicated and at locations subsequently identified as constituting dangers for persons in or about the project.

D. High Voltage: Install danger signs wherever it is practicable, for persons to come into contact with electrical power of voltages 208 volts to ground or higher.

E. Critical Switches/Controls: Install danger signs on switches and similar controls, regardless of whether concealed or locked up, where untimely or inadvertent operation (by anyone) could result in significant danger to persons, or damage to or loss of property.

F. Electrical Equipment Rooms: Provide warning signage at the entrance to each such room; identify the hazard, and direct non-qualified personnel to stay away.

G. Equipment Identification:

1. Nameplates: Install an engraved phenolic plastic laminate nameplate on each unit of electrical equipment in the building, including central or master unit of each electrical system unless unit is specified with its own self-explanatory identification or signal system. Except as otherwise indicated, provide single line of text. Provide text matching terminology and numbering of the contract documents and shop drawings.
2. Locations: Provide nameplates for each unit of the following categories of electrical work:

a. Panelboards, electrical cabinets, and enclosures.

(1) Provide a nameplate outside above the door (if equipped with one) listing its designation, voltage, source and circuit number.

b. Access panel/doors to electrical facilities.
c. Motor starters.
d. Disconnect switches.
e. Enclosed circuit breakers.

3. Viewing: Install nameplates at locations indicated and where not otherwise indicated at a location for the best convenience of viewing without interference with operation and maintenance of equipment.

   a. Secure to substrate with rigid fasteners. Utilize adhesive where fasteners cannot penetrate substrate.

4. Names: The names or wording used for a particular machine shall be the same as the one used on all motor starters, disconnects and remote button stations nameplates for that machine.

END OF SECTION 26 0553

SECTION 260961 - PERFORMANCE LIGHTING POWER AND CONTROLS DEVICES INSTALLATION

PART 1 - GENERAL

1.01 SUMMARY

A. Work in this section includes the installation of the Performance Lighting, Power, and Controls System and provision of supporting conduit, wire and standard backboxes. Work in this section also includes removal and reinstallation of historical architectural lighting fixtures.

B. Section Includes

1. Materials, components, modifications, assemblies, equipment and services as specified herein. These include, but are not limited to:

    a. Verification of site dimensions and conditions.
    b. Submittals as required by the Contract Documents.
    c. Engineering as required by the Contract Documents.
    d. Manufacture of equipment and systems as required by the Contract Documents.
    e. Scheduling, sequencing and coordination with other trades.
    f. Review of shop drawings provided by related sections
    g. Testing and demonstration of equipment and systems as specified herein and elsewhere in the Contract Documents in coordination with related sections

2. Coordination with the 116161 Contractor as specified in Section 116161 for a complete performance lighting power and controls system.
3. Power distribution devices, conduit and wire as required in this Section and related Specification Sections listed herein.
4. Disconnects, power feeds as required for performance lighting power panels.
5. Standard backboxes as noted in the contract documents. Specialized boxes are excepted from this.
6. Coordination with the 116164 Contractor as specified in Section 116164 to remove and reinstall historical architectural lighting fixtures that have been refurbished under 116164.
7. This specification is considered as an outline form and other appurtenances that may be required for the efficient and safe operation of the performance lighting power, and control systems specified in this section will be furnished under Division 26, the same as if specified herein.

C. Products Installed under this section and furnished under 116161 and 116164:

1. Backboxes for faceplates furnished under 116161. Standard boxes are excepted from this.
2. Lighting receptacles, Connector Strips, and Faceplates carrying 100V or above.
3. Motorized Breaker Panels.
4. Panel Board surge suppression.
5. Company Switches
6. Emergency Transfer Devices.
7. New Architectural Lighting Fixtures

8. Historical Architectural Lighting Fixtures

1.02 DEFINITIONS

A. The term “furnish” means to supply and deliver to the job site, ready for unloading, unpacking, assembly, installation, and similar operations.

B. The term “install” is used to describe operations at the job site including the actual anchoring, applying, assembly, cleaning, curing, cutting, erection, finishing, patching, placing, protecting, pulling, terminating, unloading, unpacking, working to dimension, and similar operations that will render the systems complete and ready for the intended use.

C. The term “provide” means to furnish and install.

D. Performance Lighting Power Panel: A dimmer rack, relay, panel, motorized breaker panel or contactor panel controlled by the performance lighting system.

E. Data Communications: Signals that provide control and feedback communications between devices in the system

F. Historical Architectural Lighting Fixtures: Any existing installed original architectural lighting fixture as called out in the contract documents.

1.03 SYSTEM DESCRIPTIONS

A. The performance lighting power, and controls system consists of wiring devices, both low and line voltage, performance power panels, lighting network control rack and remote consoles.

1. Line voltage feeds to the distributed circuits require a dedicated neutral per circuit.

B. The DMX 512 control signal will be generated by various consoles and devices, and is connected to the performance power panels via conduit runs and low voltage cables.

C. The Ethernet control signal will be generated by various consoles and devices, and is connected to the hub via conduit runs and low voltage cables.

D. Equipment will be the coordinated and the system integrated by the 116161 contractor in coordination with the Division 26 Contractor.

E. The specified performance lighting power, and controls components are fully described in the Contract Documents. Complete technical data is also available from the manufacturer. Catalog numbers are those shown on Manufacturer’s data sheets and drawings unless otherwise noted.

1.04 SUBMITTALS

A. Bid Submittals

1. The Division 26 Contractor will examine drawings prior to submitting his bid. He will note adverse conditions to be overcome or circumvented, and favorable conditions to be taken advantage of. Submittal of a bid will indicate that the Division 26 Contractor has full knowledge of the problems involved in the work and that he has taken these into consideration in computing his bid.
2. The Division 26 Contractor will bid on installation of the performance lighting power and control system as specified in 116161 and any additional materials required to implement the system such as conduit, panel boxes and wire as specified in the Contract Documents.
3. In addition to the submittals required under the general conditions of these specifications, bidders are required to furnish supporting documents as noted below in order for their bids to be considered.
4. The Owner reserves the right to waive formalities, to be sole judge of quality and equality of the several bid proposals, and reserves the right to reject any and all bids.

B. Samples

1. The Division 26 Contractor will, if requested by the Consultant, furnish satisfactory evidence as to kind and quality of materials he proposes to furnish by submission of exact samples of materials intended for installation. If required, these samples will be submitted with shop drawings and any such samples shall be returned.
2. Handling, shipping and delivery to, or removal from the site, of any sample required will be at the cost of the Division 26 Contractor.

1.05 QUALITY ASSURANCE

A. Supplementary:

1. Secure equipment, except portable equipment, firmly in place. Mount components rigidly, except where resilient isolation is required. Design and provide fastenings and supports adequate to support their loads with a safety factor of at least three.
2. Clearly mark switches, jacks, outlets, cables, connectors, etc. logically and permanently during fabrication and installation.
3. Where many cables are run in close proximity color code by function in a logical manner.
4. Take necessary precautions to prevent and guard against electromagnetic, electrostatic and radio frequency interference.
5. Exercise care in wiring, so as to avoid damage to the cables and to the equipment. Between racks, cabinets, consoles or modules insure cables are well-supported, neatly laced and dressed. Make joints and connections with mechanical connectors approved by the Consultant.
6. Affix a removable label in coordination with 116164 on every historical architectural lighting fixture prior to removal. Label should contain information so that each fixture can be re-installed in the same location after refurbishment by 116164.
7. When cable is surface mounted and crossing through fire walls, use the equivalent fire rated plenum cable to the specified cable type.
8. Label terminal strips, punch blocks, wire and cables in a permanent and logical manner with a unique number on each end of cable runs.
9. Final location of equipment is as shown on the Drawings, located in the field by the Architect or as shown on supplementary drawings prepared by the Consultant.

1.06 WARRANTY

A. In addition to manufacturer's warranties, warrant provided systems and equipment to be free of defective components, faulty workmanship or improper adjustment for a period of two years from the date of Owner's acceptance. Paint and exterior finishes are excluded. Equipment supplied under 116161 excluded.

B. In addition to manufacturer's warranties, warrant installation to be free of defective components, faulty workmanship or improper adjustment for a period of two years from the date of Owner's acceptance.

C. Replace items showing evidence of defective materials or workmanship (including installation workmanship) within thirty (30) days after notification. Make replacements without cost to the Owner.

D. Rectify conditions that might present a hazard to human life, well-being and or property within 48 hours of notification.

1.07 PROJECT CONDITIONS

A. Questions requiring clarification of the specifications are addressed to the Architect.

B. Provide continuous liaison with the 116161 Contractor during demolition and construction, and coordinate delivery schedules and installation of equipment with related trades.

1.08 PRODUCT HANDLING AND STORAGE

A. The Division 26 Contractor will make good or replace work, materials and equipment which have become contaminated, stolen, marred otherwise damaged, as directed by the Consultant and at no cost to the Owner once the equipment has been accepted by the Division 26 Contractor.

B. Equipment will remain the responsibility of the Division 26 Contractor until turned over to the owner.

PART 2 - PRODUCTS

2.01 MATERIALS

A. Materials as specified under Division 26.

PART 3 - EXECUTION

3.01 DELIVERY

A. Materials within this contract will be delivered by the Division 26 Contractor to the project site. Performance lighting power, and controls system equipment shall be delivered by the 116161 Contractor.

