



STATE OF NEW YORK
OFFICE OF GENERAL SERVICES
DESIGN AND CONSTRUCTION GROUP
THE GOVERNOR NELSON A. ROCKEFELLER
EMPIRE STATE PLAZA
ALBANY, NY 12242



ADDENDUM NO. 1 TO PROJECT NO. 44520

**ELECTRICAL WORK
REPLACE/UPGRADE STREET LIGHTING,
ROCKLAND PC - HUDSON RIVER CAMPUS
ROSS CIRCLE, CHENEY DRIVE, SNOW TERRACE AND PARKING LOTS, BLDS 141, 142
10 ROSS CIRCLE
POUGHKEEPSIE, NY 12601**

May 23, 2013

NOTE: This Addendum forms a part of the Contract Documents. Insert it in the Project Manual. Acknowledge receipt of this Addendum in the space provided on the Bid Form.

ELECTRICAL WORK SPECIFICATIONS

1. Discard the following Sections bound in the Project Manual, and substitute the attached Sections noted "Revised 5/22/13".
 - a. "Section 011000 Summary of The Work": In its entirety.
 - b. "Section 012100 Allowances": In its entirety.
 - c. "Section 012200 Cost Computations": In its entirety.
 - d. "Section 013000 Administrative Requirements": In its entirety.
 - e. "Section 013119 Project Meetings": In its' entirety.
 - f. "Section 013300 Submittals": In its entirety.
 - g. "Section 014100 Regulatory Requirements": In its entirety.
 - h. "Section 014216 Definitions": In its entirety.
 - i. "Section 015000 Construction Facilities & Temporary Controls": In its entirety.
 - j. "Section 016500 Materials and Equipment": In its' entirety.
 - k. "Section 017716 Contract Closeout": In its entirety.
 - l. "Section 033001 Cast-In-Place Concrete": In its entirety.
 - m. "Section 260519 Wiring, General – 600Volts And Under": In its entirety.
 - n. "Section 260529 Fasteners, Attachments, And Supporting Devices": In its entirety.
 - o. "Section 260531 Exposed Conduit – Wet Locations": In its entirety.
 - p. "Section 260534 Outlet, Junction, And Pull Boxes": In its entirety.
 - q. "Section 262416 Panelboards": In its entirety.
 - r. "Section 265629 Street Lighting And Grounds Lighting": In its entirety.
 - s. "Section 347115 Steel Pipe Bollards": In its entirety.

END OF ADDENDUM

James Dirolf, P.E.
Director of Design

Updated 02/07/2008
Printed 05/23/2013

SECTION 011000

SUMMARY OF THE WORK

PART 1 GENERAL

1.01 WORK COVERED BY CONTRACT DOCUMENTS

- A. The title and location of the Work is printed on the cover of this Project Manual.
- B. Type of Contract: Fixed price.

1.02 SUBSTANTIAL AND PHYSICAL COMPLETION DATES

- A. Substantially complete the Work within 150 days after the Agreement is approved by the Comptroller.
 - 1. The time allocated for the performance of work under this contract includes 10 days for notification of the Contractor of the Comptroller's approval of the Agreement.
 - 2. The approval of the Agreement by the Comptroller constitutes the filing of the Contract Documents as a public record and notice to the Contractor that a fully executed contract exists between the Contractor and the State.
- B. Physically complete the Work within 90 days after the established Substantial Completion date.

1.03 CONTRACT AWARD SUBMITTALS

- A. Submittal No. 1 (Lead Contractor Only): Establish the subscription with the electronic submittals website provider as described in ELECTRONIC SUBMITTALS Article in Specifications Section 013300, and submit not later than 10 days after approval of the Contract by the Comptroller.
- B. Submittal No. 2: Submit the CONTRACTOR'S LIST OF SUBCONTRACTORS-SUPPLIERS information required in SCHEDULES AND RECORDS Article in Specification Section 013000 not later than 15 days after approval of the Contract by the Comptroller.
- C. Submittal No.3: Submit the CONTRACTOR'S PROGRESS SCHEDULE information required in SCHEDULES AND RECORDS Article in Specification Section 013000 not later than 15 days after approval of the Contract by the Comptroller.

1.04 ITEMS NOT INCLUDED

- A. The following items shown on the Drawings are not included in this Contract:
 - 1. Items indicated "NIC" (Not in Contract).

2. Existing construction, except where such construction is to be removed, replaced, or altered.

1.05 OCCUPANCY

- A. This is an occupied Facility. The site will be occupied and operational during execution of the Work.
- B. This is an occupied Facility. The building, except for the work areas, will be occupied during execution of the Work. Ingress to and egress from the building shall be maintained at all times.
- C. This is an occupied Facility, however, the building will be vacated during execution of the Work.

1.06 CONTRACTOR USE OF PREMISES

- A. Work hours shall be as established by the Facility authorities through the Director's Representative.
- B. Inform the Director's Representative of work area access requirements. The Director's Representative will coordinate and schedule the requirements with Facility staff to obtain and ensure timely availability of work areas.
- C. Check in with the Facility Representative, as directed, at the beginning of each work day. Furnish information regarding where employees will be working during the day.
- D. Comply with the Facility's Visitor Identification Policy. A copy of the current policy will be distributed at the initial job meeting.
- E. The following items are not allowed on the Site or on Facility premises.
 1. Firearms, ammunition, weapons, and dangerous instruments (other than tools required for the Work).
 2. Alcoholic beverages and persons under the influence of same.
 3. Illegal controlled substances and persons under the influence of same.
 4. Cameras (except with written permission from the Director's Representative).
- F. Comply with Facility policies relating to smoking at the Site.
- G. Store materials and perform the Work so that pedestrian and vehicular traffic is not obstructed.
- H. Do not diminish the level of life safety during performance of the Work.
- I. Utility Outages and Shutdowns: Do not interrupt utility services or branch services within the site except for the time required to make new connections.

Arrange with the Director's Representative for the time and duration of interruptions of services. Provide temporary services required to maintain lighting services at all times other than during scheduled interruptions.

- J. Be responsible and accountable for employees, suppliers, subcontractors and their employees, with regard to their use of the premises. Direct them to comply with the Facility Regulations and with the security and traffic regulations.
- K. Furnish Facility authorities with a telephone number or method to contact the supervisor for the Work in case of an emergency after work hours, including weekends and holidays.
- L. Comply with applicable federal and State of New York Right-to-Know Law provisions and supply copies of the appropriate Material Safety Data Sheets (MSDS) to the Director's Representative, and to the Facility's Right-to-Know Information Officer.
- M. Direct employees to be watchful for people in or near the work area where safety hazards may be present. Notify the Facility Safety/Security Department, if necessary, to remove them from the work area or Site.
- N. Report fire and other emergency situations to the Facility Safety/Security Department immediately.

1.07 FACILITY REGULATIONS

- A. Do not physically, verbally, or psychologically mistreat patients, clients, or other persons at the Facility.
- B. Do not receive from or give to patients, clients, or other persons at the Facility, any items (food, cigarettes, money, matches, mail, etc.) as this practice may be harmful to the treatment plan or may be illegal.
- C. Do not have sexual relations with any patient or client. This, even at their invitation, is a crime and may be a felony.

1.08 REFERENCE SPECIFICATIONS AND STANDARDS

- A. Comply with the requirements of the various specifications and standards referred to in these Specifications, except where they conflict with the requirements of these Specifications. Such reference specifications and standards shall be the date of latest revision in effect at the time of receiving bids, unless the date is given.
- B. DOT Specifications: If the abbreviation DOT appears in these Specifications, it shall mean the most current edition of the New York State Department of Transportation, Office of Engineering specifications entitled "STANDARD SPECIFICATIONS - CONSTRUCTION AND MATERIALS", including all applicable Addenda in effect at the time of receipt of bids. The DOT specifications may be purchased from the Department of Transportation, Plan and Publication Sales, 50 Wolf Road, Albany, NY 12232, (518) 457-2124.

1.09 LAYING OUT

- A. Examine the Contract Documents thoroughly and promptly report any errors or discrepancies to the Director's Representative before commencing the Work.
- B. Lay out the Work in accordance with the Contract Documents.

PART 2 PRODUCTS (Not Used)

PART 3 EXECUTION (Not Used)

END OF SECTION

SECTION 012100

ALLOWANCES

PART 1 GENERAL

1.01 DESCRIPTION

- A. Include in the contract sum the allowances stated in this Section.
- B. Should the net cost be more than the specified amount of the allowance, the contract sum will be adjusted by Order on Contract in accordance with the General Conditions. No Work in excess of the allowance will be permitted except by Order on Contract. Should the net cost be less than the specified amount of the allowance, the balance will be deducted from the final payment.

1.02 TOTAL FOR ALLOWANCES

- A. The sum of allowances required by this Contract is \$11,300.

1.03 ALLOWANCE FOR CONTINGENCIES

- A. Include in the contract sum the amount of \$11,300 to cover the cost of additional labor and materials for contingent activities within the scope of the Contract as directed in writing by Field Order. The Field Order will include a description of the Work and a method for determining the cost of such Work.
- B. The value of the directed Work under this allowance will be determined by one or more of the methods authorized in Section 012200 which will be specified in the Field Order.

PART 2 PRODUCTS (Not Used)

PART 3 EXECUTION (Not Used)

END OF SECTION

SECTION 012200

COST COMPUTATIONS

PART 1 GENERAL

1.01 DESCRIPTION

- A. The Contracting Officer shall determine the value of any order on contract or field order by one or more of the following methods:
1. By accepting an amount agreed upon by both parties, which amount is to be calculated in a manner similar to that provided in Subparagraph 1.01 A. 3.
 2. By applying the applicable price or prices set forth in the Contract Documents or in the Detailed Estimate or by applying a unit price agreed to by both parties.
 3. By estimating the fair and reasonable cost of: (i) labor, including all wages, required wage supplements and insurance required by law (workers' compensation, social security, disability, unemployment, etc.) paid to or on behalf of foremen, workers and other employees below the rank of the Contractor's designated representative directly employed at the Site of the Project, and, on contracts with an award price less than \$1,000,000, the Contractor's designated representative, regardless of job title or work status; (ii) materials; (iii) equipment, excluding hand tools, which, in the judgment of the State, would have been or will be employed exclusively and directly on the omitted work or extra work, as the case may be; and, where the same is performed directly by the Contractor; by adding to the total of such estimated costs a sum equal to 15 percent thereof, but, where the extra work is performed by a subcontractor, by adding a sum equal to 15 percent of said costs for the benefit of such subcontractor, and by adding, for the benefit of the Contractor (no further allowance will be made where extra work is performed by the sub-subcontractor), an additional sum equal to 10 percent of the first \$10,000 of the above-estimated costs, including the subcontractor's percentage override, plus 5 percent of the next \$90,000 of the total of said items, plus 3 percent of any sum in excess of \$100,000 of the total of said items. For the purposes of the aforesaid percentage overrides, the words "extra work" shall be defined as a complete item of added, modified or changed work as described in writing to the Contractor and the reductions enumerated shall be applied individually to each Order on contract issued on a Contract. Such "extra work" may include the work of one or more trades and/or subcontractors or sub-subcontractors and shall include all labor, material, plant, equipment, tools and all incidentals directly and/or indirectly necessary, related, involved in or convenient to the successful completion of the extra work item.
 4. All profit, overhead and expense of whatsoever kind and nature, other than those set forth above in items (i) through (iii) and below in Paragraph 1.01 D., of the Contractor, its subcontractors and sub-

subcontractors, are covered by the aforesaid percentage overrides and no additional payment therefore will be made by the State.

5. By determining the actual cost of the extra work in the same manner as in the above Subparagraph 1.01 A. 3. except that actual costs of the Contractor be utilized in lieu of estimated costs. The State shall have the option to utilize this method provided it notifies the Contractor of its intent to do so prior to the time the Contractor is properly authorized to commence performance of such work.
- B. Irrespective of the method used or to be used by the State in determining the value of non unit price work, the Contractor shall, after receipt of a request, promptly submit to the State a detailed breakdown of the Contractor's estimate of the value of the omitted or extra work. The Contractor shall submit evidence, satisfactory to the Contracting Officer, to substantiate each and every item that constitutes his proposal for the change. The State shall promptly respond to such submission.
- C. Whenever this Contract requires the determination of the cost of equipment, it shall be determined as follows:
1. Equipment used or to be used in the performance of Work shall be specifically described by the manufacturer, model number and date of manufacture and be of suitable size and capacity required for the work to be performed.
 2. Equipment, excluding hand tools which are defined as tools and equipment having a new purchase price of less than FIVE HUNDRED DOLLARS, and which will be used exclusively and directly on the Work. For the purposes of computing the Contractor's cost for self-owned equipment, the rate used for periods of under five days shall be the monthly rate set forth for the item of equipment in the "Rental Rate Blue Book" published by K-III Directory Corporation (800) 669-3282 divided by 22 days to establish a daily rate and divided again by eight hours to establish an hourly rate. The rate used for periods of 5 days or more shall be 45% of the published monthly rate. In the event the "Rental Rate Blue Book" does not list the item of equipment used, the applicable rate shall be determined in the same manner as set forth above except that the monthly rate used shall be that set forth in "The AED Green Book" published by K-III Directory Corporation (800) 669-3282. In the event that a rate is not established in the "Rental Rate Blue Book" or "The AED Green Book" for a particular piece of equipment, the Contracting Officer shall establish a rate for ownership costs and operating costs for that piece of equipment, that is consistent with its cost and expected life. Self-owned equipment is defined to include equipment rented from controlled or affiliated companies.
 3. Rented equipment will be paid for at the actual rental cost.
 4. For the purposes of the performance of extra or additional work, when, in the opinion of the Contractor, and as approved in writing by the Director's Representative, suitable equipment is not available on the Site, the moving of said equipment to and from the Site will be paid for at actual cost.