B. Equipment furnished under Division 116161 or 116164 will become the responsibility of the Division 26 Contractor at such time that the Division 26 Contractor takes possession of the equipment from the 116161/116164 contractor.

1. At this time the Division 26 Contractor will document the exact condition, breakage or damage evident in the equipment.
2. Exact quantities will be documented.
3. Any discrepancies in the quantities and any damage or unsuitability of the product for the application will be provided in writing to the 116161/116164 contractor upon transfer of the equipment.
4. Acceptance of the equipment verifies proper physical condition of the product. Electrical functionality is not implied at acceptance and is not the responsibility of the Division 26 Contractor.
5. The 116161/116164 Contractor will be present at the time of transfer to coordinate and expedite this action. The 116161/116164 Contractor shall be given a two week minimum lead time prior to this meeting.

3.02 SUPERVISION OF INSTALLATION

A. The 116161 contractor will provide instruction and supervision to the Division 26 Contractor as it pertains to the installation of these systems. Provide the necessary personnel for coordination meetings and site visits prior to installation of systems.

3.03 SYSTEM COMMISSIONING

A. At no time will the equipment furnished under Section 116161 or 116164 be energized prior to the 116161/116164 Contractor authorized commissioning.

B. The Division 26 Contractor will notify the 116161 Contractor within at least two weeks time for system commissioning.

C. The Division 26 Contractor will confirm in writing that the following conditions have been met prior to scheduling system commissioning

1. Arrangements will be made for access to equipment and terminations. Scaffolding, lifts or any other OSHA approved method will be acceptable.
2. Power Panels will be installed and wired.
3. Distribution equipment will be completely installed.
4. Historical architectural lighting fixtures will be completely reinstalled.
5. Continuity checks for the entire system will have been performed and failures remedied.

D. At the time of commissioning the Division 26 Contractor will provide a representative who is has full working knowledge of the system, device placement and job conditions. This representative will be on-site throughout the commissioning process and will coordinate with, and aid, the 116161 Contractor to expeditiously commission the system.

3.04 INSPECTION AND TESTING

A. Field Check-out & Final Approvals. After the system is commissioned and functions in accordance with the contract documents in the opinion of the Division 26 Contractor and the 116161 contractor, the Consultant will inspect and test the system.

B. Make necessary arrangements for parties concerned to be present, by scheduling such inspection in a manner acceptable to the Consultant and give a minimum of 14 days notice.

C. A representative from the Division 26 Contractor, the 116161 contractor and the Consultant will be present at the test.

D. Furnish equipment and instruments necessary for testing the complete wiring system during the progress of the work as well as after installation. Tests shall be demonstrated to the satisfaction of the Owner. Tests include the following:

1. Circuits are continuous and free from short circuits.
2. Circuits are free from unspecified grounds.
3. Circuits are properly connected in accordance with the applicable wiring diagram.
4. Voltage drop at each end of the circuit with a 2000 watt load.
5. Low voltage circuits complying to industry standards.

E. Any defects will be repaired at once and the tests re-conducted.

3.05 RECORD DRAWINGS & OPERATION MANUAL

A. The Division 26 Contractor will provide three (3) copies of black and white prints on the system corrected in red to indicate changes made during construction.

END OF SECTION 260961

SECTION 26 2416
PANELBOARDS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. General: Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification sections, apply to work specified of this section.

1.2 DESCRIPTION

A. Description: Provide panelboards with main breaker or main lugs where shown on the drawings, of a dead front, distributed phase sequence design. Panelboards shall be equipped with thermal-magnetic molded case circuit breakers with frame and trip ratings as indicated in the schedules.

1.3 QUALITY ASSURANCE

A. ANSI: the latest edition of the Reference Standards for the American National Standards Institute shall apply as follows;

1. ANSI Y32.2 - Graphic Symbols for Electrical and Electronic Diagrams.
2. ANSI Z55.1 - (R1973) Gray finishes for Industrial Apparatus and Equipment.

B. NEMA: National Electrical Manufacturers Association shall apply as follows;

1. NEMA PB1-1984 Panelboards
2. NEMA PB1-57 Gutter space

C. NFPA: The latest edition of the National Fire Protection Association shall apply as follows;

1. NFPA 70, National Electrical Code (NEC).

D. UL: The latest edition of the Underwriters' Laboratories, Incorporated shall apply as follows;

1. UL Electrical Construction Materials List, panelboards-dead front type.
2. UL 67 Panelboard wiring gutter space, bus heat rise test.

E. Listing: Panelboards shall be listed by Underwriters Laboratories and bear the UL or other nationally recognized testing laboratory label. Where required, panelboards shall be listed for use as service entrance equipment.

1.4 SUBMITTALS

A. Shop drawings:

1. Product data shall be submitted on:
   a. Panel
   b. Cabinet
   c. Bus
   d. Construction
   e. Dimensions

2. Shop drawings shall be submitted for every panel, and shall clearly indicate all of the following information:

    a. U.L. Label
    b. Each circuit breaker amperage rating, circuit number and position/location in panel
    c. Electrical characteristics of panel
    d. Main bus rating
    e. Main device rating
    f. Mounting type
    g. Dimensions, (width, depth, height, weight)
    h. Bus material
    i. Interrupting capacity of minimum rated breaker
    j. Panelboard classification
    k. Submit coordination curves on log-log paper for all breakers, fuses, transformers, etc.
    l. If dimensions for equipment proposed in submitted shop drawings are different than was shown on drawings, contractor shall submit sketches showing layout of proposed equipment.

3. Coordination Study: The Contractor shall expect an additional 10 working days for panelboard and switchboard review to allow the Engineer to design the coordination study.

1.5 OVERCURRENT PROTECTIVE DEVICES - DESCRIPTION

A. Description of System: Connections of all items using electric power shall be included under this division of the specifications, including necessary wire, conduit, circuit protection, disconnects and accessories. Securing of roughing-in drawings and connection information for equipment involved shall also be included under this division. See other divisions for specifications for electrically operated equipment. Provide overcurrent protection for all wiring and equipment in accordance with the NEC, all federal, state and local codes as required and/or as shown on the drawings.

1.6 OVERCURRENT PROTECTIVE DEVICES - SUBMITTALS

A. Shop drawings and product data: Shop drawings shall clearly indicate;

1. Frame sizes and interrupting capacity of all circuit breakers.
2. Horsepower ratings of rated voltage of fused switches and/or circuit breakers.
3. Size and type of fuses being provided.
4. Device is U.L. Listed, and bears the U.L. Label.
5. Device complies with these specifications, drawings, and applicable standards of NEMA, IEEE, ANSI, and ASA.

PART 2 - PRODUCTS

2.1 PANELBOARDS

A. Equipment: The panelboard bus assembly shall be enclosed in a steel cabinet and shall be surface or flush mounted as shown in the schedules. The box shall be fabricated from galvanized steel with standard baked enamel finish. Panelboard front shall include a door and shall have a flush, cylinder tumbler-type lock with catch and spring-loaded stainless steel door pull. All panelboard locks shall be keyed alike. All panel cabinets shall be a minimum of 20 inches wide. Fronts shall have adjustable indicating trim clamps which shall be completely concealed when the doors are closed. Doors shall be mounted with completely concealed steel hinges. Panel front shall not be removable with door in the locked position.

B. Bus: Panelboard bus structure and main lugs or main circuit breaker shall have current ratings as shown on the panelboard schedule. Bus shall be insulated and bus bar connections to the branch circuit breakers shall be of the "distributed phase" or phase sequence type. All current carrying parts of the bus structure shall be tin plated copper. A full size insulated neutral bus bar shall be provided. Provide system grounding tin plated copper bus bar bonded to the panelboard cabinet for connection of system grounding conductors. This bar shall be mechanically and electrically isolated from the neutral bar except where panelboard is used as service entrance equipment.

C. Molded Case Circuit Breakers: All panelboard branch circuit breakers shall be bolt-on thermal-magnetic molded case type. Breakers shall be 1, 2 or 3 pole with an integral crossbar to assure simultaneous opening of all poles in multi-pole circuit breakers. Breakers shall have an overcenter, trip-free, toggle-type operating mechanism with quick-make, quick-break action and active handle indication. Handles shall have "ON", "OFF", and "TRIPPED" positions. Bolt-on circuit breakers shall be able to be installed in the panelboard without requiring additional mounting hardware.

D. 120/208 Rating: 120/208 volt circuit breakers shall have interrupting ratings a minimum of 10,000 rms symmetrical amperes at 240 volts AC maximum, refer to drawings for specific ratings.

E. Switching Type: Single pole, 15 and 20 ampere circuit breakers intended to switch fluorescent lighting loads on a regular basis shall carry the SWD marking.

F. Directories: A typed panelboard directory shall be provided for each panelboard and shall indicate the actual circuit number used, room name and type of load. Room names shall be the actual name or room number used not necessarily as shown on the drawing. Panel directories shall include all room numbers and names. Where panel schedules are indicated on the drawings as "receptacles or "lighting", etc., it shall be the responsibility of the Contractor to include the specific area served.

G. Bracing: Panelboard as a complete unit shall be braced for a minimum short circuit rating equal to or greater than the lowest breaker symmetrical interrupting capacity as shown on the schedule. However, all panelboards shall be fully rated. No series ratings are allowed.