5. Notwithstanding any other provision, if the State should determine that the nature or size of the equipment used by the Contractor in connection with the performance of Work is larger or more elaborate, as the case may be, than the size or nature of the minimum equipment determined by the State to be suitable for the performance of Work, the cost of equipment used in calculating the costs of extra work or delay damages will not be based upon the equipment used by the Contractor but instead will be based on the smallest or least elaborate equipment determined by the State to have been suitable for the performance of the Work. In no event shall the amount paid to the Contractor as the allowance for the use of self-owned construction equipment exceed the lower of the actual cost of such equipment or the depreciated value of such equipment as carried on the Contractor or subcontractors books.
 6. The Contractor shall be reimbursed for its operating costs for self-owned equipment based on actual cost data. Operating costs shall include fuel, lubricants, other operating expendables and preventive and field maintenance. Operating costs do not include the operator's wages. In the event, after documented and demonstrated due diligence, actual operating costs are not ascertainable, then the Contractor will be compensated utilizing 100 percent of the operating costs set forth in the "Rental Rate Blue Book" and the Contractor shall be reimbursed the product of the number of hours of actual use multiplied by the operating cost per hour.
 7. The maximum amount of reimbursement for the ownership costs of self-owned equipment is limited to the original purchase price of the equipment as listed in the "Green Guide for Construction Equipment" published by K-III Directory Corporation (800) 669-3282. In the specific event when the ownership reimbursement is limited by the original purchase price, the Contractor shall, nevertheless, be reimbursed for the operating cost per hour for each hour of actual use.
- D. The additional cost of all required bonds and Liability and Builder's Risk Insurance Premium, whether required by this Contract or a subcontract between the Contractor and a subcontractor actually performing extra work, arising from the additional cost of performing extra work shall be paid by a change order or field order to be issued upon physical completion of the Work and upon the submission of proof of payment of such additional premiums assessed by the respective insurance companies for such additional cost of the extra work.
- E. Unless otherwise specifically provided for in an order on contract or field order, the compensation specified therein for extra work includes full payment for both the extra work covered thereby and for any damage or expense caused the Contractor by any delays to other work to be done under the Contract resulting from or on account of said extra work, and the Contractor waives all rights to any other compensation for said extra work, damage or expense.
- F. In computing the value of an order on contract or field order which involves additions and deletions of work and the cost of the added work exceeds the cost of the deleted work, overhead and profit shall be computed on the amount by which the actual cost of additional labor and material exceeds the actual cost of

the deleted labor and material, except no additional overhead and profit shall be allowed on the value of any order on contract or field order determined by the method provided in Subparagraphs 1.01 A. 1. or A. 2.

- G. In computing the value of an order on contract or field order which involves additions and deletions of work and the cost of the deleted work exceeds the cost of the added work, the Contractor will be allowed to retain the overhead and profit on the amount by which the cost of the deleted work exceeds the cost of the added work, except that no overhead and profit shall be retained on the cost of work determined by the method provided in Subparagraphs 1.01 A. 1. or A. 2.
- H. Subject to the provisions of Article 17A of the General Conditions, the following elements of damage, and only the following elements, as determined by the Contracting Officer, will be recoverable by the Contractor as “delay damages” provided that they are actual, reasonable and necessary:
1. Documented additional or escalated job site labor expenses;
 2. Documented additional or escalated costs for materials;
 3. Documented additional or escalated equipment costs less appropriate credits, as such are determined in accordance with this Section;
 4. Documented costs of extended job-site overhead (including job superintendent, office engineer and clerical staff, but not including working foremen);
 5. An additional 10 percent of the total of the above items in Subparagraphs 1.01 H. 1., 2., 3. and 4. for home office overhead and 5 percent for profit thereon;
 6. Documented additional or escalated insurance and bond costs;
 7. When the work is performed by a subcontractor, the Contractor shall be paid the actual, reasonable and necessary cost of such subcontracted work as outlined Subparagraphs 1.01 H. 1. through 4. and the Contractor’s and subcontractor’s main office overhead and profit shall be figured at 15 percent and 10 percent respectively.
 8. The phrases “additional expenses”, “escalated expenses”, “additional costs” and “escalated costs” shall include expenses and costs above or below those normally incurred in the performance of the work, less any appropriate credit, and/or attributable, with appropriate credits, to the performance of work or portions of work in a different time period than that which was indicated on the approved progress schedule.
- I. The parties agree that, with regard to delay damages, the State will have no liability for the following items and the Contractor further agrees it shall make no claim for the following items:
1. Profit, in excess of that provided for above;
 2. Loss of anticipated or unanticipated profit;
 3. Labor inefficiencies and loss of productivity;
 4. Home office overhead in excess of that provided for above;
 5. Consequential damages, including but not limited to interest on monies in dispute, including interest which is paid on such monies, loss of bonding capacity, bidding opportunities, or interest on retainage or investment, or any resultant insolvency;
 6. Indirect costs or expenses of any nature;

7. Direct or indirect costs attributable to performance of work where the Contractor, because of situations or conditions within its control, has not progressed in a manner satisfactory to the Executive Director.
 8. Attorneys fees, or claims preparation expenses.
- J. Remedies Exclusive: With respect to extra costs and delay damages, the parties agree that the State shall have no liability to the Contractor for expenses, costs, or items of damage other than those which are specifically identified as payable above. In the event any legal action is instituted against the State by the Contractor on account of any extra work or for additional compensation, whether on account of delay, acceleration, breach of contract, or otherwise, the Contractor agrees that the State's liability will be limited to those items which are specifically identified as compensable above. The Contractor further agrees to make no claim for expenses other than those which are specifically identified as compensable above.

PART 2 PRODUCTS (Not Used)

PART 3 EXECUTION (Not Used)

END OF SECTION

SECTION 013000

ADMINISTRATIVE REQUIREMENTS

PART 1 GENERAL

1.01 RELATED REQUIREMENTS SPECIFIED ELSEWHERE

- A. Other requirements pertaining to payments are included in the General Conditions and in the various sections of the Specifications.
- B. Cost Computations: Section 012200.
- C. Submittals: Section 013300.

1.02 WAIVER OF CERTAIN SUBMITTAL REQUIREMENTS

- A. The Electronic Contractor Payments (ECP) program facilitates electronic submission of payment applications and related documents and information via a secure web-based portal. This portal is hereinafter referred to as the “Vendor Interface”. Hardcopy (paper) submission of the following forms is waived, and the information required by these forms shall be submitted via the Vendor Interface:
 - 1. BDC 58 (Cumulative Monthly Payment Statement)
 - 2. BDC 169 (Contractor’s Application for Payment form).
 - 3. BDC 187 (Detailed Estimate form).
 - 4. BDC 328 (MWBE Utilization Plan) – submitted prior to award
 - 5. BDC 329 (Contractor’s List of Subcontractors–Suppliers).

1.03 SCHEDULES AND RECORDS

- A. Submit the following information not later than 15 days after approval of the Contract unless the Contractor or the Director determines an earlier submission is required to properly schedule or progress the Work.
 - 1. **CONTRACTOR’S LIST OF SUBCONTRACTORS – SUPPLIERS:** An affirmative review of the subcontractor’s responsibility will be conducted. Any subcontractor disapprovals resulting from negative information derived from the State’s review will result in written notice (by letter or e-mail) to the Contractor. A responsibility meeting may result from these actions. The Contractor will defer to the provisions of Article 6, General Conditions, regarding its responsibility to prosecute the work.
 - a. Submit the **CONTRACTOR’S LIST OF SUBCONTRACTORS – SUPPLIERS** information using the required electronic entry process via the Vendor Interface.
 - b. Indicate the items of Work proposed to be accomplished by subcontractors, the name and address of each proposed subcontractor, the dollar value of the subcontract, and Minority and Women-Owned Business Enterprise (MWBE) information.
 - 1) Attach a properly completed and executed **NEW YORK STATE VENDOR RESPONSIBILITY**

QUESTIONNAIRE – FOR PROFIT CONSTRUCTION (CCA-2) and forward to the Vendor Responsibility Unit for each subcontractor whose subcontract is valued at \$100,000.00 or more unless requested otherwise by the Contracting Officer and/or the Director’s Representative.

- 2) As an alternative to submitting a paper version of the form, subcontractors may opt to submit the CCA-2 on-line via the New York State VendRep System. Information on this system and the New York State vendor responsibility requirements is available at: <http://www.osc.state.ny.us/vendrep/index.htm>.
 - c. Indicate the names and addresses of proposed suppliers, the dollar value of the supplies, and MWBE information.
 - d. Failure in providing this information may result in payments being withheld and referral to the Contracting Officer for a responsibility determination.
2. CONTRACTOR’S PROGRESS SCHEDULE (Form BDC 331):
Establish the periods of time during which the various segments of the Work must be completed in order to complete all of the Work by the physical completion date.
- a. Submit the schedule at least two days prior to initial job meeting.
- B. If after initial approval, circumstances require a change in a subcontractor or supplier or require additional subcontractors or suppliers to be used, use the Vendor Interface to submit a revised BDC 329 form that reflects the changes or additions.

1.04 DETAILED ESTIMATE

- A. Before making the first requisition for a progress payment, prepare a detailed estimate of quantities and prices for materials, labor and other items required for the Work, which shall aggregate the contract sum.
 1. Submit the DETAILED ESTIMATE information using the required electronic entry process via the Vendor Interface.
- B. The detailed estimate shall be supported by such evidence, including certified copies of subcontracts, as the Director may require.
- C. The detailed estimate must be approved by the Director who may revise it as, in his reasonable judgment, is necessary to make the various items conform to their true values.
 1. The value of each requisition for payment shall be based on the approved detailed estimate.

PART 2 PRODUCTS (Not Used)

PART 3 EXECUTION (Not Used)

END OF SECTION

SECTION 013119

PROJECT MEETINGS

PART 1 GENERAL

1.01 INITIAL JOB MEETING

- A. The Director's Representative will notify all parties concerned of the time and place of the initial job meeting.
- B. The meeting will be conducted by the Director's Representative. In order to insure an orderly procedure, an agenda for the meeting will be developed using the Format for Initial Job Meeting, Form BDC 311, a copy of which will be transmitted to the Contractor prior to the meeting. All items on the format, as they apply, will be discussed.
 - 1. A copy of the Facility's current Visitor Identification Policy will be distributed.

1.02 BI-WEEKLY JOB MEETINGS

- A. Unless otherwise directed, job meetings will be held every 2 weeks at a time and place agreed upon by the Director's Representative, the Contractor, and the Facility's Representative. Other interested parties may attend when needed, e.g., subcontractors and representatives from suppliers, public utilities, and local government.
- B. The meetings will be conducted by the Director's Representative for the following purposes:
 - 1. Review job progress, quality of Work, and approval and delivery of materials.
 - 2. Identify and resolve problems which impede planned progress.
 - 3. Coordinate the efforts of all concerned so that the project progresses on schedule to on time completion.
 - 4. Maintain a sound working relationship between the Contractor and the Director's Representative and a mutual understanding of the project requirements.
 - 5. Maintain sound working procedures.

1.03 PRE-INSTALLATION MEETINGS

- A. Pre-installation meetings will be held to review the specifications, drawings and approved submittals in preparation for start of a particular activity.
- B. The meetings shall be attended by the Director's Representative, a Design Representative and the Contractor's Representative including installer and representatives of manufacturers & fabricators involved in or affected by the installation and its coordination with other materials/trades.
- C. The Director's Representative shall schedule the meetings prior to the start of the work. The goal of these meetings is to ensure the quality of construction and to maintain the schedule.

1.04 ATTENDANCE

- A. A Contractor's Representative shall be required to attend all meetings scheduled by the Director's Representative.
- B. The Contractor's Representative shall be a competent supervisor familiar with the work and have authority to act for the Contractor.
- C. If the Contractor's Representative fails to attend 2 scheduled meetings without prior approval, the Contractor will be directed to replace the current Contractor's Representative. Further incidents of non-attendance by the Contractor's Representative, will form the basis for review of the Contractor's responsible bidder status.

PART 2 PRODUCTS (Not Used)

PART 3 EXECUTION (Not Used)

END OF SECTION

SECTION 013300

SUBMITTALS

PART 1 GENERAL

1.01 RELATED REQUIREMENTS SPECIFIED ELSEWHERE

- A. Other requirements pertaining to submittals are included in the General Conditions and in the various sections of the Specifications.
- B. Administrative Requirements: Section 013000.
- C. Contract Closeout Submittals: Section 017716.

1.02 DEFINITIONS

- A. Deviation: Changes in products, materials, equipment and methods of construction from those required by the Contract Documents and proposed by the Contractor.

1.03 DEVIATIONS FROM REQUIREMENTS OF THE CONTRACT DOCUMENTS

- A. Deviations from the requirements of the Contract Documents will not be allowed unless a request for deviation is made in writing prior to or at the time of submission and the specific deviation is approved by the Director's Representative subject to the requirements of Article 4 of the General Conditions. The request for deviation shall be made utilizing the CONTRACT DOCUMENT DEVIATION REQUEST FORM (Form BDC 49) bound in the Appendix or from the OGS Web Site.
 - 1. The submission of a deviation shall be done in a timely manner according to the schedule of submittals to allow the Director sufficient time for review.

1.04 "OR EQUAL" TO BRAND NAME PRODUCTS

- A. Whenever a product is specified by brand name, a comparable brand, equal to that named, may be submitted for approval subject to the requirements of Article 5 of the General Conditions.
 - 1. The contractor shall bear the burden of proving that the proposed product is equal to the specified product. The submission of an "or equal" shall be done in a timely manner to allow the Director sufficient time to review the proposed product.
 - 2. Whenever a color or pattern is indicated by a specific manufacturer's name or number, the intent is to communicate the required color or pattern of the material. Other manufacturers' comparable colors or patterns may be submitted for approval as equal.

1.05 WAIVER OF CERTAIN SUBMITTAL REQUIREMENTS

- A. Unless otherwise specified, the requirement to submit product data and samples for approval will be waived for products specified by brand name if the specifically named products are furnished for the Work. In such cases, submit required Product Data to the Director's Representative via the Submittals Website for information only.

1.06 ADMINISTRATIVE REQUIREMENTS

- A. Identify all submittals by project title and number. Include Contractor's name, date, and revision date. On shop drawings, product data and samples, also include the name of the supplier and subcontractor (if any), and applicable specification section number. Stamp each submittal and initial or sign the stamp to certify review and approval of submittal.
- B. Assemble submittals in accordance with the requirements in the individual sections of the Specifications and as required by this section. It is the Contractor's responsibility to review and verify that all information required for each submittal is included in the submittal package. Errors or omissions found by the Contractor are to be corrected prior to the submission of the submittal package for approval. Incomplete submittal packages that have been submitted for review and approval will be returned.
 - 1. It is the Contractor's responsibility to verify that portions of the submittal package to be provided by a subcontractor (or supplier) are complete, as well as portions of the submittal package being provided directly by the Contractor.
 - 2. Do not combine the submittals of more than one specification section with submittals required by other specification sections unless specifically stated in the contract specifications.
- C. If a submittal is based on, or the result of, a change order or field order to the Contract documents, include copies of the applicable change order or field order with the submittal.

1.07 RE-EVALUATION FEE

- A. In accordance with Article 4.7 of the General Conditions, a re-evaluation processing fee will be levied against the Contractor for each re-evaluation of any Submittal Package submission that was returned for failure to comply with the submittal requirements relative to completeness, content or format.

1.08 ELECTRONIC SUBMITTALS

- A. A Submittals Website, an internet (web-based) service shall be used to provide an on-line database and repository which shall be used to transmit and track project related documents. The intent for using the Submittals Website is to expedite the construction process by reducing paperwork, improving information flow, and decreasing submittal review turnaround time.
 - 1. Project submittals (shop drawing, product data and quality assurance submittals) shall be transmitted by the Contractor in Portable Document Format (PDF) to the Submittals Website, where it will be tracked and stored for retrieval for review. After the submittal is reviewed it is

- uploaded back to the Submittals Website for action or use by the Contractor and Director's Representatives.
2. The service also tracks and stores documents related to the project such as RFI's (Request for Information), IB's (Information Bulletins), CAD Coordination, Minutes, Testing, Closeout, and SWPPP documents.
- B. For each submittal, the Contractor shall review and apply electronic stamp certifying that the submittal complies with the requirements of the Contract Documents, including verification of manufacturer/product, dimensions and coordination of information with other parts of the work.
- C. It is the Contractor's responsibility to provide the submittals in a PDF format. The contractor may use any of the following options:
1. Subcontractors and suppliers provide electronic submittals in PDF format to the Contractor via the Submittals Website.
 2. Subcontractors and suppliers provide paper submittals to the Contractor, who electronically scans and converts them to PDF format.
 3. Contract a Scanning Service, which will allow the Contractor and the Contractor's subcontractors and suppliers to provide paper submittals to the Scanning Service, which electronically scans and converts them to PDF format. It will be the Contractor's responsibility to transmit the scanned submittals to the Submittals Website.
- D. Image Quality:
1. Image resolution: The PDF files shall be created at a minimum resolution of 200 dots per inch utilizing the original document size. The Contractor will be responsible to increase the resolution of the scanned file or images being submitted as required to adequately present the information.
 2. Image Color Rendition: When information represented requires color to convey the intent and compliance, provide full color PDF reproduction.
- E. Internet Service and Equipment Requirements:
1. The Contractor will be required to have an Email address and Internet access at Contractor's main office.
 2. Unless the Contractor will exclusively be using a Scanning Service to create all PDF documents, the Contractor will be required to own a PDF reviewing, creating and editing software, such as Adobe Acrobat (www.adobe.com), Bluebeam PDF Revu (www.bluebeam.com), or other similar PDF reviewing, creating and editing software for applying electronic stamps and comments.
- F. Training and Support:
1. Web-based training and support shall be available, free of charge from the Submittals Website, for all project participants regarding use of the Submittals Website and PDF submittals.
 2. Coordinate training schedule through the Director's Representative.
- G. Administration and Cost:
1. The Electrical Contractor shall include the full cost of Submittals Website project (all contracts) subscription in their proposal. This cost is

included in the Contract Amount. Contact service provider to verify cost prior to bid.

- a. All related Contracts will utilize the Submittals Website at no additional charge.
2. The Submittals Website project subscription shall be in the name of, and administered by the Director's Representative.

H. Products:

1. Basis of specification is Submittal Exchange, 800-714-0024, www.submittalexchange.com.
2. If a Pre-Award Meeting is held, it may include discussion regarding conformance of the Contractor proposed Submittal Website based on the criteria established below.
3. Submit documented conformance and provide an online demonstration to the Director's Representative within three business days of Award of Contract if a product other than Submittal Exchange is proposed.
4. Acceptable Submittal Website shall document conformance with the following requirements:
 - a. Independently hosted, web-based system for automated tracking, storage and distribution of contract submittals and other contract related documents. FTP sites, e-mail exchanges, and server-based systems hosted from inside a contractor's office will not be considered.
 - b. Utilize 256-bit SSL encryption and hosted at SAS70 Type II compliant data centers.
 - c. Minimum four years experience of use on comparable commercial construction projects. "Comparable commercial construction projects" shall include documented use on a minimum of twenty governmental or public-entity projects of ten million dollar construction value or greater.
 - d. Website requirements:
 - 1) Minimum of four years documented 99.5% website uptime.
 - 2) Minimum of four gigabytes of on-line storage available for each contract, for storage of all documents related to that contract.
 - 3) Minimum of two gigabytes of on-line storage for common documents relating to all contracts for the project.
 - 4) Redundant storage of all project information (all contracts) at a minimum of two geographically separate storage sites (not in the same building).
 - e. Unlimited secure individual user accounts and system access for all project subcontractors, prime contractors, OGS staff, design consultants, and subconsultants.
 - f. Separate locations for OGS staff, design consultant, and subconsultant review comments with contractors restricted from viewing comments until final review or release by OGS staff or primary design consultants.
 - g. Full version histories and dates of exchanges automatically tracked and available for viewing, searching, and reporting in a

linear log format compatible with the Design and Construction Schedule of Submittals.

- 1) Each Contract's Submittal Log shall be tracked and maintained independent of the Submittal Logs of the related Contracts.
 - h. Automatic, email reminders of past due items to related reviewers by specification and discipline.
 - i. Customized, automated PDF form generation matching OGS standard templates for Transmittal, IB, RFI, and Design & Construction Submittal Comment forms. Documentation and demonstration of automatic form generation using OGS templates must be submitted for approval.
 - j. Automated workflow processes
 - 1) Two stage review workflows for Submittal, and RFI,
 - 2) Posting Only for IB, CAD Coordination, Minutes, Testing, Closeout, and SWPPP documents.
 - 3) Documentation of automated workflow processes matching requirements must be submitted for approval.
 - k. Functionality to group submittals as required packages and apply forms and review comments to entire package simultaneously.
 1. Within three business days of Award of Contract, Contractor shall execute the form of agreement with the System Vendor and shall have notified the Director's Representative and the related work contractors of such agreement. Within three days of Agreement, each Contractor shall provide the Submittal Website with all required information from Project Manual for their related Contract in regard to set up of the Submittal Website for their contract. Within fourteen days of award the Submittal Website shall be ready for use.
 - m. Director's Representative and primary design consultant shall have full control over required items list and access to edit, add or remove items during project.
 - n. System vendor shall provide minimum one-hour live web meeting training sessions to prime contractors, design consultants, subconsultants, and OGS staff prior to project start.
 - o. System vendor shall make available minimum thirty-minute live web meeting training sessions for subcontractors at least once weekly for the entire duration of the project.
 - p. System vendor shall provide access for OGS staff, design consultants, subconsultants, prime contractors, and subcontractors to live technical support by phone and email minimum of 8 AM to 5 PM EST on standard business days for the entire duration of the project at no additional cost.
 - q. At completion of project closeout, minimum four sets of archival discs that include all documents and tracking logs in a navigable format shall be sent by system vendor to Director's Representative.
- I. Paper prints (hardcopies) of reviewed submittals:
1. Record Copy: Within 14 days of receipt of submittals marked "Approved", "Approved As Noted", or meeting the requirements of

Article 1.05 of this specification section, each Contractor shall provide one paper copy of the submittal they are responsible for to the Director's Representative.

- a. Paper copies shall be printed in a size format equal to the original document.
 - b. Scaled Shop Drawings shall be printed to the scale noted on the drawings.
 - c. The resolution of the printed copy shall be equal to that of the PDF file that it is being printed from.
 - d. The Record Copy shall be used by the Director's Representative during the construction of the project and shall be retained as a turn-over item to the facility at the end of the project as required section 017716 Contract Closeout.
2. Contractor Copies: The Contractor will be responsible for making copies, for the Contractors own use and for use by its subcontractors and suppliers.

1.09 SHOP DRAWINGS

- A. Provide shop drawings in the format required by the specifications. Show the information, dimensions, connections and other details necessary to insure that the shop drawings accurately interpret the Contract Documents. Show adjoining construction in such detail as required indicating proper connections. Where adjoining connected construction requires shop drawings or product data, submit such information for approval at the same time so that connections can be accurately checked.
- B. Have shop drawings prepared by a qualified detailer. Shop drawings shall be neatly drawn and clearly legible. Machine duplicated copies of Contract Drawings will not be accepted as shop drawings.
 1. Where shop drawings are indicated to be drawn to scale:
 - a. Use scale normally found on an "Architect" or "Engineer" scale.
 - b. Written Scale: Clearly label scales being used on each drawing and/or on each detail on the drawing.
 - 1) Examples: 1/8" = 1'-0" 1" = 40'-0".
 - c. Graphic Scale: Adjacent to each Written Scale, provide a graphic scale delineating the scale being used. Graphic scale shall be divided into measuring units relating to the accuracy required for the drawing or details.
 - d. Clearly dimension key elements of the drawing or detail.
 2. When the drawing sheet is printed full size, the minimum text size shall be 1/8" (3.2 mm) for hand drafting and 3/32" (2.5 mm) for CADD drawings.
- C. Submit the shop drawings through the Submittals Website. The shop drawings will be reviewed and the review results will be posted on the Submittals Website. Contractor will receive email notice of completed review. If the review results in disposition of "DISAPPROVED" or "RETURNED FOR CORRECTION", promptly correct the deficiencies and resubmit the shop drawings meeting Contract requirements.

1.10 PRODUCT DATA

- A. Provide product data in the format required by the specifications. Modify product data by deleting information that is not applicable to the project or by marking the product data to identify pertinent products. Supplement standard information, if necessary, to provide additional information applicable to project.
- B. Submit the product data through the Submittals Website. The product data will be reviewed and the review results will be posted on the Submittals Website. Contractor will receive email notice of completed review. If the review results in disposition of “DISAPPROVED” or “RETURNED FOR CORRECTION”, promptly correct the deficiencies and resubmit the product data meeting Contract requirements.

1.11 QUALITY ASSURANCE

- A. Provide quality assurance information in the format required by the specifications, including supporting documentation as required.
- B. Submit the quality assurance information through the Submittals Website. The quality assurance information will be reviewed and the review results will be posted on the Submittals Website. Contractor will receive email notice of completed review. If the review results in disposition of “DISAPPROVED” or “RETURNED FOR CORRECTION”, promptly correct the deficiencies and resubmit the quality assurance information meeting Contract requirements.

1.12 SAMPLES

- A. Submit 2 (unless a different number is specified) of each sample required by the Specifications.
- B. Samples will become the property of the State when submitted and will not be incorporated in the Work unless specifically stated otherwise.
- C. The electronic submittal process is not intended for color samples, color charts, or physical material samples.
- D. Record transmittal of each sample required by the Specifications through the Submittals Website.
- E. Consult with the Director’s Representative for direction on where Samples will be sent for review.
- F. The sample will be reviewed and the review results will be posted on the Submittals Website. Contractor will receive email notice of completed review.

1.13 REVIEW OF SUBMITTALS

- A. Items submitted for review will be reviewed for compliance with the contract documents, based upon the information submitted. The items will be acted upon with the following dispositions:

1. Approved (or No Exception Noted): Where the submittal is marked “Approved”, the work covered by the submittal may proceed provided it complies with the contract documents. Final acceptance will depend on that compliance.
2. Approved as Noted (or Make Corrections Noted): Where the submittal is marked “Approved as Noted”, the work covered by the submittal may proceed provided it complies with the review comments noted on the submittal and the contract documents. Final acceptance will depend on that compliance.
3. Disapproved (or Rejected): Where the submittal is marked “Disapproved”, do not proceed with the work covered by the submittal, including purchasing, fabrication, delivery or other activity for the item submitted. Prepare a new submittal according to the review comments noted on the submittal and meeting the contract documents.
4. Returned for Correction (or Revise and Resubmit): Where the submittal is marked “Returned for Correction”, do not proceed with the work covered by the submittal, including purchasing, fabrication, delivery or other activity for the item submitted. Revise or prepare a new submittal according to the review comments noted on the submittal and meeting the contract documents.
5. Acknowledged: Where the submittal is marked “Acknowledged”, receipt of the submittal is acknowledged and has been recorded.
6. No Action: Where the submittal is marked “No Action” or “No Action Taken”, no review was made of this item, see comments noted on submittal and take appropriate action.
7. Multi-Action: Where the submittal is marked “Multi-Action”, separate dispositions were made for the items submitted, see the review comments for the disposition of each item submitted.

1.14 SCHEDULES AND RECORDS

- A. Submit the following Schedules and Records information not later than 15 days after approval of the Contract unless the Contractor or the Director determines an earlier submission is required to properly schedule or progress the Work.
 1. SCHEDULE OF SUBMITTALS: In the Submittal Log on the Submittals Website, for each item to be submitted indicate in the “Date Expected” column the date the item will be submitted for review and approval. The submission date that is entered shall provide sufficient time for the item to be reviewed, ordered, delivered and installed for timely completion of the Work in accordance with the Project Schedule. The date entered for submittal of each item is the last day a deviation will be considered.

1.15 TRANSMITTALS

- A. Submittal Transmittal (Form BDC 42):
 1. Furnish separate Form BDC 42 for each submitted item sent to Submittals Website for review.
 - a. Contractor may utilize their own Transmittal Form (or Transmittal Letter) in lieu of utilizing the Form BDC 42,

contingent on the Contractor's Transmittal Form includes all information and certifications required by Form BDC 42.