H. Grounding: All panelboard cabinets shall have a system grounding bar bonded to the panelboard cabinet for connection of system grounding conductors. This bar shall be mechanically and electrically isolated from the neutral bar.

I. Stubs: Provide four 3/4 inch conduits from all flush mounted panels to adjacent accessible ceiling space and mark "for future use". Provide pull cord in all empty conduits and provide plastic end bushing.

J. Design Selection:

120/208V		480/277V
Square "D", NQOD Cutler-Hammer: Pow-R-Line 1 General Electric: A-Series Siemens: S1 Series		Square "D", NF Series Cutler-Hammer: Pow-R-Line 2 General Electric: A-Series Siemens: SL/SE Series
600A	thru	1200A
Square "D": I-Line Cutler-Hammer: Pow-R-Line 4 General Electric: Spectra Series Siemens: S4/S5 Series		Square "D": I-line Cutler-Hammer: Pow-R-Line 4 General Electric: Spectra Series Siemens: S4/S5 Series

PART 3 - EXECUTION

3.1 INSPECTION

A. General: Examine area to receive panelboard and assure that there is adequate clearances to meet NEC requirements and normal maintenance issues.

B. Correction: Start work only after any unsatisfactory conditions have been corrected.

3.2 INSTALLATION

A. General: Provide panelboards in complete accordance with manufacturer's written instructions and all applicable codes.

B. Support: Panelboards shall be rigidly supported and installed per manufacturers recommended supporting instructions, with beams provided if necessary, to suit actual site conditions. Panels shall not be directly mounted to masonry walls. Use kindorf or similar channel.

C. Storage and Delivery: Panelboards shall be delivered to the site during that phase of panelboard installation in order to avoid storing panels on site where damage may occur. Replace any damaged parts prior to energizing panel. Cover panelboard to avoid damage to finish.

D. Mounting: Do not mount equipment directly to masonry or concrete walls. Provide two uni-strut spacers between wall and panelboard.

E. Operations and Maintenance Data: Manufacturer's instructions for tightening bus connections, cleaning, operation and maintenance.

3.3 QUALITY CONTROL

A. General: Field test prior to energization;

1. Megger check, and record all data, of phase to phase and phase to ground insulation levels.
2. Continuity.
3. Proper phase relationship.

3.4 CHECK-OUT MEMO

A. General: Submit check-out memo from panelboard representative.

END OF SECTION 26 2416

SECTION 26 24 20
SAFETY SWITCHES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. General: Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 specification sections, apply to work specified of this section.

1.2 QUALITY ASSURANCE

A. General: Switches and all components shall be manufactured and tested in accordance with the latest applicable standards of NEMA and UL.

1.3 SUBMITTALS

A. Shop drawings: Product data shall be submitted on:

1. Switch rating, including voltage, continuous current, short-circuit.
2. Fuse ratings, when applicable.
3. Cable terminal sizes.
4. Enclosure type.
5. Conduit entry/exit locations.

PART 2 - PRODUCTS

2.1 HEAVY DUTY SAFETY SWITCHES

A. General: All disconnect switches shall be heavy-duty type, unless specifically noted otherwise. Switches shall be fusible or non-fusible and sized as noted on the drawings. Provide units manufactured by Siemens, GE, Square D or Cutler Hammer.

B. Switches shall be 240 volt rated on systems up to and including 120/240V. All switches serving motor loads or shall be horsepower rated.

C. Provide NEMA 1 enclosure, unless otherwise noted. All switches mounted outdoors shall be NEMA Type 3R or as noted NEMA Type 4X Stainless Steel.

D. Provide lugs on disconnect switch as required to accept conductors called for on drawings.

E. Provide switches with an externally operated handle; quick make quick break mechanism; the handle shall be interlocked with the switch cover by means of a defeatable interlock device. The switch shall be lockable in the "off" position with a padlock.

F. Switches shall have arc suppressors and pin hinges. Switch blades shall be readily visible in the OFF position. Switch blades and jaws shall be plated copper. Provide with line side terminal shields.

2.2 FUSES

A. General: All fuses shall be of the same manufacture to retain selectability as designed. No fuse shall be installed until equipment is ready to be energized and after tightening of all electrical connections, inspection of all ground and grounding conductors and a megger test of adequate insulation to ground of all circuits.

B. Current Limiting: All fuses shall be current-limiting with 200,000 amperes interrupting capacity.

C. 601 Amps and Above: Fuses rated 601 amperes and larger shall be UL Class L and have a minimum time-delay of 45 seconds at 300% rating and have 0-ring gas seals at the end bells.

D. 600 Amps and Below: Fuses rated 600 amperes or less, installed ahead of circuit breakers or circuit breaker panels, shall be UL Class K-1. Fuses rated 600 amperes or less for all general power circuits shall be dual-element, UL Class K-5 time-delay type. They shall be self protecting from extraneous heat.

E. Motor Circuits: Fuses installed in individual motor circuits shall be dual element time-delay type, UL Class K-5. Use fuse reducers when fuse clip spacing is larger than the fuse dimension.

F. Rejection Fuses: Fuses called for to be rejection type are to have rejection fuse holders.

G. Identification Label: A fuse identification label, showing type and size, shall be placed inside the door of each fused switch. Labeling for rejection type fused switches shall read "Warning-Use Only Current Limiting Fuses Class ___ , Type ___ , MFR ___ ," engraved in red laminated plastic.

PART 3 - EXECUTION

3.1 INSPECTION

A. General: Examine area to receive safety switch and assure that there is adequate clearances to meet NEC requirements and normal maintenance issues.

B. Correction: Start work only after any unsatisfactory conditions have been corrected.

3.2 INSTALLATION

A. General: Provide safety switches in complete accordance with manufacturer's written instructions and all applicable codes.

B. Support: Switches shall be rigidly supported and installed per manufacturers recommended supporting instructions. Switches shall not be directly mounted to masonry walls; Use Kindorf, uni-strut or similar support.

C. Storage and Delivery: Safety switches shall be delivered to the site during that phase of installation in order to avoid storing switches on site where damage may occur. Replace any damaged parts prior to energizing. Cover to avoid damage to finish.

H. Operations and Maintenance Data: Manufacturer's instructions for tightening connections, cleaning, operation and maintenance.

3.3 ADJUSTMENT AND CLEANING

A. General: Adjust operating mechanisms for free mechanical movement.

B. Connections: Tighten lug connections and mechanical fasteners.

C. Finish: Touch-up scratched or marred surfaces to match original finish.

END OF SECTION 26 2420

SECTION 26 27 26
WIRING DEVICES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. General: Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification sections, apply to this section.

1.2 DESCRIPTION

A. General: Provide factory fabricated wiring devices in type, color and electrical rating for the service indicated to provide convenient access to the electrical system for portable and permanent connections, and control of fixed outlets.

B. Ratings: Voltage and ampere rating of switches and receptacles shall be marked on the device, and shall conform to Voltage and Ampacity of system to which applied.

C. Hardware: Devices consist of all the necessary hardware to complete an installation and provide a margin of safety by inaccessibility of live electrical components.

1.3 RECEPTACLES AND SWITCHES QUALITY ASSURANCE

A. Manufacturers: Manufacturers shall be companies regularly engaged in manufacture of wiring devices, of types and ratings required, whose products have been in satisfactory use in similar service for not less than 5 years. Acceptable manufacturers are Pass & Seymour, Hubbell, and Leviton Manufacturing.

B. Installer: A firm with at least 5 years of successful installation experience on projects with electrical installation work similar to that required for the project.

C. Compliance: Comply with the latest edition of the following standards;

1. NEMA WD1, WD3 and WD5
2. UL 5, 20 and 231
3. ANSI/IEEE Standard C62.41-1980 (Formerly IEEE 587)

    a. Test withstand voltage surges of up to 6000 volts and current surges of up to 200 amperes without damage.

D. Warranty: Provide a minimum one-year warranty from time of final acceptance.

1.4 SUBMITTALS

A. Wiring Devices: Submit manufacturer's product data on all wiring devices listed on the drawings including;

1. Colors
2. Dimensions
3. U.L. Label
4. Finish
5. Voltage
6. Wiring diagrams

7. Application information

B. Coverplates and Identification: Submit type of identification used for coverplates to comply with the Identification Section as specified herein. Screws to match coverplate color.

1.5 SEQUENCING AND SCHEDULING

A. Coordination: Coordinate with other work including wires/cables, electrical boxes and fittings, and raceways, to properly interface installation of all wiring devices.

PART 2 - PRODUCTS

2.1 CONVENIENCE RECEPTACLES

A. Twenty Ampere Receptacles: Provide commercial specification grade single or duplex receptacles, 2-pole, 3-wire grounding, with green hexagonal equipment ground screw, ground terminals and poles internally connected to mounting yoke, 20 ampere, 120 volts, with metal plaster ears, side wiring, NEMA configuration 5-20R unless otherwise indicated.

B. Color: Devices connected to the normal system shall match existing devices, unless otherwise noted.

C. Device Type: Unless otherwise noted, in all public areas, provide all receptacles as the duplex modular type. Provide standard devices in non-public areas such as storage rooms, janitor's closet, penthouses & mechanical spaces, and electrical rooms.

D. Construction: Heavy duty nylon face and wraparound mounting strap, locked into and on the body, utilizing heavy-gauge brass ground contacts riveted to strap. Include automatic self-grounding spring to assure ground continuity between mounting strap and metal wall box. T-slot one piece copper alloy contact wipes which interface with plug blades inserted at 3 points. Line terminals shall be screw terminals and accept #14 to #10 AWG copper conductors.

E. Manufacturer: Manufacturer shall be Pass & Seymour, Leviton or Hubbell.

Pass & Seymour		Leviton		Hubbell	
P/S 15A	P/S 20A	15A	20A	15A	20A
6262-ISP	6362-ISP	8280-I	8380-I	8200 HIS	8300-HIS

2.2 SWITCHES

A. Toggle Switches: Provide specification grade, fast-make positive-break, flush single-pole, three and four way, silent operation toggle switches, 20 ampere, 120 volt AC with mounting yoke insulated from mechanism, equipped with plaster ears, and side-wired screw terminals.

B. Two Pole Switches: Provide two pole switches where drawings indicate the switching of 208 volt systems consisting of two phase conductors.

C. Security Key Switches: Provide key switches where drawings indicate, where a degree of security requires limited access to control of the lighting system.

D. Pilot Light Handle: Handle glows when switch is on. Handle color shall be clear, unless otherwise indicated.

E. Thermal Switch: Provide fractional horsepower switch with melting alloy type overload relay, with number of poles to coordinate with the equipment being controlled. Surface or flush mounted cover, as required, equipped with padlocking device and pilot light. Provide overload relay heaters for each pole of the switch, sized per the manufacturer's instruction, and adjust heater size to permit normal operation of the motor.

F. Color: Match receptacle devices.

2.3 PLUGS AND CONNECTORS

A. Standard: Comply with NEMA Standards Pub. No. WD1.

2.4 WIRING DEVICE ACCESSORIES

A. Faceplates: Unless otherwise noted, provide smooth faced nylon, single and ganged switch, receptacle, telephone, blank and other outlet wall plates for wiring devices, with ganging and cutouts as required

B. Multigang: Provide all necessary hardware and frames to properly mount various devices in combinations.

C. Exterior Device Covers: Provide "Weatherproof" duplex with stainless steel hinged cover. Device opening shall be standard or modular, to be compatible with the device provided for elsewhere in these specifications.

D. Color: Unless otherwise noted, provide colored faceplates to match devices listed elsewhere in these specifications.

2.5 PRODUCT DESIGN SELECTION

A. Standard Commercial Specification Grade Receptacles: Provide standard commercial specification grade receptacles as follows;

Description	Leviton	Hubbell	P & S
20 amp Simplex	#5801	#5351	#5351
20 amp Duplex	#CR20	#CR20	#5342
20 amp Duplex GFCI	#6898	#GF-5352	#2091-S
20 amp Duplex Isolated Gnd.	#5362-IG	#IG-5362	#IG-6300
20 amp Duplex TVSS	#5380	#5352-IS	#6362-SP

B. Motor Starter Switches: Provide motor starter type switches as follows;

Description	Square D	Cutler Hammer	GE	Siemens
Manual motor starter switch with overloads	Class 2510	Class MS	Class CR	Class SMF
Manual motor starter switch with overloads and pilot light	Class 2510	Class MS	Class CR	Class SMF

C. Device Covers: Provide device covers as follows;

Description	Leviton	Hubbell	P & S
Weatherproof stainless steel cover plate	----	#5221-5222	WP-8
Weatherproof stainless steel cover plate locking type	----	----	SP-26L

PART 3 - EXECUTION

3.1 INSTALLATION OF WIRING DEVICES

A. General: Provide wiring devices, in accordance with manufacturer's written instructions, applicable requirements of NEC and National Electrical Contractors Associations "Standard of Installation", and in accordance with recognized industry practices to ensure that products serve intended function.

B. Completion: Delay installation of devices until wiring and wall finish is completed.

C. Support: Devices shall be securely supported to box, not supported to device plate. Device shall trim out flush with front of plate. Do not support the device by loosening device mounting screws and attaching the cover plate for leveling.

D. Adjustment: Provide receptacles and switches only in electrical boxes which are clean, free from excess building materials, debris, etc. Adjust devices to plumb when tightened, and in position to receive faceplate. Devices shall not be leveled by using the mounting screws, outlet boxes shall be flush to wall finish prevent leveling problems. Tighten devices and provide securely, so that there shall be no movement during usage.

E. Position: Position ground pin at the top of the device in vertical application, unless otherwise noted.

F. Wiring: Provide screw terminal connections using a single conductor only. Do not "back-stab" devices. Provide single whips for all multiple conductor connections within each box.

3.2 APPLICATION OF COVER PLATES

A. Mounting: Provide cover plates in true vertical or horizontal alignment as applicable. Plates shall be properly secured by means of screws which have heads with finish matching the plate. Secure plates so as to maintain a snug fit against wall surfaces with no gaps.

B. Replacement: Replace all cover plates which are warped, cracked, chipped, or whose color does not match the balance of the installation. Replace screws whose threads do not allow the drawing up tight of the cover plate to the device.

3.3 CLEANING

A. Soiled Devices: Clean devices soiled prior to acceptance inspection, to remove all debris and foreign materials, such as paint, varnish, drywall compound, etc.

B. Solutions: Do not use liquid cleaning solutions, etc. on the face of the devices without written direction from the Engineer/Architect.

3.4 TESTING

A. Ground testing: Provide ground testing procedures as specified herein. Prior to energizing circuitry, test wiring devices for electrical continuity, and for short circuits.

B. Polarity: Subsequent to energization, test wiring devices for proper polarity, and to demonstrate operations as required in this and other sections of this Specification.

C. Recording: Record all tests as required in other sections of this specification.

END OF SECTION 26 2726

SECTION 26 2727 – DEVICE PLATES

PART 1 -GENERAL

1.1 WORK INCLUDED

A. Comply with the provisions of Section 26 0500 and 26 0500.

B. Provide device plates on switches, receptacles, telephone outlets and miscellaneous devices.

1.2 RELATED WORK

A. Section 26 2726: Wiring Devices

1.3 SUBMITTALS

A. Submit product data for review.

PART 2 -PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS

A. Plates for switches, receptacles, communication outlets and miscellaneous devices to be thermoplastic. The color shall match the existing device plates for the specific location.

B. Provide cast alloy or stamped metal plates on exposed switches and receptacles.

PART 3 -EXECUTION

3.1 INSTALLATION REQUIREMENTS

A. Install device plates in full contact with wall surface. Plates shall not project out from the wall.

B. Install device plates in full contact with surface mounted box. Plates shall not project out from the edge of the box.

C. Provide engraved plates with epoxy finish for receptacles and switches identifying the branch and panel circuit.

END OF SECTION

SECTION 26 28 16
INDIVIDUALLY ENCLOSED CIRCUIT BREAKERS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. General: Drawings and general provisions of the contract, including general and supplementary conditions and Division 1 specification sections, apply to work specified of this section.

1.2 DESCRIPTION

A. Description of System: Provide enclosed unit-mounted overcurrent protection devices for all wiring and equipment in accordance with the NEC, all federal, state and local codes as required and/or as shown on the drawings.

B. Discrepancies: If there are any conflicts or discrepancies in the construction documents or should the contractor disagree with the size of or application of, an overcurrent protection device called for on the drawings, the contractor shall bring it to the attention of the Engineer immediately.

C. Manufacturer: All breakers shall be of the same manufacturer: Cutler Hammer, Square "D", General Electric, or Siemens.

1.3 SUBMITTALS

A. Shop Drawings and Product Data: Shop drawings shall clearly indicate:

1. Frame sizes and interrupting capacity of all circuit breakers.
2. Horsepower ratings of rated voltage of fused switches and/or circuit breakers.
3. Size and type of fuses being furnished.
4. Device is U.L. Listed, and bears the U.L. Label.
5. Device complies with these specifications, drawings, and applicable standards of NEMA, IEEE, ANSI, and ASA.
6. Submit coordination curves on log-log paper for all breakers.
7. Enclosure type and size.

PART 2 - PRODUCTS

2.1 CIRCUIT BREAKERS

A. General: All circuit breakers shall be molded-case, quick-make, quick-break, thermal -magnetic type, and shall be U.L. listed and rated for voltage and class of service to which applied.

B. Multi-Pole Breakers: Double and triple pole breakers shall be of the common trip, single handle type.

C. Fault Rating: Circuit breakers shall have a rating equal to or greater than the fault current available but in no case less than 22,000 amp interrupting capacity (AIC) at 240V. Circuit breakers shall be fully rated for the available fault; Series rating is not allowed.

D. Arc Fault: Arc-fault circuit interrupter device shall be provided where indicated on the drawings, and where required by NEC. Device shall be UL listed for operation required in recognizing characteristics unique to arcing, functioning to de-energize circuit when arc fault is detected.

E. Shunt Trip: Shunt trip device shall be provided as breaker accessory, where indicated on drawings. Device shall trip breaker from remote location, via trip coil. For use with momentary or maintained push button.

F. Ground Fault: Ground fault trip shall be provided as breaker accessory, where indicated on drawings. Device shall trip breaker electrically via ground fault sensing module.

G. Solid State Circuit Breakers: Provide solid state circuit breakers for all breakers 400 amperes and above. Breakers shall have adjustable settings for long time pickup, long time delay, short-time pickup and short time delay.