2. Clearly identify applicable specification section number of submitted item (product data, shop drawing, etc.) on the Form BDC 42.

B. All Contracts:

1. Transmit items designated in the Schedule of Submittals (and project specifications) to the Submittals Website.

PART 2 PRODUCTS (Not Used)

PART 3 EXECUTION (Not Used)

END OF SECTION



Design and Construction

AN ISO 9001:2008 CERTIFIED ORGANIZATION

Division of Construction, 34th Floor, Corning Tower
The Governor Nelson A. Rockefeller Empire State Plaza
Albany, New York 12242

Phone: (518) 474-0331 FAX: (518) 474-8201

SUBMITTAL TRANSMITTAL

Project No.: _____

NOTE: A Transmittal is required for each Specification Section. DO NOT bind together separate submittals from different Specification Sections.

This form is to be used *only* if there are no deviations from the Contract Documents. If there are ANY deviations from the Contract Documents, you must submit the Contract Document Deviation Request Form (BDC 49).

Project Description: *(Project Title, Facility Name and Address)*

Date: _____

TO:

FROM:

SUBMITTAL TYPE:

- | | | |
|---------------------------------------|--|--|
| <input type="checkbox"/> Product Data | <input type="checkbox"/> Re-Submittal | <input type="checkbox"/> Information (Waiver) |
| <input type="checkbox"/> Test Reports | <input type="checkbox"/> Shop Drawings | <input type="checkbox"/> Quality Control/Assurance |
| <input type="checkbox"/> Design Data | <input type="checkbox"/> Certificate | <input type="checkbox"/> Contract Closeout |
| | <input type="checkbox"/> Samples | <input type="checkbox"/> Other |

Comply with all submittal requirements in the Project Manual as per Section 013300 and the particular Specification Section for which you are transmitting material.

Specification Number and Title: _____

Part	Type	Description

Contractor's Certification:

We have verified that all material or equipment contained in this submittal meets all the requirements specified or shown **(no exceptions)**.

Contractor/Contractor's Representative (Print Name)

Signature



NYS OGS DESIGN AND CONSTRUCTION SUBMITTAL COMMENTS

To: Contractor: **Submittal No.:**
From: EIC:
Contract No.: Submittal Desc:
Facility: Disposition:
Reviewed By: Remarks:

No.	Date of Action	Action	Spec Section	Supplier/Mfr	No. of Dwgs	Drawing No's
-----	----------------	--------	--------------	--------------	-------------	--------------

1

Item Description:

Remarks:

2

Item Description:

Remarks:

3

Item Description:

Remarks:



Request for Information

Design And Construction
 Division of Construction
 34th Floor, Corning Tower
 The Governor Nelson A. Rockefeller
 Empire State Plaza
 Albany, New York 12242
 FAX: (518)474-8201

Project Information		
Project Number	Client	Location
	Project Title	
RFI Information		
Number	Trades	Spec Section
Contractor's Ref#		Drawing No.
Brief Description		
Date of Request	Requested By	Affiliation
	Estimated Cost Impact <input type="checkbox"/> Additional Cost <input type="checkbox"/> No Change <input type="checkbox"/> Credit	
Detailed Description		
Response Date	Response By	Affiliation
	Estimated Cost Impact <input type="checkbox"/> Additional Cost <input type="checkbox"/> No Change <input type="checkbox"/> Credit	
Response		
Attached Document Description		



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INFORMATION BULLETIN

Project No.: _____

Project Description: <i>(Project Title, Facility Name and Address)</i>			Client Agency:		
IB No.:	Trades:	Spec. Section:		Drawing No.:	
Brief Description:					
Issue Date:	Issued By:		Affiliation:		
Detailed Description:					
Justification:					
Estimated Cost Impact: <input type="checkbox"/> Additional Cost <input type="checkbox"/> No Change <input type="checkbox"/> Credit			Estimated Time Impact: <input type="checkbox"/> YES <input type="checkbox"/> NO		
Attached Document Description:					

SECTION 014100

REGULATORY REQUIREMENTS

PART 1 GENERAL

1.01 COMPLIANCE

- A. Comply with applicable regulatory requirements and various codes referenced in these specifications. Where conflicts exist between local, State, and/or Federal regulatory requirements, codes, or these specifications advise the Director's Representative. The Director's Representative will assist in resolving the conflicts to the satisfaction of the regulatory agencies prior to commencing the Work.

1.02 CODES

- A. All Work shall comply with the New York State Uniform Fire Prevention and Building Code (the "Uniform Code"), which includes the current editions of Part 1220 (Residential Code), Part 1221 (Building Code), Part 1222 (Plumbing Code), Part 1223 (Mechanical Code), Part 1224 (Fuel Gas Code), Part 1225 (Fire Code), Part 1226 (Property Maintenance Code), and Part 1227 (Existing Building Code) and their referenced standards except as noted in the following paragraphs of this section.
 - 1. The above referenced codes shall be the date of latest revision in effect at the time of receiving bids, unless the date is given.
- B. Electrical Work: Conform to the requirements of the 2008 National Electrical Code (NEC) unless otherwise shown or specified. The Director will be the sole judge of the interpretation of these rules and requirements.

1.03 STATE REQUIRED PERMITS AND INSPECTIONS

- A. A New York Board of Fire Underwriters inspection or certificate is not required.

1.04 LISTINGS

- A. Equipment and materials for which Underwriters' Laboratories, Inc. (UL) provides product listing service, shall be listed and bear the listing mark.
 - 1. Alternately, ETL Testing Laboratories, Inc. Product Safety Testing Listing is acceptable if the listed product has been tested to the applicable UL Standard.

1.06 UTILITIES

- A. Underground Utilities:
 - 1. Locate existing underground utilities prior to commencing excavation work. Conform to all requirements of NYCRR 16 Part 753, including the following:
 - a. Notify Dig Safely New York at least 48 hours in advance not counting the date of contact.

- 1) Statewide: 800-962-7962.
 - 2) Website: www.digsafelynewyork.com
 - b. Refer to Section 023313 Underground Utility Locator Service of the Project Manual to locate all utilities on facility and/or private property.
 - c. Determine exact utility locations by hand excavated test pits. Contractor will be responsible for the proper support and protection of all utilities to remain in service.
- B. Utility Work Within State Highway Right-Of-Way:
1. Utility Work, either overhead or underground, within the boundaries of the state highway right-of-way, shall conform to procedures set forth in the following Department of Transportation publications:
 - a. “Department Rules and Regulations Governing the Accommodation of Utilities Within State Highway Right-of-Way” (Part 131 - Title 17 Transportation).
 - b. Manual of Administrative Procedures - “Issuance of Highway Work Permits” 7.12-2.

PART 2 PRODUCTS (Not Used)

PART 3 EXECUTION (Not Used)

END OF SECTION

SECTION 014216

DEFINITIONS

PART 1 GENERAL

1.01 DEFINITIONS SPECIFIED ELSEWHERE

- A. Other definitions are included in Article 2 of the General Conditions and in various sections of the Specifications.

1.02 DEFINITIONS

- A. The following terms shall have the meanings ascribed to them in this Section, wherever they appear in the Contract Documents.
1. Company Field Advisor: An employee of the Company which lists and markets the primary components of the system under their name who is certified in writing by the Company to be technically qualified in design, installation, and servicing of the required products or an employee of an organization certified by the foregoing Company to be technically qualified in design, installation and servicing of the required products. Personnel involved solely in sales do not qualify.
 2. Location, Dry: Location not normally subject to dampness or wetness.
 3. Location, Damp: Location subject to moderate degree of moisture, including:
 - a. Partially protected locations under canopies, marquees, roofed open porches, and like locations.
 - b. Installations in exterior walls.
 - c. Interior locations such as unheated basements, unheated barns, and cold-storage areas.
 4. Location, Wet: Location subject to saturation with water or other liquids, including:
 - a. Installations underground.
 - b. Locations exposed to the weather and unprotected.
 - c. Installations in concrete slabs on grade (with or without vapor barrier between slab and grade).
 - d. Installations under concrete slabs on grade.
 - e. Installations in concrete or masonry walls in contact with the earth (with or without membrane waterproofing between wall and earth).
 - f. Vehicle washing areas and like locations.
 5. Mechanical: General term applicable to HVAC, Plumbing, Sprinkler, Laboratory Equipment, Food Service Equipment, Laundry Equipment, and Refrigeration.

PART 2 PRODUCTS (Not Used)

PART 3 EXECUTION (Not Used)

END OF SECTION

SECTION 015000

CONSTRUCTION FACILITIES & TEMPORARY CONTROLS

PART 1 GENERAL

1.01 PROJECT CONDITIONS

- A. Provide construction facilities and temporary controls necessary for the Work.

1.02 TEMPORARY LIGHT AND POWER

- A. Electric energy will be made available without charge, at source or sources directed, for lighting and for power tools. Power supply for motors rated in excess of 1/2 hp will be made available within the limits of the existing circuitry and usage.
- B. Provide temporary lighting as required to maintain a minimum of 10 foot candles in the work areas.
- C. Provide ground-fault protection for personnel (such as portable plug-in type ground-fault circuit-interrupters) on single phase 15 and 20 ampere receptacle outlets which are in use.
- D. Receptacle outlets and portable cord connectors shall have standard NEMA configuration.
- E. Provide temporary wiring and equipment in conformance with the National Electrical Code.

1.03 TEMPORARY WATER

- A. Water will be made available for the Work without charge at source or sources directed within the limits of the existing supply and usage.
- B. Prevent waste of water.

1.04 TEMPORARY TOILETS

- A. Provide temporary toilet facilities for Contractor's and subcontractors employees engaged on the project. Locate toilets where directed and maintain them in a sanitary condition.

NUMBER OF EMPLOYEES	MINIMUM NUMBER OF FACILITIES*
20 or less	1 toilet
20 or more	1 toilet and 1 urinal per 40 employees

NUMBER OF EMPLOYEES	MINIMUM NUMBER OF FACILITIES*
200 or more	1 toilet and 1 urinal per 50 employees

*Toilet/Urinal combinations shall count as only one facility.

1. Where water and sewer connections are available, provide water closets, otherwise provide approved chemical or electric toilets.
2. Inside buildings, locate toilet facilities no more than 4 stories or 60 feet above or below, nor more than 500 feet travel on the same level from the work location of any person.
3. Locate toilet facilities no more than 1000 feet from any work location.
 - a. Exception: Mobile crews having readily available transportation to nearby toilet facilities.

1.06 BARRIERS AND ENCLOSURES

- A. Provide barriers during performance of the Work to:
 1. Prevent unauthorized entry to work areas.
 2. Allow for State's occupancy of Site.
 3. Protect existing facilities and adjacent properties from damage.
 4. Protect vehicular and pedestrian traffic.

1.07 PROTECTION OF WORK AND EXISTING PROPERTY

- A. Protect installed Work and existing construction and finishes during performance of the Work.
- B. Maintain the building in a watertight condition during performance of the Work.
- C. Provide temporary and removable protection for installed products. Control activity in immediate work area to prevent damage.
- D. Provide protective coverings at wall projections, jambs, sills, and soffits of openings.
- E. Protect finished floors, stairs, and other surfaces from traffic, dirt, wear, damage, and movement of heavy objects by covering them with durable sheet materials.
- F. Protect smoke detectors from airborne dust and debris.
 1. At the beginning of each work day, provide protective coverings over smoke detectors in areas where airborne dust and debris will be generated by the Work.
 2. At the end of the work day, clean the areas in which the smoke detectors are located by whatever means necessary to assure that airborne dust and debris will not contaminate the smoke detectors, then remove protective coverings.

3. Provide signs, instructions and alternate methods for reporting a fire during the periods that the smoke detectors are covered.
 4. Notify the Director's Representative and have procedures approved.
- G. Prohibit traffic or storage upon waterproofed and roofed surfaces. If traffic or activity is necessary, obtain recommendations for protection from waterproofing or roofing material manufacturer.
- H. Protect existing trees and plants during performance of the Work unless otherwise indicated. Box trees and plants within the grading limit lines. Do not deposit excavated materials or store building materials around trees or plants. Do not attach guy wires to trees.
- I. Prohibit traffic from landscaped areas.

1.08 SECURITY

- A. Key Deposits: A \$500 deposit will be required for each key issued by the Facility. Deposits will be refunded upon return of the keys.
- B. Facility Key Regulations:
1. Sign Facility keys out and in on a daily basis unless otherwise directed.
 2. Keep keys on person at all times while on the premises. Do not loan or give keys to other persons.
 3. Do not remove keys from the premises without written permission from the Director's Representative.
 4. Report lost, missing, or stolen keys immediately to the Facility Safety/Security Department. Assume responsibility for cost of necessary key and lock replacement as a result of lost, missing, or stolen keys.
- C. Promptly relock doors and security screens located in access routes, storage areas, and work areas after use.
- D. Restore, by the end of each work day, existing in place safety/security items such as doors, screens, alarm systems components, that required removal, replacement, or adjustment to perform the Work, unless otherwise authorized in writing by the Director's Representative.
- E. Remove all tools and materials from patient occupied work areas when the work areas are not attended by employees and at the end of each work day. Store tools in a locked tool box, cabinet, or shed. Store materials where directed in a location secure from access by patients and clients.

1.09 WATER CONTROLS

- A. Provide and maintain pumping equipment necessary to keep the work areas free from water. Discharge water into existing storm drainage systems or otherwise disperse as directed.

1.10 FIRE PREVENTION

- A. Take precautions necessary to prevent fires.
- B. Fuel for cutting and heating torches shall be gas only, and shall be contained in Underwriters Laboratory approved containers.
- C. Furnish and maintain a currently inspected 20 pound capacity multi-class A B C fire extinguisher in the immediate vicinity where welding tools or torches are in use.
- D. Furnish and maintain a currently inspected fire extinguisher of the appropriate class and size whenever the temporary storage of materials changes that areas classification of fire load or life safety.
- E. Do not use flammable liquids, other than those specified, within a building without written approval from the Director's Representative.
- F. Tarpaulins shall be flameproof and shall be securely anchored when attached to scaffolding or when used to enclose any portion of a building.