H. Enclosures: Provide NEMA 1 enclosure, unless otherwise noted. All breakers mounted outdoors shall be NEMA Type 3R or as noted NEMA Type 4X, stainless steel.

PART 3 - EXECUTION

3.1 INSPECTION

A. General: Examine area to receive device and assure that there is adequate clearances to meet NEC requirements and normal maintenance issues.

B. Correction: Start works only after any unsatisfactory conditions have been corrected.

3.2 INSTALLATION

A. General: Provide in complete accordance with manufacturer's written instructions and all applicable codes.

B. Support: Enclosure shall be rigidly supported and installed per manufacturers recommended supporting instructions. Panels shall not be directly mounted to masonry walls; Use Kindorf, uni-strut or similar support.

C. Storage and Delivery: Overcurrent device shall be delivered to the site during that phase of installation in order to avoid storing device on site where damage may occur. Replace any damaged parts prior to energizing panel. Cover enclosure to avoid damage to finish.

D. Operations and Maintenance Data: Manufacturer's instructions for tightening connections, cleaning, operation and maintenance.

3.3 TESTING

A. Refer to section 26 0080 for requirements of testing by independent testing contractor, prior to energizing overcurrent devices.

END OF SECTION 26 2816

SECTION 26 43 13
SURGE PROTECTION DEVICES

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

A. General: Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification sections, apply to this section.

1.2 DESCRIPTION

A. General: The term surge protective device (SPD) describes the equipment necessary for the protection of all AC electrical circuits and equipment from the affects of lightning induced voltages, external switching transients and internally generated switching transients.

1.3 REFERENCE STANDARDS AND PUBLICATIONS

A. General: The latest edition of the following standards and publications shall comply to the work of this section;

1. ANSI/IEEE C62.41 (IEEE 587) Guide for Surge Voltages in Low-Voltage AC Power Circuits Categories A, B and C.
2. ANSI/IEEE C62.33 Standard for Test Specifications for Varistor Surge Protection Devices.
3. ANSI/IEEE C62.45 Guide on Surge Testing for Equipment Connected Low Voltage AC Power Circuits.
4. IEEE Standard 142 - Recommended Practice for Grounding
5. IEEE Standard 518 Recommended Guide on Electrical Noise
7. IEEE Std. 1100 (2005) “The Emerald Book” Section 8.4.2.5
6. UL-1449 3rd edition Standard for Surge Protective Devices
7. NFPA 70, 75 and 78 (780).
8. MIL Std. 220A
9. FIPS PUB 94
11. NEC 2008 – National Electrical Code Article 285

1.4 SYSTEM PERFORMANCE CRITERIA

A. General: Surge suppression, grounding and bonding required by this specification for protection of electrical systems shall effectively protect the systems to which it is applied against lightning, equipment transients, internal spikes, and other surge transients throughout the useful life of the system. Surge protective devices and related grounding and bonding systems shall be designed and installed in such a manner that normal operation and listing of the system is not impaired due to the installation of such devices.

B. Intent: The intent of this specification is to allow manufacturers with varying equipment concepts to provide transient voltage surge suppression which will properly protect equipment within the guidelines set forth herein. Specific manufacturers listed shall be used as the basis of design, however, submitted components shall comply to the minimum and maximum values listed and shall be equal to or better than the specific manufacturers type specified herein. The listed data specified herein shall be used for the comparative analysis of all manufacturers.

1.5 MANUFACTURER QUALIFICATIONS

A. General: Those firms responding to this specification shall provide proof that they have been regularly engaged in the design, manufacturing and testing of SPD for not less than twenty five (25) years.

B. Repair: The surge suppressor manufacturer shall offer factory repair service and replacement for all units. The manufacturer shall provide this service within four working days, and provide replacement components shipped to the Owner for installation within the allocated response time.

C. Acceptable Manufacturers: Only the following acceptable manufacturers shall be considered; LEA International and Current Technology.

1.6 WARRANTY

A. Period: All surge suppression devices and supporting components shall be guaranteed for a period of not less than ten (10) years from date of installation. The Contractor shall submit a check-out memo to the manufacturer indicating the date when the equipment was put into service and the actual method of installation. Submit three copies to the Engineer for review.

B. Replacement: Warranty shall cover unlimited replacement of SPD modules during the warranty period.. The warranty shall cover the entire device not just the modules.

1.7 SUBMITTAL

A. General: Surge protective devices shall be submitted as an integral part of the equipment submittal for the system or equipment which they protect. Surge suppressors and their wiring, bonding, and grounding connections shall be indicated on the wiring diagrams for each system.

B. Testing: The test data submitted shall be specific for the actual method on installation proposed. Submittals will not be reviewed unless they include proper project related data. Interpretation of standard manufacturers published data will not be acceptable unless the data coincides with the actual installation procedure.

C. Independent Testing:
1. High exposure with the 10 x 1,000µs tests per IEEE C62.41.2 Section 7.2
2. Life Cycle/Repetitive Testing per C62.45-2002 section B.38 minimum of 1,000 to 2,000 times.
3. Additional testing may be required for per phase or per mode fused products with a 200kA or 100kA per phase per IEEE C62. Products must be on line and function after surge test.

D. Information: The surge suppression submittal shall also include, but shall not be limited to, the following additional data;

1. Complete data for each suppressor type indicating conductor sizes, conductor types, connection configuration, lead lengths and all appropriate dimensions.
2. Dimensions for each suppressor type indicating mounting dimensions and required accessory hardware.
3. Manufacturers certified test data indicating the ability of the product to meet or exceed requirements of this specification.
4. If requested, a sample of each suppressor type to be used for testing and evaluation shall be submitted.
5. Drawings shall be provided indicating surge protection device mounting arrangement and lead length configuration.

6. List and detail all protection systems such as fuses.

E. UL 1449 stipulation for fused SPD – The manufacturer's authorized representative is required to submit the following:
   1. Certify that the SPD system is UL 1449 listed (UL Card) with UL Card.
   2. Indicate the type of internal or external fusing that is incorporated in the SPD system and what impact the fusing has on the performance of the device with respect to surge capacity and clamping levels.

   Include Electromagnetic interference filter which provides noise attenuation.

F. UL 1449 3rd edition Voltage protection rating (VPR) is assigned to each mode of protection using a combination wave generator at a setting of 6kV, 3kA. SPD shall have a Nominal discharge current rating (In) of 10kA or 20kA.

1.08 PROJECT CONDITIONS

A. Each protective device shall have a capacitive filtering system connected in each Line to Neutral (L-N)(Wye) mode or Line to Line (L-L)(Delta) mode to provide EMI/RFI noise attenuation.

B. Protection modes: The SPD shall provide Line to Neutral (L-N)(Wye or Split phase), Line to Ground (L-G)(All configurations), Line to Line (L-L)(Delta) and Neutral to Ground (N-G)(Wye or Split phase) protection.

C. Service conditions: Rate surge protective devices for continuous operation under the following conditions, unless otherwise indicated
   1. Maximum Continuous Operation Voltage: Not less than 115 percent of nominal system operating voltage.
   2. Operating Temperature: 30 to 120 deg F (0 to 50 deg C).
   3. Humidity: 0 to 85 percent, noncondensing.
   4. Altitude: Less than 20,000 feet (6000 m) above sea level.

PART 2 - PRODUCTS

2.1 PANELBOARD SUPPRESSORS

A. Suppressor's minimum surge current capacity shall be of 200kA per phase (L-N plus L-G) and 100kA per mode (L-N, L-G, L-L and N-G) for panels (feeding any outdoor equipment) rated equal to or greater than 600 amps.

B. Suppressor's minimum surge current capacity shall be of 100kA per phase (L-N plus L-G) and 50kA per mode (L-N, L-G, L-L and N-G) for branch panels feeding sensitive loads.

C. The system protection modules shall contain a technology that utilizes a symmetrical array of balanced metal oxide varistors (MOV). Each MOV will be individually coordinated to pass UL 1449.

D. All primary transient paths shall utilize copper wire, aluminum bus bar and lugs of equivalent capacity to provide equal impedance interconnection between phases. No plug-in module or components shall be used in surge carrying paths.

E. The suppressor shall provide the following monitoring features: visual indicator monitoring, dry contacts and audible alarm with alarm disable switch. Suppressor shall utilize a NEMA 4X enclosure.

F. Types: Surge suppression equipment shall be based on LEA International. Distribuition panels equal to or greater than 600 amps shall utilize SP200 Series, and panels less than 600 amps feeding sensitive loads shall utilize SP100 Series.

PART 3 - EXECUTION

3.1 SEGREGATION OF WIRING

A. General: All system wiring shall be classified into protected and non-protected categories. Wiring on the exposed side of suppression devices shall be considered unprotected. Surge suppressor grounding and bonding conductors shall also fall into this category.

B. Protection: All wiring between surge suppressors and protected equipment shall be considered protected and connected in accordance with the latest edition of the NEC.

C. Separation: A minimum of three inches of separation shall be provided between parallel runs of protected and unprotected wiring in control panels, terminal cabinets, terminal boards and other locations. In no case shall protected and unprotected wiring be bundled together or routed through the same conduit. Where bundles of protected and unprotected wiring cross, such crossings shall be made at right angles.