1.11 ACCESS ROADS

- A. Routes of ingress and egress on the premises to the location of the Work shall be as directed.
- B. Keep designated access roads clear of dirt and debris resulting from the Work.
- C. Provide means of removing mud from vehicle wheels before entering paved roads.

1.12 PARKING

- A. Parking areas shall be where designated by the Director's Representative.
 - 1. Keep designated parking areas clear of dirt and debris resulting from the Work.
 - 2. If requested, register vehicles which are to be parked at the Facility with the Facility Safety/Security Department.
 - 3. Remove ignition key from unattended vehicles and lock doors.

1.13 RUBBISH REMOVAL

- A. Clean up and containerize the rubbish (refuse, debris, waste materials, and removed materials and equipment) resulting from the Work at the end of each work day and leave work areas broom clean, except where more stringent cleaning is specified. Locate containerized rubbish where directed.
- B. Remove rubbish from State property at least once a week and more often if the rubbish presents a hazard. Properly dispose of rubbish.

- C. Burning of rubbish will not be permitted.

1.14 RELOCATION AND REMOVALS

- A. Should a change in location of any construction facilities and temporary controls be necessary in order to progress the Work properly, remove and relocate such items as directed.
- B. Remove the construction facilities and temporary controls when they are no longer required. Restore permanent facilities used for or connected to temporary facilities to their original condition or better.

PART 2 PRODUCTS (Not Used)

PART 3 EXECUTION (Not Used)

END OF SECTION

SECTION 016500

MATERIALS AND EQUIPMENT

PART 1 GENERAL

1.01 RELATED REQUIREMENTS SPECIFIED ELSEWHERE

- A. Specific requirements pertaining to materials and equipment specified elsewhere are additional to the provisions of this Section.

1.02 PRODUCT LABELS

- A. When materials or equipment are specified to conform to ASTM, Federal or other reference specifications, the materials delivered to the site shall bear the manufacturer's printed labels stating that the materials meet the requirements of such referenced specifications.

1.03 TRANSPORTATION AND HANDLING

- A. Deliver factory packaged materials and equipment in the manufacturer's original containers.
- B. Transport and handle materials and equipment in such a manner as to prevent their damage.
- C. Arrange for delivery of materials and equipment during the hours of the day established by the Director's Representative.
- D. Have workers available to receive and unload materials and equipment delivered to the site. Do not deliver, or have delivered, any materials and equipment to the site unless such forces are available.
- E. Facility personnel are not authorized to sign for receipt of Contractor's material or equipment.

1.04 STORAGE AND PROTECTION

- A. Neatly pile, store, protect, and secure materials and equipment in locations where directed.
- B. Protect materials and equipment subject to damage by temperature or other weather conditions.
- C. Do not store volatile liquids in a State building.

PART 2 PRODUCTS (Not Used)

PART 3 EXECUTION (Not Used)

END OF SECTION

SECTION 017716

CONTRACT CLOSEOUT

PART 1 GENERAL

1.01 RELATED REQUIREMENTS SPECIFIED ELSEWHERE

- A. Other provisions pertaining to this Section are included in Article 9 of the General Conditions.

1.02 CONTRACT CLOSEOUT INSPECTIONS

- A. The following 3 inspections will be made in addition to the normal inspections to ensure that all Contract requirements are met and that the Work is complete and acceptable. The purpose of each of these inspections is to furnish the Contractor a written list of Contract exceptions, omissions, and incompletions so that the Work can be progressed to timely completion in accordance with the Contract Documents.
 - 1. Detailed Inspection: The "Detailed Inspection" will be made when the Work is substantially complete. A copy of the detailed inspection list will be furnished to the Contractor. When this inspection progresses over any length of time, copies of the list will be furnished as the inspection progresses so that the Contractor may proceed with the required Work without delay.
 - 2. Final Inspection: The Contractor will be advised by letter of the date and time of final inspection. A copy of the final inspection list containing all incomplete or unsatisfactory items and the time allowed to complete the Work will be furnished to the Contractor.
 - 3. Joint Inspection for Physical Completion: The joint inspection for physical completion may be made to verify completion of the exception items listed on the final inspection list so that the physical completion date (defined in the General Conditions) may be established.

1.03 FINAL CLEANING

- A. Perform final cleaning prior to joint inspection for physical completion. Leave the premises in a neat, unobstructed condition, the work areas broom clean (except where more thorough cleaning is specified), and everything in perfect repair and adjustment.
- B. Clean site; sweep paved areas, rake clean landscaped surfaces.
- C. Remove tools, equipment, waste and surplus materials, rubbish, and construction facilities from the premises as soon as possible upon completion of the Work.

1.04 PROJECT RECORD DOCUMENTS

- A. Maintain on site, 2 sets of the following record documents; record actual revisions to the Work:
 - 1. Contract Drawings.
 - 2. Project Manual.
 - 3. Addenda.
 - 4. Change Orders and other modifications to the Contract.
 - 5. Reviewed shop drawings, product data, and samples.
- B. Store record documents separate from documents used for construction.
- C. Record information concurrent with construction progress.
- D. Project Manual: Legibly mark and record in Part 2 of each Section of the Specifications, a description of the actual products installed, including the following:
 - 1. Manufacturer's name and product model and number.
 - 2. Product substitutions or alternates utilized.
 - 3. Changes made by addenda and modifications.
- E. Record Documents and Shop Drawings: Legibly mark each item to record actual construction including:
 - 1. Measured depths of foundations in relation to finish (first) (main) floor datum.
 - 2. Measured horizontal and vertical locations of underground utilities and appurtenances, referenced to permanent surface improvements.
 - 3. Measured locations of internal utilities and appurtenances concealed in construction, referenced to visible and accessible features of the Work.
 - 4. Field changes of dimension and detail.
 - 5. Details not on original Contract Drawings.
- F. Upon completion of the work, create electronic versions of the project record documents. Black and white documents are to be scanned into TIFF format using CCIT Group 4 compression. Documents with color, which include black line documents with color notations, are to be scanned into TIFF format using a minimum of 8 colors and "packbit" compression.
 - 1. The scanned images are to be put on a compact disc (CD) using ISO 9660 format. Name the electronic files with the same name as the drawing. Create a folder on the CD for each trade and one for Shop Drawings.
 - 2. Label the CD with the project number, name, and title as it appears on the project manual cover. If there is more than one CD include notation to that effect on the label; i.e., 1 of 3, 2 of 3, 3 of 3. The project record documents and CD(s) are to be turned over to the Director's Representative.
- G. Applications for progress payments will not be approved if the record documents are not kept current. Application for final payment will not be approved until the project record documents are delivered to the Director's Representative.

1.05 OPERATION AND MAINTENANCE DATA

- A. Prepare 2 sets comprised of 8-1/2 x 11 inch text pages bound in capacity expansion binders with durable plastic covers identified with printed title "OPERATION AND MAINTENANCE INSTRUCTIONS", title of project, and subject matter of binder when multiple binders are required. Prepare a printed Table of Contents for each volume, with each product or system description identified. Internally subdivide the binder contents with permanent page dividers, logically organized as described below, with tab titles clearly printed under reinforced laminated plastic tabs:

Part 1: Directory, listing names, addresses, and telephone numbers of Architect/Engineer, Contractor, subcontractors, and major equipment suppliers.

Part 2: Operation and maintenance instructions, arranged by system and subdivided by specification section. For each category, identify names, addresses, and telephone numbers of subcontractors and suppliers.

Identify the following:

1. Significant design criteria.
2. List of equipment.
3. Parts list for each component.
4. Operating instructions.
5. Maintenance instructions for equipment and systems.
6. Maintenance instructions for finishes, including recommended cleaning methods and materials and special precautions identifying detrimental agents.

Part 3: Project documents and certificates, including the following:

1. Shop drawings and product data.
2. Air and water balance reports.
3. Certificates.
4. Photocopies of warranties.

- B. Submit one copy of completed volumes in final form 15 days prior to final inspection. This copy will be returned after final inspection, with the Director's comments. Revise content of documents as required prior to final submittal.
- C. Submit 2 volumes prior to final Application for Payment.

1.06 WARRANTIES

- A. Furnish warranty certification and copies of warranties that extend beyond the one year period required by the General Conditions. Warranties submitted without warranty certification will not be accepted.
1. **Warranty Certification:** Written certification from the warrantor that invoices for installation, service, supplies, and warranty fees have been paid in full to persons or firms due payment, and that the warranty is in effect and non-retractable due to any of the specified conditions.

- B. Prepare printed Table of Contents and assemble warranty certifications and warranty copies in a binder with a durable plastic cover.
- C. Deliver the binder to the Director's Representative prior to final Application for Payment.
- D. For items of Work delayed beyond date of Substantial Completion, provide updated submittal within 10 days after acceptance, indicating date of acceptance as start of warranty period.
- E. Applications for final payment will not be approved until the warranty certification and warranty documents are delivered to the Director's Representative.

1.07 SPARE PARTS AND MAINTENANCE MATERIALS

- A. Label and deliver spare parts, maintenance items, and extra materials to the Site. Place in locations as directed.
 - 1. Include "NOT FOR WARRANTY REPAIRS" on the labels.
 - 2. Obtain receipt prior to final payment.
- B. Do not use the spare parts and maintenance materials required by the Contract Documents to remedy defects during the one-year period described in Paragraph 9.8 of the General Conditions except when approved otherwise by authorized Facility Representative. In such cases, replace items used.
- C. Furnish the names, business addresses, and telephone numbers of fully equipped authorized service organizations to the Director's Representative.
- D. Applications for final payment will not be approved until these items are delivered to the Director's Representative.

PART 2 PRODUCTS (Not Used)

PART 3 EXECUTION (Not Used)

END OF SECTION

SECTION 033001

CAST-IN-PLACE CONCRETE

PART 1 GENERAL

1.01 RELATED WORK SPECIFIED ELSEWHERE

- A. Fibrous Reinforcement: Section 032101.

1.02 REFERENCES

- A. Except as shown or specified otherwise, the Work of this Section shall conform to the requirements of Specifications for Structural Concrete for Buildings ACI 301-05 of the American Concrete Institute.

1.03 DEFINITIONS (Amendments to ACI 301, Section 1.2):

- A. Exposed Construction: Exposed to view.

1.04 SUBMITTALS

- A. Submittals Package: Submit product data for design mix(es) and materials for concrete specified below at the same time as a package.
- B. Shop Drawings: Placing drawings for bar reinforcement.
- C. Product Data:
 - 1. Concrete design mix(es) with name and location of batching plant.
 - 2. Portland Cement: Brand and manufacturer's name.
 - 3. Fly Ash: Name and location of source, and DOT test numbers.
 - 4. Air-entraining Admixture: Brand and manufacturer's name.
 - 5. Water-reducing Admixture: Brand and manufacturer's name.
 - 6. Aggregates: Name and location of source, and DOT test numbers.
 - 7. Lightweight Coarse Aggregate: Brand and manufacturer's name
 - 8. Chemical Hardener (Dustproofing): Brand and manufacturer's name, and application instructions.
- D. Samples:
 - 1. Fabric Reinforcement: 8 inches square.
 - 2. Bar Supports: Full size.
- E. Quality Control Submittals:
 - 1. Certificates: Affidavit required under Quality Assurance Article.

1.05 QUALITY ASSURANCE

- A. Concrete batching plant shall be currently approved as a concrete supplier by the New York State Department of Transportation.

- B. Fly ash supplier shall be currently approved as a fly ash supplier by the New York State Department of Transportation.
- C. Certifications: Affidavit by the bar reinforcement manufacturer certifying that bar material meets the contract requirements.
- D. Source Quality Control: The Director reserves the right to inspect and approve the following items, at his own discretion, either with his own forces or with a designated inspection agency:
 1. Batching and mixing facilities and equipment.
 2. Sources of materials.

1.06 STORAGE

- A. Store materials so as to insure the preservation of their quality and fitness for the Work. Materials, even though accepted prior to storage, are subject to inspection and shall meet the requirements of the Contract before their use in the Work.

PART 2 PRODUCTS

2.01 MATERIALS (Amendments to ACI 301, Section 4, for Normal Weight Concrete and Section 7, for Lightweight Concrete):

- A. Water-reducing Admixture: ASTM C 494, Type A, and on the New York State Department of Transportation's current "Approved List".
- B. Fly Ash: ASTM C 618, including Table 1A (except for footnote A), Class F except that loss on ignition shall not exceed 4.0 percent.
- C. Chemical Curing and Anti-Spalling Compound: ASTM C-309, Type 1D, Class B, with a minimum 18 percent total solids content. No thinning of material allowed.
 1. SureCure Emulsion, Kaufman Products, Inc. 3811 Curtis Avenue, Baltimore, MD 21226, (800) 637-6372.
 2. Cure & Seal by Symons Corp., 200 East Touhy Ave., PO Box 5018, Des Plaines, IL 60017-5018, (847) 298-3200.
 3. "Kure N Seal W" by Sonneborn/ BASF Building Systems, 889 Valley Park Dr., Shakopee, MN 55379, (800) 433-9517.
 4. Day-Chem Cure & Seal 26 percent (J-22) by Dayton Superior Corp., 721 Richard St., Miamisburg, OH 45342, (800) 745-3700.
 5. Acrylseal HS by Master Builders/ BASF Building Systems, 23700 Chagrin Blvd., Cleveland, OH 44122, (800) 628-9990.
- D. Chemical Hardener (Dustproofing): Colorless aqueous solution of magnesium-zinc fluosilicate. Approved products include:
 1. Lapidolith by Sonneborn/ BASF Building Systems, 889 Valley Park Dr., Shakopee, MN 55379, (800) 433-9517.
 2. Surfhard by The Euclid Chemical Co., 19218 Redwood Rd., Cleveland, OH 44110, (216) 531-9222.