3.2 INSTALLATION OF SUPPRESSORS

A. General: Suppressors shall be installed as close as practical to the equipment to be protected consistent with the available space, however, do not exceed five feet for service entrance suppressors and utilize a 3 pole 60 amp breaker for connection means for the service entrance panels. For distribution/panelboards do not exceed eighteen inches and utilize 3 pole 30 amp breaker for connection. Suppressors shall be externally mounted to the panelboards as stand-alone units.

B. Installation: Suppressor shall be installed as close as practical to the electric panel or electronic equipment to be protected, consistent with available space. Suppressors shall be close nippled to the device being protected in a position near the neutral bus which will minimize lead length between suppressors and the buses and disconnect means to which the suppressor connects. Suppressor leads shall not extend beyond the suppressor manufacturer's recommended maximum lead length without specific approval of the Engineer.

C. Workmanship: Suppressors shall be installed in a neat, workmanlike manner. Lead dress shall be consistent with recommended industry practices for the system on which these devices are installed.

END OF SECTION 26 4313

SECTION 26 51 00
INTERIOR LIGHTING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. General: Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification sections, apply to work specified of this section.

1.2 DESCRIPTION

A. Description of System: Light fixtures provided under this Division shall be provided complete with lamps and all necessary trim and mounting hardware, and installed as shown on the drawings. Light fixtures shall be neatly and firmly mounted, using standard supports for outlets and fixtures. Lamps shall be included in the system guarantee for a period of 90 days after final acceptance of the building. All fixtures and associated products shall be UL listed for the application intended.

1.3 SUBMITTALS

A. Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
   1. Lithonia
   2. Day-Brite
   3. Cooper

B. Shop Drawings: Shop drawings shall be submitted for all fixtures ballasts, lamps, special accessories, etc. Submittals for fixtures that require modifications either as specified or as required to fit this projects' architectural field conditions (i.e. luminous ceiling, wall/slot fixtures, special fixtures) shall also be provided.

   1. Shop drawings shall be complete showing all dimensions and installation instructions required for this project's architectural/field conditions.
   2. Shop drawings for exterior post/pole mounted light fixtures shall be provided and shall clearly indicate handhole and lightning protection ground lug mounted to post/pole at handhole inside post/pole. Submit information on pole mounting, concrete base, etc.

C. Product Data: Product data shall be submitted for all light fixtures showing:

   1. Dimensions
   2. U.L. Label
   3. Fusing
   4. Metal gauge
   5. lLns/louver thickness
   6. Finish
   7. Voltage
   8. Lamps
   9. Ballasts

D. Product data shall be submitted showing manufacturer's written recommendations for storage and protection, and installation instructions.

1.4 PRODUCT STORAGE AND HANDLING

A. Protection: Physically protect fixtures against damage as recommended by manufacturer.

PART 2 - PRODUCTS

2.1 GENERAL

A. Fusing: All fluorescent fixtures provided under this Division shall be individually fused with a renewable fuse in an external GLR holder. All fluorescent ballasts shall be CBM-ETL accepted, and shall be of the automatic thermal resetting type Class P. Provide ten extra renewable fuses to the Owner. Place GLR fuse holder at the most readily accessible location for ease of maintenance.

B. Testing: All fixtures shall adhere to UL Test Standard No. 1571 and Section 410-65(c) of the National Electrical Code.

C. Mounting: The contractor shall provide fixture trims and supports as required to match type of ceiling system. No ceiling fixture shall be ordered until the Ceiling System Installer has given written acceptance of the method and location of fixture hanging and fixture type. Fixtures shall be supported independent of the suspended ceiling system. Provide closed link jack chain at all four corners of fixtures utilizing a trapeze inverted "Y" connection. Provide individual supports at all four corners when trapeze connections conflict with mechanical work.

D. Labels: All light fixtures and ballasts shall be UL listed. All light fixtures shall not have any labels exposed to normal viewing angles. This includes manufacturer labels and U.L. labels. All labels shall be concealed within the body of the fixture. No manufacturers name or logo shall appear on the exterior of any light fixtures unless accepted in writing by the engineer.

E. Exterior Fixtures: All lighting fixtures mounted outdoors subject to dampness and insects shall have gasketing material between lens door and frame to completely seal interior of fixture. Knockouts and holes in fixtures housing shall be closed and sealed. All fixtures shall be complete with lamps, shielding, brackets, concrete bases, anchor bolts and all necessary fittings and accessories for a complete installation.

F. Ceiling Coordination: The contractor shall coordinate installation of all fixtures with architectural ceiling types and shall provide any/all required accessories necessary for proper installation of fixtures (i.e. flange kits).

G. Stairwell: Stairwell landing fixtures shall be mounted so they are accessible from a ladder.

2.2 ELECTRONIC BALLAST

A. General: Ballast shall be electronic type, normal power factor and shall be covered by a five-year warranty against defects. Warranty shall include payment for normal labor costs of replacements of inoperative in-warranty ballasts. Ballast shall be rated for voltage system to which applied. The electronic ballast shall incorporate the following min. features:

1. Solid state ballast shall be compatible for use with F-32(32W), F-25(25W) and F-17(17W) straight biax-type lamps.
2. Ballast shall be high frequency (20-62.5 KHz) and operate without detectable flicker.
3. Ballast shall be constant current rated 95 percent power factor.
4. Ballast shall have a thermo-setting, non-toxic, fire retardant partial filler to serve as a conformal coating and protective insulator against both internal and external damage.
5. Ballast shall have internal regulation of power consumption and light output under input line voltage fluctuations.
6. Ballast shall be minimum "A" sound rated and operate quiet.
7. Ballast case temperature shall not exceed 90 degrees C.
8. Ballast shall contain MOV transient surge protection.

9. Ballast shall not cause RFI interference.
10. Ballast shall have total harmonic distortion of less than 20 percent.
11. Ballasts (including compact fluorescent ballasts) shall be Instant Start Type

B. Manufacturers: All ballasts shall be compatible to lamps provided. Ballasts shall be provided by one of the following manufacturers. No substitutions are allowed:

1. Advance
2. MagneTek
3. Valmont
4. Motorola
5. Osram-Sylvania

2.3 T-8 FLUORESCENT LAMPS

A. General: Provide lamps as follows:

1. 2 foot lamps, T-8, 17 watts, 4100 degrees K, 85 minimum CRI, 1350 minimum initial lumens, 20,000 average life.
2. 3 foot lamps, T-8, 25 watts, 4100 degrees K, 85 minimum CRI, 2150 minimum initial lumens, 20,000 average life.
3. 4 foot lamps, T-8, 32 watts, 4100 degrees K, 85 minimum CRI, 2850 minimum initial lumens, 20,000 average life.

B. Design Selection: OSRAM-Sylvania, GE, or Philips.

2.4 2 FOOT BIAX LAMPS

A. General: Lamps shall be 40 watts, 4100 degrees K, CRI of 82 minimum, 3150 lumens, 20,000 average rated hours.

B. Design Selection: OSRAM- Philips.

2.5 COMPACT FLUORESCENT

A. Lamps shall be 4100 degrees K, CRI of 82 minimum. Lamps 13 watts and below shall be rated minimum 10,000 hours life. Lamps 18 watts and above shall be rated minimum 20,000 hours life. Refer to light fixtures schedule for wattage of lamps.

B. Design Selection:

1. OSRAM-Sylvania
2. GE
3. Philips

PART 3 - EXECUTION

3.1 INSTALLATION

A. Sealing: Ducseal shall be installed to seal all conduits entering exterior light fixtures from underground.

B. Instructions: Install all fixtures in accordance with manufacturer's written instructions and NEC.

C. Suspended Installation: Pendant mounted fluorescent fixtures installed in exposed ceiling areas are to be suspended from structure with all-thread rods and 1-1/2 x 1-1/2 inch Kindorf channels, full length of fixture/row. Mount outlet box at structure with flexible connection to fixture.

D. Coordination: Coordinate fixtures installed in mechanical rooms with piping and ductwork prior to installation and relocate fixtures as required to provide proper illumination and access.

E. All ballasts shall be securely mounted to eliminate resonate humming.

3.2 LAMPS

A. Lamps: Provide a minimum of one case or six lamps, which ever is greater, for every type of lamp installed. Quantity may increase with large scale projects. Coordinate with an owners representative for conformation prior to bid.

B. Lamps shall be “burned in” for a period of 30 days prior to substantial completion of the project. All lamps requiring replacement (flickering, burn out, etc.) during this period through 90 days after Owner Acceptance shall be done so at no additional cost.

3.3 CLEAN-UP

A. Luminaires: Prior to the Owner move-in, the Contractor shall clean all fixtures and remove any dust or dirt. Wash lens and glassware using cleaner such as "Windex" and dry with absorbent cloth. Clean plastic per manufacturer's recommendations; do not wipe. Clean "Alzak" aluminum surfaces (reflectors, fixture cones and the like) per manufacturer's recommendations being careful to remove fingerprints and smudges.

END OF SECTION 26 5100

SECTION 270528 - PATHWAYS FOR COMMUNICATIONS SYSTEMS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:
1. Metal conduits and fittings.
2. Nonmetallic conduits and fittings.
3. Optical-fiber-cable pathways and fittings.
4. Metal wireways and auxiliary gutters.
5. Nonmetallic wireways and auxiliary gutters.
6. Surface pathways.
7. Boxes, enclosures, and cabinets.
8. Handholes and boxes for exterior underground cabling.

B. Related Requirements:
1. Division 26 Section "Raceways and Boxes for Electrical Systems" for conduits, wireways, surface raceways, boxes, enclosures, cabinets, handholes, and faceplate adapters serving electrical systems.

1.3 DEFINITIONS

A. ARC: Aluminum rigid conduit.

B. GRC: Galvanized rigid steel conduit.

C. IMC: Intermediate metal conduit.

1.4 ACTION SUBMITTALS

A. Product Data: For surface pathways, wireways and fittings, floor boxes, hinged-cover enclosures, and cabinets.

B. Shop Drawings: For custom enclosures and cabinets. Include plans, elevations, sections, and attachment details.

1.5 INFORMATIONAL SUBMITTALS

A. Coordination Drawings: Pathway routing plans, drawn to scale, on which the following items are shown and coordinated with each other, using input from installers of items involved:

1. Structural members in paths of pathway groups with common supports.
2. HVAC and plumbing items and architectural features in paths of conduit groups with common supports.

B. Qualification Data: For professional engineer.

PART 2 - PRODUCTS

2.1 METAL CONDUITS AND FITTINGS

A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
1. Allied Tube & Conduit; a Tyco International Ltd. Co.
2. Alpha Wire Company.
3. O-Z/Gedney; a brand of EGS Electrical Group.
4. Southwire Company.
5. Thomas & Betts Corporation.
6. Wheatland Tube Company; a division of John Maneely Company.

B. General Requirements for Metal Conduits and Fittings:

1. Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
2. Comply with TIA-569-B.

C. GRC: Comply with ANSI C80.6 and UL 1242.

D. IMC: Comply with ANSI C80.6 and UL 1242.

E. EMT: Comply with ANSI C80.3 and UL 797.

F. Fittings for Metal Conduit: Comply with NEMA FB 1 and UL 514B.

1. Conduit Fittings for Hazardous (Classified) Locations: Comply with UL 886 and NFPA 70.
2. Fittings for EMT:

a. Material: Steel.
b. Type: Sets crew or compression.

3. Expansion Fittings: PVC or steel to match conduit type, complying with UL-467, rated for environmental conditions where installed, and including flexible external bonding jumper.

4. Coating for Fittings for PVC-Coated Conduit: Minimum thickness of 0.040 inch, with overlapping sleeves protecting threaded joints.

G. Joint Compound for IMC, GRC, or ARC: Approved, as defined in NFPA 70, by authorities having jurisdiction for use in conduit assemblies, and compounded for use to lubricate and protect threaded conduit joints from corrosion and to enhance their conductivity.

2.2 NONMETALLIC CONDUITS AND FITTINGS

A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
1. Allied Tube & Conduit; a Tyco International Ltd. Co.
2. RACO; a Hubbell company.
3. Thomas & Betts Corporation.

B. General Requirements for Nonmetallic Conduits and Fittings:

1. Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
2. Comply with TIA-569-B.

2.3 OPTICAL-FIBER-CABLE PATHWAYS AND FITTINGS

A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

1. Alpha Wire Company.
2. Arnco Corporation.
3. Lamson & Sessions; Carlon Electrical Products.

B. Description: Comply with UL 2024; flexible-type pathway, approved for general-use installation unless otherwise indicated.

1. Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
2. Comply with TIA-569-B.

2.4 METAL WIREWAYS AND AUXILIARY GUTTERS

A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

1. Cooper B-Line, Inc.
2. Hoffman; a Pentair company.
3. Square D; a brand of Schneider Electric.

B. Description: Sheet metal, complying with UL 870 and NEMA 250, Type 1 unless otherwise indicated, and sized according to NFPA 70.

1. Metal wireways installed outdoors shall be listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
2. Comply with TIA-569-B.

C. Fittings and Accessories: Include covers, couplings, offsets, elbows, expansion joints, adapters, hold-down straps, end caps, and other fittings to match and mate with wireways as required for complete system.

D. Wireway Covers: Screw-cover type unless otherwise indicated.

E. Finish: Manufacturer's standard enamel finish.

2.5 SURFACE PATHWAYS

A. General Requirements for Surface Pathways:

1. Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
2. Comply with TIA-569-B.

B. Surface Metal Pathways: Galvanized steel with snap-on covers complying with UL 5. Manufacturer's standard enamel finish in color selected by Architect.

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

a. Mono-Systems, Inc.
b. Panduit Corp.
c. Wiremold / Legrand.

C. Surface Nonmetallic Pathways: Two- or three-piece construction, complying with UL 5A, and manufactured of rigid PVC with texture and color selected by Architect from manufacturer's standard colors. Product shall comply with UL-94 V-0 requirements for self-extinguishing characteristics.

2.6 BOXES, ENCLOSURES, AND CABINETS

A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
1. Cooper Technologies Company; Cooper Crouse-Hinds.
2. EGS/Appleton Electric.
3. Hoffman; a Pentair company.
4. Hubbell Incorporated; Killark Division.

5. RACO; a Hubbell company.
6. Thomas & Betts Corporation.
7. Wiremold / Legrand.

B. General Requirements for Boxes, Enclosures, and Cabinets:

1. Comply with TIA-569-B.
2. Boxes, enclosures and cabinets installed in wet locations shall be listed for use in wet locations.

C. Sheet-Metal Outlet and Device Boxes: Comply with NEMA OS 1 and UL 514A.

D. Cast-Metal Outlet and Device Boxes: Comply with NEMA FB 1, ferrous alloy Type FD, with gasketed cover.

Box extensions used to accommodate new building finishes shall be of same material as recessed box.

E. Metal Floor Boxes:

1. Material: Cast metal or sheet metal.
2. Type: Fully and Semi-adjustable.
3. Shape: Rectangular.
4. Listing and Labeling: Metal floor boxes shall be listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

F. Small Sheet Metal Pull and Junction Boxes: NEMA OS 1.

G. Cast-Metal Access, Pull, and Junction Boxes: Comply with NEMA FB 1 and UL 1773, galvanized, cast iron with gasketed cover.

H. Device Box Dimensions: 4 inches square by 2-1/8 inches deep.

I. Gangable boxes are allowed

J. Nonmetallic Outlet and Device Boxes: Comply with NEMA OS 2 and UL 514C.

K. Hinged-Cover Enclosures: Comply with UL 50 and NEMA 250, Type 1 with continuous-hinge cover with flush latch unless otherwise indicated.

1. Metal Enclosures: Steel, finished inside and out with manufacturer's standard enamel.
   a. Finished inside with radio-frequency-resistant paint.

2. Interior Panels: Steel; all sides finished with manufacturer's standard enamel.

L. Cabinets:

1. NEMA 250, Type 1 galvanized-steel box with removable interior panel and removable front, finished inside and out with manufacturer's standard enamel.

2. Hinged door in front cover with flush latch and concealed hinge.
3. Key latch to match panelboards.
4. Metal barriers to separate wiring of different systems and voltage.
5. Accessory feet where required for freestanding equipment.
6. Nonmetallic cabinets shall be listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

PART 3 - EXECUTION

3.1 PATHWAY APPLICATION

A. Indoors: Apply pathway products as specified below unless otherwise indicated:

1. Exposed, Not Subject to Physical Damage: EMT.
2. Exposed, Not Subject to Severe Physical Damage: EMT.
3. Exposed and Subject to Severe Physical Damage: GRC. Pathway locations include the following:

    a. Loading dock.
    b. Corridors used for traffic of mechanized carts, forklifts, and pallet-handling units.
    c. Mechanical rooms.
    d. Gymnasiums

4. Concealed in Ceilings and Interior Walls and Partitions: EMT.
5. Damp or Wet Locations: GRC.
6. Pathways for Optical-Fiber or Communications Cable in Spaces Used for Environmental Air: Plenum-type, communications-cable pathway EMT.
7. Pathways for Concealed General-Purpose Distribution of Optical-Fiber or Communications Cable: General-use, optical-fiber-cable pathway.

B. Minimum Pathway Size: 3/4-inch trade size. Minimum size for optical-fiber cables is 1 inch.

C. Pathway Fittings: Compatible with pathways and suitable for use and location.

1. Rigid and Intermediate Steel Conduit: Use threaded rigid steel conduit fittings unless otherwise indicated. Comply with NEMA FB 2.10.
2. PVC Externally Coated, Rigid Steel Conduits: Use only fittings listed for use with this type of conduit. Patch and seal all joints, nicks, and scrapes in PVC coating after installing conduits and fittings. Use sealant recommended by fitting manufacturer and apply in thickness and number of coats recommended by manufacturer.
3. EMT: Use setscrew fittings. Comply with NEMA FB 2.10.

D. Do not install aluminum conduits, boxes, or fittings in contact with concrete or earth.

E. Install surface pathways only where indicated on Drawings.

3.2 INSTALLATION

A. Comply with NECA 1, NECA 101, and TIA-569-B for installation requirements except where requirements on Drawings or in this article are stricter. Comply with NECA 102 for aluminum pathways. Comply with NFPA 70 limitations for types of pathways allowed in specific occupancies and number of floors.

B. Keep pathways at least 6 inches away from parallel runs of flues and steam or hot-water pipes. Install horizontal pathway runs above water and steam piping.

C. Complete pathway installation before starting conductor installation.

D. Comply with requirements in Division 26 Section "Hangers and Supports for Electrical Systems" for hangers and supports.