3. Pena-Lith by W.R. Meadows, Inc., PO Box 543, Elgin, IL 60121, (847) 683-4500.
 4. FluoHard by L & M Construction Chemicals, Inc., 14851 Calhoun Rd., Omaha, NE 68152, (402) 453-6600.
 5. Armortop by Anti Hydro International, Inc., 265 Badger Ave., Newark, NJ 07108, (800) 777-1773.
 6. Diamond by Kaufman Products, Inc., 3811 Curtis Avenue, Baltimore, MD 21226, (800) 637-6372.
- E. Type 1 Expansion Joint Filler: Preformed, resilient, non-extruding cork units; ASTM D 1752, Type II.
- F. Chamfer Strips: Wood, metal, PVC or rubber; one inch chamfer.
- G. Epoxy Bonding Agent (Adhesive): 100 percent solids epoxy-resin-base bonding compound, complying with ASTM C 881, Types I, II, IV and V, Grade 2 (horizontal areas) or Grade 3 (overhead/vertical areas), and Class B (40-60 degrees Fahrenheit) or Class C (60 degree Fahrenheit and above).
1. SurePoxy HM Series by Kaufman Products, Inc., 3811 Curtis Avenue, Baltimore, MD 21226, (800) 637-6372.
 2. Sikadur Hi-Mod 32 by Sika Corporation, 201 Polito Avenue, Lyndhurst, NJ 07071, (800) 933-7452.
 3. Epogrip by Sonneborn/ BASF Building Systems, 889 Valley Park Drive, Shakopee, MN 55379, (800) 433-9517.

2.02 PROPORTIONING (Amendments to ACI 301, Sections 4 & 7):

- A. Compressive Strength: Minimum 3000 psi, unless shown or specified otherwise.
1. Minimum 4000 psi for garage floor slabs, and exterior slabs, ramps and stairs.
- B. Weight: Normal.
- C. Durability: Concrete shall be air-entrained. Design air content shall be 6 percent by volume, with an allowable tolerance of plus or minus 1.5 percent for total air content. Entrained air shall be provided by use of an approved air-entraining admixture. Air-entrained cement shall not be used.
- D. Slump:
1. 3000 psi Normal Weight Concrete: Between 2 inches and 4 inches.
 2. 4000 psi Normal Weight Concrete: Between 2 inches and 3 inches.
 3. Lightweight Concrete: Between 1 inch and 4 inches.
- E. Admixtures: Do not use admixtures in concrete unless specified or approved in writing by the Director.
- F. Selection of Proportions: Concrete proportions shall be established on the basis of previous field experience or laboratory trial batches, unless otherwise approved in writing by the Director. Proportion mix with a minimum cement content of 564 pounds per cubic yard for 3000 psi concrete and 611 pounds per cubic yard for 4000 psi concrete.
1. Optional Material: Fly ash may be substituted for (Portland) cement in normal weight concrete up to a maximum of 15 percent by weight of the

required minimum (Portland) cement. If fly ash is incorporated in a concrete design mix, make necessary adjustments to the design mix to compensate for the use of fly ash as a partial replacement for (Portland) cement.

- a. Adjustments shall include the required increase in air-entraining admixture to provide the specified air content.
- b. Lower early strength of the concrete shall be considered in deciding when to remove formwork.

2.03 REINFORCEMENT (Amendments to ACI 301, Section 3):

- A. Bar Reinforcement: ASTM A 615, Grade 60, deformed steel bars.
- B. Fabric Reinforcement: ASTM A 185, welded wire fabric, fabricated into flat sheets unless otherwise indicated.
- C. Bar Supports: Galvanized steel or AISI Type 430 stainless steel, and without plastic tips.
- D. Tie Wire: Black annealed wire, 16-1/2 gage or heavier.

2.04 JOINTS AND EMBEDDED ITEMS (Amendments to ACI 301, Section 5.3.2.6):

- A. Obtain bond at construction joints by the use of bonding agent (adhesive) or the use of cement grout.

2.05 PRODUCTION (Amendments to ACI 301, Section 5):

- A. Provide ready-mixed concrete, either central-mixed or truck-mixed.

PART 3 EXECUTION

3.01 EXAMINATION AND PREPARATION

- A. Do not use items of aluminum for mixing, chuting, conveying, forming or finishing concrete, except magnesium alloy tools may be used for finishing.
- B. Keep excavations free of water. Do not deposit concrete in water.
- C. Hardened concrete, reinforcement, forms, and earth which will be in contact with fresh concrete shall be free from frost at the time of concrete placement.
- D. Prior to placement of concrete, remove all hardened concrete spillage and foreign materials from the space to be occupied by the concrete.

3.02 FORMWORK (Amendments to ACI 301, Section 2):

- A. Chamfer all exposed external corners of concrete.

3.03 PLACING REINFORCEMENT (Amendments to ACI 301, Section 3):

- A. At the time concrete is placed, reinforcement shall be free of mud, oil, loose rust, loose mill scale, and other materials or coatings that may adversely affect or reduce the bond.

3.04 PLACING CONCRETE (Amendments to ACI 301, Section 5):

- A. Operation of truck mixers and agitators and discharge limitations shall conform to the requirements of ASTM C 94.
- B. Do not allow concrete to free fall more than 4 feet.

3.05 FINISHING FORMED SURFACES (Amendments to ACI 301, Section 5.3.3):

- A. Finish Schedule: Except where indicated otherwise on the Drawings, provide the finishes below:
 - 1. Rough Form Finish for concrete surfaces not exposed to view.

3.06 FINISHING SLABS (Amendments to ACI 301, Section 5.3.4):

- A. Slabs On Grade: Provide key type joints unless otherwise shown. Tool exposed joints.
- B. Finish Schedule: Except where indicated otherwise on the Drawings, provide the finishes below:
 - 1. Floated Finish for:
 - a. Treads and platforms of exterior steps and stairs.
 - b. Slabs and fill over which waterproofing, roofing, vapor barrier, insulation, terrazzo, or resin bound flooring is required.
 - 2. Troweled Finish for:
 - a. Interior slabs that are to be exposed to view.
 - b. Slabs and fill over which resilient wood flooring, resilient tile or sheet flooring, carpet, or thin-film coating system is required.
 - c. Slabs and fill over which thin-set ceramic tile is required, except fine-broom finished surface.
 - d. Treads and platforms of interior steps and stairs.
 - 3. Broom or Belt Finish for:
 - a. Exterior slabs. Texture, as approved by the Director's Representative.
 - 4. Scratched Finish for:
- C. Finishing, General: Provide monolithic finishes on concrete floors and slabs without the addition of mortar or other filler material. Finish surfaces in true planes, true to line, with particular care taken during screeding to maintain an excess of concrete in front of the screed so as to prevent low spots. Screed and darby concrete to true planes while plastic and before free water rises to the surface. Do not perform finishing operations during the time free water (bleeding) is on the surface.

- D. Integral Emery Aggregate Surfacing: Provide a nonslip “dry shake” finish with emery aggregate. Apply emery aggregate in accordance with the manufacturer’s printed application instructions for a moderate duty nonslip surface, unless otherwise indicated.

3.07 CURING AND PROTECTION (Amendments to ACI 301, Section 5.3.6):

- A. Maintain concrete surfaces in a moist condition for at least 7 days after placing, except where otherwise indicated. Do not use curing compound.
 - 1. For surfaces of exterior slabs (on grade), apply chemical curing and anti-spalling compound in accordance with the recommendations of the manufacturer.

3.08 CHEMICAL HARDENER (DUSTPROOFING)

- A. Apply chemical hardener to all troweled finished interior floors which are to be left exposed.
- B. Do not apply chemical hardener until concrete has cured the number of days recommended in manufacturer’s instructions.
- C. Prepare surfaces and apply chemical hardener in accordance with manufacturer’s printed instructions and recommendations.

3.09 FIELD QUALITY CONTROL (Amendments to ACI 301, Section 1):

- A. Make available to the Director’s Representatives whatever test samples are required to make tests. Furnish shipping boxes for compression test cylinders.

END OF SECTION

SECTION 260519

WIRING, GENERAL - 600 VOLTS AND UNDER

PART 1 GENERAL

1.01 SUBMITTALS

- A. Waiver of Submittals: The “Waiver of Certain Submittal Requirements” in Section 013300 does not apply to Shop Drawings.
- B. Shop Drawings:
 - 1. For Electrical Circuit Protective Systems: Show proposed routes and installation details (include UL classification data, listing, and system number).
- C. Product Data: Catalog sheets, specifications and installation instructions.

1.02 PRODUCT DELIVERY

- A. Mark and tag insulated conductors and cables for delivery to the site. Include:
 - 1. Contractor’s name.
 - 2. Project title and number.
 - 3. Date of manufacture (month & year).
 - 4. Manufacturer’s name.
 - 5. Data which explains the meaning of coded identification (UL assigned electrical reference numbers, UL assigned combination of color marker threads, etc.).
 - 6. Environmental suitability information (listed or marked “sunlight resistant” where exposed to direct rays of sun; wet locations listed/marked for use in wet locations; other applications listed/marked suitable for the applications).

PART 2 PRODUCTS

2.01 INSULATED CONDUCTORS AND CABLES

- A. Date of Manufacture: No insulated conductor more than one year old when delivered to the site will be acceptable.
- B. Acceptable Companies: American Insulated Wire Corp., BICC General Cable Industries Inc., Cerro Wire & Cable Co. Inc., Pirelli Cable Corp., Rome Cable Corp., or Southwire Co.
- C. Conductors: Annealed uncoated copper or annealed coated copper in conformance with the applicable standards for the type of insulation to be applied on the conductor. Conductor sizes No. 8 and larger shall be stranded.
- D. Types:
 - 1. Electric Light and Power Wiring:

- a. General: Rated 600V, NFPA 70 Type FEP, THHN, THW, THW-2, THWN, THWN-2, XHH, XHHW, XHHW-2.

2.02 ELECTRICAL CIRCUIT PROTECTIVE SYSTEM

- A. Minimum 1-Hour Fire Rating: A system listed in UL Building Materials Directory, product category Electrical Circuit Protective Systems (FHIT).

2.03 CONNECTORS

- A. General:
 - 1. Connectors specified are part of a system. Furnish connectors and components, and use specific tools and methods as recommended by connector manufacturer to form complete connector system.
 - 2. Connectors shall be UL 486 A listed, or UL 486 B listed for combination dual rated copper/aluminum connectors (marked AL7CU for 75 degrees C rated circuits and AL9CU for 90 degrees C rated circuits).
- B. Splices:
 - 1. Indent Type (Uninsulated): Anderson/Hubbell's Versa-Crimp, VERSAtile, Blackburn/T&B Corp.'s Color-Coded Compression Connectors, Electrical Products Div./3M's Scotchlok 10000, 11000 Series, Framatome Connectors/Burndy's Hydent, Penn-Union Corp.'s BCU, BBCU Series, or Thomas & Betts Corp.'s Compression Connectors.
 - 2. Resin Splice Kits: Electrical Products Div./3M's Scotchcast Brand Kit Nos. 82A Series, 82-B1 or 90-B1, or Scotchcast Brand Resin Pressure Splicing Method.
 - 3. Heat Shrinkable Splices: Electrical Products Div./3M's ITCSN, Raychem Corp.'s Thermofit Type WCS, or Thomas & Betts Corp.'s SHRINK-KON Insulators.
 - 4. Cold Shrink Splices: Electrical Products Div./3M's 8420 Series.
- C. Gutter Taps: Anderson/Hubbell's GP/GT with GTC Series Covers, Blackburn/T&B Corp.'s H-Tap Type CF with Type C Covers, Framatome Connectors/Burndy's Polytap KPU-AC, H-Crimpit Type YH with CF-FR Series Covers, ILSCO's GTA Series with GTC Series Covers, Ideal Industries Inc.'s Power-Connect GP, GT Series with GIC covers, NSI Industries Inc.'s Polaris System, OZ/Gedney Co.'s PMX or PT with PMXC, PTC Covers, Penn-Union Corp.'s CDT Series, or Thomas & Betts Corp.'s Color-Keyed H Tap CHT with HTC Covers.
- D. Terminals: Nylon insulated pressure terminal connectors by Amp-Tyco/Electronics, Electrical Products Div./3M, Framatome Connectors/Burndy, Ideal Industries Inc., Panduit Corp., Penn-Union Corp., Thomas & Betts Corp., or Wiremold Co.
- E. Lugs:
 - 1. Single Cable (Compression Type Lugs): Copper, one or 2 hole style (to

- suit conditions), long barrel; Anderson/Hubbell's VERSAtile VHCL, Blackburn/T&B Corp.'s Color-Coded CTL, LCN, Framatome Connectors/Burndy's Hylug YA, Electrical Products Div./3M Scotchlok 31036 or 31145 Series, Ideal Industries Inc.'s CCB or CCBL, NSI Industries Inc.'s L, LN Series, Penn-Union Corp.'s BBLU Series, or Thomas & Betts Corp.'s 54930BE or 54850BE Series.
2. Single Cable (Mechanical Type Lugs): Copper, one or 2 hole style (to suit conditions); Blackburn/T&B Corp.'s Color-Keyed Locktite Series, Framatome Connectors/Burndy's Qiklug Series, NSI Industries Inc.'s Type TL, Penn-Union Corp.'s VI-TITE Terminal Lug Series, or Thomas & Betts Corp.'s Locktite Series.
 3. Multiple Cable (Mechanical Type Lugs): Copper, configuration to suit conditions; Framatome Connectors/Burndy's Qiklug Series, NSI Industries Inc.'s Type TL, Penn-Union Corp.'s VI-TITE Terminal Lug Series, or Thomas & Betts Corp.'s Color-Keyed Locktite Series.

2.04 TAPES

- A. Insulation Tapes:
 1. Plastic Tape: Electrical Products Div./3M's Scotch Super 33+ or Scotch 88, Plymouth Rubber Co.'s Plymouth/ Bishop Premium 85CW.
 2. Rubber Tape: Electrical Products Div./3M's Scotch 130C, or Plymouth Rubber Co.'s Plymouth/Bishop W963 Plysafe.
- B. Moisture Sealing Tape: Electrical Products Div./3M's Scotch 2200 or 2210, or Plymouth Rubber Co.'s Plymouth/Bishop 4000 Plyseal-V.
- C. Electrical Filler Tape: Electrical Products Div./3M's Scotchfil, or Plymouth Rubber Co.'s Plymouth/Bishop 125 Electrical Filler Tape.
- D. Color Coding Tape: Electrical Products Div./3M's Scotch 35, or Plymouth Rubber Co.'s Plymouth/Bishop Premium 37 Color Coding.
- E. Arc Proofing Tapes:
 1. Arc Proofing Tape: Electrical Products Div./3M's Scotch 77, Mac Products Inc.'s AP Series, or Plymouth Rubber Co.'s Plymouth/Bishop 53 Plyarc.
 2. Glass Cloth Tape: Electrical Products Div./3M's Scotch 27/Scotch 69, Mac Products Inc.'s TAPGLA 5066,, or Plymouth Rubber Co.'s Plymouth/Bishop 77 Plyglas.
 3. Glass-Fiber Cord: Mac Products Inc.'s MAC 0527.

2.05 WIRE-PULLING COMPOUNDS

- A. To suit type of insulation; American Polywater Corp.'s Polywater Series, Electric Products Div./3M's WL, WLX, or WLW, Greenlee Textron Inc.'s Y-ER-EAS, Cable Cream, Cable Gel, Winter Gel, Ideal Industries Inc.'s Yellow 77, Aqua-Gel II, Agua-Gel CW, or Thomas & Betts Corp.'s Series 15-230 Cable Pulling Lubricants, or Series 15-631 Wire Slick.

2.06 TAGS

- A. Precision engrave letters and numbers with uniform margins, character size minimum 3/16 inches high.
 - 1. Phenolic: Two color laminated engraver's stock, 1/16 inch minimum thickness, machine engraved to expose inner core color (white).
 - 2. Aluminum: Standard aluminum alloy plate stock, minimum .032 inches thick, engraved areas enamel filled or background enameled with natural aluminum engraved characters.

2.07 WIRE MANAGEMENT PRODUCTS

- A. Cable Clamps and Clips, Cable Ties, Spiral Wraps, etc: Catamount/T&B Corp., or Ideal Industries Inc.

PART 3 EXECUTION

3.01 INSTALLATION

- A. Install conductors in raceways after the raceway system is completed.
- B. No grease, oil, or lubricant other than wire-pulling compounds specified may be used to facilitate the installation of conductors.

3.02 CIRCUITING

- A. Do not change, group or combine circuits other than as indicated on the drawings.
- B. Do not change, group or combine circuits other than as indicated on the drawings.

3.03 COMMON NEUTRAL CONDUCTOR

- A. A common neutral may be used for 2 or 3 branch circuits where the circuits are indicated on the drawings to be enclosed within the same raceway, provided each branch circuit is connected to different phase busses in the panelboard.
- B. Exceptions - The following circuits shall have a separate neutral:
 - 1. Circuits containing ground fault circuit interrupter devices.
 - 2. Circuits containing solid state dimmers.
 - 3. Circuits recommended by equipment manufacturers to have separate neutrals.

3.04 CONDUCTOR SIZE

- A. Conductor Size:
 - 1. For Electric Light and Power Branch Circuits: Install conductors of size shown on drawings. Where size is not indicated, the minimum size allowed is No. 12 AWG.

3.05 COLOR CODING

- A. Color Coding for 120/208 Volt Electric Light and Power Wiring:
1. Color Code:
 - a. 2 wire circuit - black, white.
 - b. 3 wire circuit - black, red, white.
 - c. 4 wire circuit - black, red, blue, white.
 2. White to be used only for an insulated grounded conductor (neutral). If neutral is not required use black and red, or black, red and blue for phase to phase circuits.
 - a. "White" for Sizes No. 6 AWG or Smaller:
 - 1) Continuous white outer finish, or:
 - 2) Three continuous white stripes on other than green insulation along its continuous length.
 - b. "White" for Sizes Larger Than No. 6 AWG:
 - 1) Continuous white outer finish, or:
 - 2) Three continuous white stripes on other than green insulation along its continuous length, or:
 - 3) Distinctive white markings (color coding tape) encircling the conductor, installed on the conductor at time of its installation. Install white color coding tape at terminations, and at 1' 0" intervals in gutters, pullboxes, and manholes.
 3. Colors (Black, Red, Blue):
 - a. For Branch Circuits: Continuous color outer finish.
 - b. For Feeders:
 - 1) Continuous color outer finish, or:
 - 2) Color coding tapes encircling the conductors, installed on the conductors at time of their installation. Install color coding tapes at terminations, and at 1' 0" intervals in gutter, pullboxes, and manholes.
- B. Color Coding For 277/480 Volt Electric Light and Power Wiring:
1. Color Code:
 - a. 2 wire circuit – brown, gray.
 - b. 3 wire circuit – brown, yellow, gray.
 - c. 4 wire circuit – brown, yellow, orange, gray.
 2. Gray to be used only for an insulated grounded conductor (neutral). If neutral is not required use brown and yellow, or brown, yellow and orange for phase to phase circuits.
 - a. "Gray" For Sizes No. 6 AWG or Smaller.
 - 1) Continuous gray outer finish.
 - b. "Gray" For Sizes Larger Than No. 6 AWG:
 - 1) Distinctive gray markings (color coding tape) encircling the conductor, installed on the conductor at time of its installation. Install gray color coding tape at terminations, and at 1' 0" intervals in gutters, pullboxes, and manholes.
 - c. Colors (Brown, Yellow, Orange):
 - d. For Branch Circuits: Continuous color outer finish.
 - e. For Feeders:

- 1) Continuous color outer finish, or:
 - 2) Color coding tapes encircling the conductors, installed on the conductors at the time of their installation. Install color coding tapes at terminations, and at 1' 0" intervals in gutters, pullboxes, and manholes.
- C. More Than One Nominal Voltage System Within A building: Permanently post the color coding scheme at each branch-circuit panelboard.
- D. Existing Color Coding Scheme: Where an existing color coding scheme is in use, match the existing color coding if it is in accordance with the requirements of NFPA 70.
- E. Color Code For Wiring Other Than Electric Light and Power: In accordance with ICEA/NEMA WC-30 "Color Coding of Wires and Cables". Other coding methods may be used, as approved.

3.06 IDENTIFICATION

- A. Identification Tags: Use tags to identify feeders and designated circuits. Install tags so that they are easily read without moving adjacent feeders or requiring removal of arc proofing tapes. Attach tags with non-ferrous wire or brass chain.
1. Interior Feeders: Identify each feeder in pullboxes and gutters. Identify by feeder number and size.
 2. Exterior Feeders: Identify each feeder in manholes and in interior pullboxes and gutters. Identify by feeder number and size, and also indicate building number and panel designation from which feeder originates.
 3. Street and Grounds Lighting Circuits: Identify each circuit in manholes and lighting standard bases. Identify by circuit number and size, and also indicate building number and panel designation from which circuit originates.
- B. Identification Plaque: Where a building or structure is supplied by more than one service, or has any combination of feeders, branch circuits, or services passing through it, install a permanent plaque or directory at each service, feeder and branch circuit disconnect location denoting all other services, feeders, or branch circuits supplying that building or structure or passing through that building or structure and the area served by each.

3.07 WIRE MANAGEMENT

- A. Use wire management products to bundle, route, and support wiring in junction boxes, pullboxes, wireways, gutters, channels, and other locations where wiring is accessible.

3.08 EQUIPMENT GROUNDING CONDUCTOR

- A. Install equipment grounding conductor:
1. Where specified in other Sections or indicated on the drawings.

2. In conjunction with circuits recommended by equipment manufacturers to have equipment grounding conductor.
- B. Equipment grounding conductor is not intended as a current carrying conductor under normal operating circumstances.
- C. Color Coding For Equipment Grounding Conductor:
1. Color Code: Green.
 2. "Green" For sizes No. 6 AWG or Smaller:
 - a. Continuous green outer finish, or:
 - b. Continuous green outer finish with one or more yellow stripes, or:
 - c. Bare copper (see exception below).
 3. "Green" For Sizes Larger Than No. 6:
 - a. Stripping the insulation or covering from the entire exposed length (see exception below).
 - b. Marking the exposed insulation or covering with green color coding tapes.
 - c. Identify at each end and at every point where the equipment grounding conductor is accessible.

3.09 ARC PROOFING

- A. Arc proof feeders installed in a common pullbox or manhole as follows:
1. Arc proof new feeders.
 2. Arc proof existing feeders that are spliced to new feeders.
 3. Arc proof each feeder as a unit (except feeders consisting of multiple sets of conductors).
 4. Arc proof feeders consisting of multiple sets of conductors by arc proofing each set of conductors as a unit.
 5. Arc proof feeders with half-lapped layer of 55 mils thick arc proofing tape and random wrapped or laced with glass cloth tape or glass-fiber cord. For arc proofing tape less than 55 mils thick, add layers to equivalent of 55 mils thick arc proofing tape.

3.10 INSULATED CONDUCTOR AND CABLE SCHEDULE - TYPES AND USE

- A. Electric Light and Power Circuits:
1. FEP, THHN, THW, THW-2, THWN, THWN-2, XHH, XHHW, or XHHW-2: Wiring in dry or damp locations (except where special type insulation is required).
 2. THWN, THWN-2, XHHW, XHHW-2, USE, or USE-2: Wiring in wet locations (except where type USE or USE-2 insulated conductors are specifically required, or special type insulation is required).
 3. THHN, THWN or THWN-2: Wiring installed in existing raceway systems (except where special type insulation is required).
 4. THHN, THW-2, THWN-2, XHHW, or XHHW-2: Wiring for electric discharge lighting circuits (fluorescent, HID), except where fixture listing requires wiring rated higher than 90° C.

3.11 CONNECTOR SCHEDULE - TYPES AND USE

- A. Temperature Rating: Use connectors that have a temperature rating, equal to, or greater than the temperature rating of the conductors to which they are connected.

- B. Splices:
 - 1. Dry Locations:
 - a. For Conductors No. 8 AWG or Smaller: Use spring type pressure connectors, indent type pressure connectors with insulating jackets, or connector blocks (except where special type splices are required).
 - b. For Conductors No. 6 AWG or Larger: Use connector blocks or uninsulated indent type pressure connectors. Fill indentions in uninsulated connectors with electrical filler tape and apply insulation tape to insulation equivalent of the conductor, or insulate with heat shrinkable splices or cold shrink splices.
 - c. Gutter Taps in Panelboards: For uninsulated type gutter taps fill indentions with electrical filler tape and apply insulation tape to insulation equivalent of the conductor, or insulate with gutter tap cover.
 - 2. Damp Locations: As specified for dry locations, except apply moisture sealing tape over the entire insulated connection (moisture sealing tape not required if heat shrinkable splices or cold shrink splices are used).
 - 3. Wet Locations: Use uninsulated indent type pressure connectors and insulate with resin splice kits, cold shrink splices or heat shrinkable splices. Exception: Splices above ground which are totally enclosed and protected in NEMA 3R, 4, 4X enclosures may be spliced as specified for damp locations.

- C. Terminations:
 - 1. For Conductors No. 10 AWG or Smaller: Use terminals for:
 - a. Connecting wiring to equipment designed for use with terminals.
 - 2. For Conductors No. 8 AWG or Larger: Use compression or mechanical type lugs for:
 - a. Connecting cables to flat bus bars.
 - b. Connecting cables to equipment designed for use with lugs.
 - 3. For Conductor Sizes Larger Than Terminal Capacity On Equipment: Reduce the larger conductor to the maximum conductor size that terminal can accommodate (reduced section not longer than one foot). Use compression or mechanical type connectors suitable for reducing connection.

END OF SECTION

SECTION 260529

FASTENERS, ATTACHMENTS, AND SUPPORTING DEVICES

PART 1 GENERAL

1.01 SUBMITTALS

- A. Shop Drawings: Show support details if different from methods specified or shown on the drawings.
- B. Product Data: Catalog sheets, specifications and installation instructions.

PART 2 PRODUCTS

2.01 ANCHORING DEVICES

- A. Sleeve Anchors: Molly/Emhart's Parasleeve Series, Phillips' Red Head AN, HN, FS Series, or Ramset's Dynabolt Series.
- B. Wedge Anchors: Hilti's Kwik Bolt Series, Molly/Emhart's Parabolt Series, Phillips' Red Head WS, or Ramset's Trubolt Series.
- C. Self-Drilling Anchors: Phillips' Red Head Series S or Ramset's Ram Drill Series.
- D. Non-Drilling Anchors: Hilti's Drop-In Anchor Series, Phillips' Red Head J Series, or Ramset's Dynaset Series.
- E. Stud Anchors: Phillips' Red Head JS Series.

2.02 CAST-IN-PLACE CONCRETE INSERTS

- A. Continuous Slotted Type Concrete Insert, Galvanized:
 - 1. Load Rating 1300 lbs./ft.: Kindorf's D-986.
 - 2. Load Rating 2400 lbs./ft.: Kindorf's D-980.
 - 3. Load Rating 3000 lbs./ft.: Hohmann & Barnard Inc.'s Type CS-H.
 - 4. Load Rating 4500 lbs./ft.: Hohmann & Barnard Inc.'s Type CS-HD.
- B. Threaded Type Concrete Insert: Galvanized ferrous castings, internally threaded.
- C. Wedge Type Concrete Insert: Galvanized box-type ferrous castings, designed to accept bolts having special wedge shaped heads.

2.03 MISCELLANEOUS FASTENERS

- A. Except where shown otherwise on the Drawings, furnish type, size, and grade required for proper installation of the Work, selected from the following:
Furnish galvanized fasteners for exterior use, or for items anchored to exterior walls, except where stainless steel is indicated.

1. Standard Bolts and Nuts: ASTM A 307, Grade A, regular hexagon head.
 2. Lag Screws: ASME B18.2.1.
 3. Machine Bolts: ASME B18.5 or ASME B18.9, Type, Class, and Form as required.
 4. Wood Screws: Flat head, ASME B18.6.1.
 5. Plain Washers: Round, ASME B18.22.1.
 6. Lock Washers: Helical, spring type, ASME B18.21.1.
 7. Toggle Bolts: Spring Wing Type; Wing AISI 1010, Trunion Nut AISI1010 or Zamac Alloy, Bolt Carbon Steel ANSI B18.6.3.
- B. Stainless Steel Fasteners: Type 302 for interior Work; Type 316 for exterior Work; Phillips head screws and bolts for exposed Work unless otherwise specified.