E. Arrange stub-ups so curved portions of bends are not visible above finished slab.

F. Install no more than the equivalent of two 90-degree bends in any pathway run. Support within 12 inches of changes in direction. Utilize long radius ells for all optical-fiber cables.

G. Conceal conduit and EMT within finished walls, ceilings, and floors unless otherwise indicated. Install conduits parallel or perpendicular to building lines.

H. Support conduit within 12 inches of enclosures to which attached.

I. Pathways Embedded in Slabs:

1. Run conduit larger than 1-inch trade size, parallel or at right angles to main reinforcement. Where at right angles to reinforcement, place conduit close to slab support. Secure pathways to reinforcement at maximum 10-foot intervals.
2. Arrange pathways to cross building expansion joints at right angles with expansion fittings.
3. Arrange pathways to keep a minimum of 2 inches of concrete cover in all directions.
4. Do not embed threadless fittings in concrete unless specifically approved by Architect for each specific location.
5. Change from ENT to GRC or IMC before rising above floor.

J. Stub-ups to Above Recessed Ceilings:

1. Use EMT, IMC, or RMC for pathways.
2. Use a conduit bushing or insulated fitting to terminate stub-ups not terminated in hubs or in an enclosure.

K. Threaded Conduit Joints, Exposed to Wet, Damp, Corrosive, or Outdoor Conditions: Apply listed compound to threads of pathway and fittings before making up joints. Follow compound manufacturer's written instructions.

L. Coat field-cut threads on PVC-coated pathway with a corrosion-preventing conductive compound prior to assembly.

M. Terminate threaded conduits into threaded hubs or with locknuts on inside and outside of boxes or cabinets. Install insulated bushings on conduits terminated with locknuts.

N. Install pathways square to the enclosure and terminate at enclosures with locknuts. Install locknuts hand tight plus 1/4 turn more.

O. Do not rely on locknuts to penetrate nonconductive coatings on enclosures. Remove coatings in the locknut area prior to assembling conduit to enclosure to assure a continuous ground path.

P. Cut conduit perpendicular to the length. For conduits of 2-inch trade size and larger, use roll cutter or a guide to ensure cut is straight and perpendicular to the length.

Q. Install pull wires in empty pathways. Use polypropylene or monofilament plastic line with not less than 200-lb tensile strength. Leave at least 12 inches of slack at each end of pull wire. Cap underground pathways designated as spare above grade alongside pathways in use.

R. Surface Pathways:

1. Install surface pathway for surface telecommunications outlet boxes only where indicated on Drawings.
2. Install surface pathway with a minimum 2-inch radius control at bend points.
3. Secure surface pathway with screws or other anchor-type devices at intervals not exceeding 48 inches and with no less than two supports per straight pathway section. Support surface pathway according to manufacturer's written instructions. Tape and glue are not acceptable support methods.

S. Pathways for Optical-Fiber and Communications Cable: Install pathways, metal and nonmetallic, rigid and flexible, as follows:

1. 3/4-Inch Trade Size and Smaller: Install pathways in maximum lengths of 50 feet.
2. 1-Inch Trade Size and Larger: Install pathways in maximum lengths of 75 feet.
3. Install with a maximum of two 90-degree bends or equivalent for each length of pathway unless Drawings show stricter requirements. Separate lengths with pull or junction boxes or terminations at distribution frames or cabinets where necessary to comply with these requirements.

T. Install pathway sealing fittings at accessible locations according to NFPA 70 and fill them with listed sealing compound. For concealed pathways, install each fitting in a flush steel box with a blank cover plate having a finish similar to that of adjacent plates or surfaces. Install pathway sealing fittings according to NFPA 70.

U. Install devices to seal pathway interiors at accessible locations. Locate seals so no fittings or boxes are between the seal and the following changes of environments. Seal the interior of all pathways at the following points:

1. Where conduits pass from warm to cold locations, such as boundaries of refrigerated spaces.
2. Where an underground service pathway enters a building or structure.

3. Where otherwise required by NFPA 70.

V. Comply with manufacturer's written instructions for solvent welding PVC conduit and fittings.

W. Expansion-Joint Fittings:

1. Install in each run of aboveground RNC that is located where environmental temperature change may exceed 30 deg F (17 deg C), and that has straight-run length that exceeds 25 feet. Install in each run of aboveground RMC and EMT conduit that is located where environmental temperature change may exceed 100 deg F (55 deg C) and that has straight-run length that exceeds 100 feet.

2. Install fitting(s) that provide expansion and contraction for at least 0.00041 inch per foot of length of straight run per deg F of temperature change for PVC conduits. Install fitting(s) that provide expansion and contraction for at least 0.000078 inch per foot of length of straight run per deg F of temperature change for metal conduits.
3. Install expansion fittings at all locations where conduits cross building or structure expansion joints.
4. Install each expansion-joint fitting with position, mounting, and piston setting selected according to manufacturer's written instructions for conditions at specific location at time of installation. Install conduit supports to allow for expansion movement.

X. Mount boxes at heights indicated on Drawings. If mounting heights of boxes are not individually indicated, give priority to ADA requirements. Install boxes with height measured to bottom of box unless otherwise indicated.

Y. Recessed Boxes in Masonry Walls: Saw-cut opening for box in center of cell of masonry block, and install box flush with surface of wall. Prepare block surface to provide a flat surface for a rain-tight connection between box and cover plate or supported equipment and box.

Z. Horizontally separate boxes mounted on opposite sides of walls so they are not in the same vertical channel.

AA. Support boxes of three gangs or more from more than one side by spanning two framing members or mounting on brackets specifically designed for the purpose.

BB. Fasten junction and pull boxes to or support from building structure. Do not support boxes by conduits.

CC. Set metal floor boxes level and flush with finished floor surface.

DD. Set nonmetallic floor boxes level. Trim after installation to fit flush with finished floor surface.

3.3 INSTALLATION OF UNDERGROUND CONDUIT

A. Direct-Buried Conduit:

1. Excavate trench bottom to provide firm and uniform support for conduit. Prepare trench bottom as specified in Division 31 Section "Earth Moving" for pipe less than 6 inches in nominal diameter.
2. Install backfill as specified in Division 31 Section "Earth Moving."
3. After installing conduit, backfill and compact. Start at tie-in point, and work toward end of conduit run, leaving conduit at end of run free to move with expansion and contraction as temperature changes during this process. Firmly hand tamp backfill around conduit to provide maximum supporting strength. After placing controlled backfill to within 12 inches of finished grade, make final conduit connection at end of run and complete backfilling with normal compaction as specified in Division 31 Section "Earth Moving."
4. Install manufactured duct elbows for stub-ups at poles and equipment and at building entrances through floor unless otherwise indicated. Encase elbows for stub-up ducts throughout length of elbow.
5. Install manufactured rigid steel conduit elbows for stub-ups at poles and equipment and at building entrances through floor.

    a. Couple steel conduits to ducts with adapters designed for this purpose, and encase coupling with 3 inches of concrete for a minimum of 12 inches on each side of the coupling.
    b. For stub-ups at equipment mounted on outdoor concrete bases and where conduits penetrate building foundations, extend steel conduit horizontally a minimum of 60 inches from edge of foundation or equipment base. Install insulated grounding bushings on terminations at equipment.

6. Warning Planks: Bury warning planks approximately 12 inches above direct-buried conduits, but a minimum of 6 inches below grade. Align planks along centerline of conduit.
7. Underground Warning Tape: Comply with requirements in Division 26 Section "Identification for Electrical Systems."

3.4 INSTALLATION OF UNDERGROUND HANDHOLES AND BOXES

A. Install handholes and boxes level and plumb and with orientation and depth coordinated with connecting conduits to minimize bends and deflections required for proper entrances.

B. Unless otherwise indicated, support units on a level bed of crushed stone or gravel, graded from 1/2-inch sieve to No. 4 sieve and compacted to same density as adjacent undisturbed earth.

C. Elevation: In paved areas, set so cover surface will be flush with finished grade. Set covers of other enclosures 1 inch above finished grade.

D. Install removable hardware, including pulling eyes, cable stanchions, cable arms, and insulators, as required for installation and support of cables and conductors and as indicated. Select arm lengths to be long enough to provide spare space for future cables, but short enough to preserve adequate working clearances in enclosure.

E. Field cut openings for conduits according to enclosure manufacturer's written instructions. Cut wall of enclosure with a tool designed for material to be cut. Size holes for terminating fittings to be used, and seal around penetrations after fittings are installed.

3.5 SLEEVE AND SLEEVE-SEAL INSTALLATION FOR COMMUNICATIONS PENETRATIONS

A. Install sleeves and sleeve seals at penetrations of exterior floor and wall assemblies. Comply with requirements in Division 27 Section "Sleeves and Sleeve Seals for Communications Pathways and Cabling."

3.6 FIRESTOPPING

A. Install fire-stopping at penetrations of fire-rated floor and wall assemblies. Comply with requirements in Division 07 Section "Penetration Fire-stopping."

3.7 PROTECTION

A. Protect coatings, finishes, and cabinets from damage or deterioration.

1. Repair damage to galvanized finishes with zinc-rich paint recommended by manufacturer.
2. Repair damage to PVC coatings or paint finishes with matching touchup coating recommended by manufacturer.

END OF SECTION 270528