2.04 TPR (THE PEEL RIVET) FASTENERS

- A. 1/4 inch diameter, threadless fasteners distributed by Subcon Products, 315 Fairfield Road, Fairfield, NJ 07004 (800) 634-5979.

2.05 POWDER DRIVEN FASTENER SYSTEMS

- A. Olin Corp.'s Ramset Fastening Systems, or Phillips Drill Company Inc.'s Red Head Powder Actuated Systems.

2.06 HANGER RODS

- A. Mild low carbon steel, unless otherwise specified; fully threaded or threaded each end, with nuts as required to position and lock rod in place. Unless galvanized or cadmium plated, provide a shop coat of red lead or zinc chromate primer paint.

2.07 "C" BEAM CLAMPS

- A. With Conduit Hangers:
1. For 1 Inch Conduit Maximum: B-Line Systems Inc.'s BG-8, BP-8 Series, Caddy/Erico Products Inc.'s BC-8P and BC-8PSM Series, or GB Electrical Inc.'s HIT 110-412 Series.
 2. For 3 Inch Conduit Maximum: Appleton Electric Co.'s BH-500 Series beam clamp with H50W/B Series hangers, Kindorf's 500 Series beam clamp with 6HO-B Series hanger, or OZ/Gedney Co.'s IS-500 Series beam clamp with H-OWB Series hanger.
 3. For 4 Inch Conduit Maximum: Kindorf's E-231 beam clamp and E-234 anchor clip and C-149 series lay-in hanger; Unistrut Corp.'s P2676 beam clamp and P-1659A Series anchor clip with J1205 Series lay in hanger.
- B. For Hanger Rods:
1. For 1/4 Inch Hanger Rods: B-Line Systems Inc.'s BC, Caddy/Erico Products Inc.'s BC, GB Electrical Inc.'s HIT 110, Kindorf's 500, 510, or Unistrut Corp.'s P1648S, P2398S, P2675, P2676.
 2. For 3/8 Inch Hanger Rods: Caddy/Erico Products Inc.'s BC, Kindorf's 231-3/8, 502, or Unistrut Corp.'s P1649AS, P2401S, P2675, P2676.

3. For 1/2 Inch Rods: Appleton Electric Co. BH-500 Series, Kindorf's 500 Series, 231-1/2, OZ/Gedney Co.'s IS-500 Series, or Unistrut Corp.'s P1650AS, P2403S, P2676.
4. For 5/8 Inch Rods: Unistrut Corp.'s P1651AS beam clamp and P1656A Series anchor clip.
5. For 3/4 Inch Rods: Unistrut Corp.'s P1653S beam clamp and P1656A Series anchor clip.

2.08 CHANNEL SUPPORT SYSTEM

- A. Channel Material: 12 gage steel.
- B. Finishes:
 1. Phosphate and baked green enamel/epoxy.
 2. Pre-galvanized.
 3. Electro-galvanized.
 4. Hot dipped galvanized.
 5. Polyvinyl chloride (PVC), minimum 15 mils thick.
- C. Fittings: Same material and finish as channel.
- D. UL Listed Systems:
 1. B-Line Systems Inc.'s B-22 (1-5/8 x 1-5/8 inches), B-12 (1-5/8 x 2-7/16 inches), B-11 (1-5/8 x 3-1/4 inches).
 2. Grinell Corp.'s Allied Power-Strut PS 200 (1-5/8 x 1-5/8 inches), PS 150 (1-5/8 x 2-7/16 inches), PS 100 (1-5/8 x 3-1/4 inches).
 3. Kindorf's B-900 (1-1/2 x 1-1/2 inches), B-901 (1-1/2 x 1-7/8 inches), B-902 (1-1/2 x 3 inches).
 4. Unistrut Corp.'s P-3000 (1-3/8 x 1-5/8 inches), P-5500 (1-5/8 x 2-7/16 inches), P-5000 (1-5/8 x 3-1/4 inches).
 5. Versabar Corp.'s VA-1 (1-5/8 x 1-5/8 inches), VA-3 (1-5/8 x 2-1/2 inches).

2.09 MISCELLANEOUS FITTINGS

- A. Side Beam Brackets: B-Line Systems Inc.'s B102, B103, B371-2, Kindorf's B-915, or Versabar Corp.'s VF-2305, VF-2507.
- B. Pipe Straps:
 1. Two Hole Steel Conduit Straps: B-Line Systems Inc.'s B-2100 Series, Kindorf's C-144 Series, or Unistrut Corp.'s P-2558 Series.
 2. One Hole Malleable Iron Clamps: Kindorf's HS-400 Series, or OZ/Gedney Co.'s 14-G Series, 15-G Series (EMT).
- C. Deck Clamps: Caddy/Erico Products Inc.'s DH-4-T1 Series.
- D. Fixture Stud and Strap: OZ/Gedney Co.'s SL-134, or Steel City's FE-431.
- E. Supporting Fittings for Pendent Mounted Industrial Type Fluorescent Fixtures on Exposed Conduit System:

1. Ball Hanger: Appleton Electric Co.'s AL Series, or Crouse-Hinds Co.'s AL Series.
 2. Flexible Fixture Hanger: Appleton Electric Co.'s UNJ-50, UNJ-75, or Crouse-Hinds Co.'s UNJ115.
 3. Flexible (Hook Type) Fixture Hanger: Appleton Electric Co.'s FHFF, or Crouse-Hinds Co.'s UNH-1.
 4. Eyelet: Unistrut Corp.'s M2250.
 5. Eyelet with Stud: Kindorf's H262, or Unistrut Corp.'s M2350.
 6. Conduit Hook: Appleton Electric Co.'s FHSN, or Crouse-Hinds Co.'s UNH-13.
- F. Supporting Fasteners (Metal Stud Construction): Metal stud supports, clips and accessories as produced by Caddy/Erico Products Inc.

PART 3 EXECUTION

3.01 INSTALLATION

- A. Where specific fasteners are not specified or indicated for securing items to in-place construction, provide appropriate type, size, and number of fasteners for a secure, rigid installation.
- B. Install anchoring devices and other fasteners in accordance with manufacturer's printed instructions.
- C. Make attachments to structural steel wherever possible.

3.02 FASTENER SCHEDULE

- A. Material:
 1. Use cadmium or zinc coated anchors and fasteners in dry locations.
 2. Use hot dipped galvanized or stainless steel anchors and fasteners in damp and wet locations.
 3. For corrosive atmospheres or other extreme environmental conditions, use fasteners made of materials suitable for the conditions.
- B. Types and Use: Unless otherwise specified or indicated use:
 1. Cast-in-place concrete inserts in fresh concrete construction for direct pull-out loads such as shelf angles or fabricated metal items and supports attached to concrete slab ceilings.
 2. Anchoring devices to fasten items to solid masonry and concrete when the anchor is not subjected to pull out loads, or vibration in shear loads.
 3. Toggle bolts to fasten items to hollow masonry and stud partitions.
 4. TPR fasteners to fasten items to plywood backed gypsum board ceilings.
 5. Metallic fasteners installed with electrically operated or powder driven tools for approved applications, except:
 - a. Do not use powder driven drive pins or expansion nails.
 - b. Do not attach powder driven or welded studs to structural steel less than 3/16 inch thick.
 - c. Do not support a load, in excess of 250 lbs from any single welded or powder driven stud.

- d. Do not use powder driven fasteners in precast concrete.

3.03 ATTACHMENT SCHEDULE

- A. General: Make attachments to structural steel or steel bar joists wherever possible. Provide intermediate structural steel members where required by support spacing. Select steel members for use as intermediate supports based on a minimum safety factor of 5.
 1. Make attachments to steel bar joists at panel points of joists.
 2. Do not drill holes in main structural steel members.
 3. Use "C" beam clamps for attachment to steel beams.

- B. Where it is not possible to make attachments to structural steel or steel bar joists, use the following methods of attachment to suit type of construction unless otherwise specified or indicated on the drawings:
 1. Attachment to Steel Roof Decking (No Concrete Fill):
 - a. Decking With Hanger Tabs: Use deck clamps.
 - b. Decking Without Hanger Tabs:
 - 1) Before Roofing Has Been Applied: Use 3/8 inch threaded steel rod welded to a 4 x 4 x 1/4 inch steel plate and installed through 1/2 inch hole in roof deck.
 - 2) After Roofing Has Been Applied: Use welding studs, or self-drilling/tapping fasteners. Exercise extreme care when installing fasteners to avoid damage to roofing.
 2. Attachment to Concrete Filled Steel Decks (Total thickness, 2-1/2 inches or more):
 - a. Before Fill Has Been Placed:
 - 1) Use thru-bolts and fish plates.
 - 2) Use welded studs. Do not support a load in excess of 250 pounds from a single welded stud.
 - b. After Fill Has Been Placed: Use welded studs. Do not support a load in excess of 250 lbs from a single welded stud.
 3. Attachment to Cast-In-Place Concrete:
 - a. Fresh Concrete: Use cast-in-place concrete inserts.
 - b. Existing Concrete: Use anchoring devices.
 4. Attachment to Cored Precast Concrete Decks:
 - a. New Construction: Use thru-bolts and fish plates before Construction Work Contractor has placed concrete fill over decks.
 5. Attachment to Precast Concrete Planks: Use anchoring devices, except do not make attachments to precast concrete planks less than 2-3/4 inches thick.
 6. Attachment to Precast Concrete Tee Construction:
 - a. New Construction:
 - 1) Use tee hanger inserts between adjacent flanges.
 - 2) Use thru-bolts and fish plates, except at roof deck without concrete fill.
 - b. Existing Construction:
 - 1) Use anchoring devices installed in webs of tees. Install anchoring devices as high as possible in the webs.
 - c. Do not use powder driven fasteners.

- d. Exercise extreme care in drilling holes to avoid damage to reinforcement.
- 7. Attachment to Wood Construction: Use side beam brackets fastened to the sides of wood members to make attachments for hangers.
 - a. Under 15 lbs Load: Attach side beam brackets to wood members with 2 No. 18 x 1-1/2 inch long wood screws, or 2 No. 16 x 1-1/2 inch long drive screws.
 - b. Over 15 lbs Load: Attach side beam brackets to wood members with bolts and nuts or lag bolts. Do not use lag bolts in wooden members having a nominal thickness (beam face) under 2 inches in size. Install bolts and nuts or lag bolts in the side of wood members at the mid-point or slightly above. Install plain washers under all nuts.

LOAD	LAG BOLT SIZE	BOLT DIAMETER
15 lbs to 30 lbs	3/8 x 1-3/4 inches	3/8 inch
31 lbs to 50 lbs	1/2 x 2 inches	1/2 inch
Over 50 lbs to load limit of structure.	Use bolt & nut.	5/8 inch

3.04 CONDUIT SUPPORT SCHEDULE

- A. Provide number of supports as required by National Electrical Code. Exception: Maximum support spacing allowed is 4'-0" for conduit sizes 3 inches and larger supported from wood trusses.
- B. Use pipe straps and specified method of attachment where conduit is installed proximate to surface of wood or masonry construction.
 - 1. Use hangers secured to surface with specified method of attachment where conduit is suspended from the surface.
- C. Use "C" beam clamps and hangers where conduit is supported from steel beams.
- D. Use deck clamps and hangers where conduit is supported from steel decking having hanger tabs.
 - 1. Where conduit is supported from steel decking that does not have hanger tabs, use clamps and hangers secured to decking, utilizing specified method of attachment.
- E. Use channel support system supported from structural steel for multiple parallel conduit runs.
- F. Where conduits are installed above ceiling, do not rest conduit directly on runner bars, T-Bars, etc.
 - 1. Conduit Sizes 2-1/2 Inches and Smaller: Support conduit from ceiling supports or from construction above ceiling.
 - 2. Conduit Sizes Over 2-1/2 Inches: Support conduit from beams, joists, or trusses above ceiling.

3.05 CHANNEL SUPPORT SYSTEM SCHEDULE

- A. Use channel support system where specified or indicated on the drawings.
- B. Channel supports may be used, as approved, to accommodate mounting of equipment.
- C. Material and Finish:
 - 1. Dry Locations: Use 12 gage steel channel support system having any one of the specified finishes.
 - 2. Damp Locations: Use 12 gage steel channel support system having any one of the specified finishes except green epoxy/enamel.
 - 3. Wet Locations: Use 12 gage steel channel support system having hot dipped galvanized, or PVC finish.

END OF SECTION

SECTION 260531

EXPOSED CONDUIT - WET LOCATIONS

PART 1 GENERAL

1.01 REFERENCES

- A. NEMA, ANSI, and UL.

1.02 SUBMITTALS

- A. Product Data: Catalog sheets, specifications and installation instructions.

PART 2 PRODUCTS

2.01 RACEWAYS

- A. Rigid Ferrous Metal Conduit: Steel, hot dipped galvanized on the outside and inside UL categorized as Rigid Ferrous Metal Conduit (identified on UL Listing Mark as Rigid Metal Conduit - Steel, or Rigid Steel Conduit), by Allied Tube & Conduit Corp., LTV Copperweld, or Wheatland Tube Co.
- B. Rigid Nonmetallic PVC Conduit, Fittings, and Accessories: UL categorized as Rigid Nonmetallic, Schedule 40 and Schedule 80 PVC conduit (identified on UL Listing Mark as Rigid Nonmetallic Conduit Aboveground and Underground Schedule 40; Rigid Nonmetallic Conduit Aboveground and Underground Extra Heavy Wall Schedule 80), by Beck Mfg./Picoma Industries, Cantex Inc., Carlon/Div. Of Lamson and Sessions, Ipex Inc., J-M Mfg. Co., Inc., National Pipe & Plastics Inc., or Queen City Plastics, Inc.

2.02 FITTINGS AND ACCESSORIES

- A. Connectors and Couplings:
 - 1. Couplings (For Rigid Metal Conduit): Standard threaded couplings as furnished by conduit manufacturer.
 - 2. Watertight Conduit Hubs: Cooper/Crouse Hinds' Myers Hubs (stainless steel), OZ/Gedney Co.'s Type CH-T (hot dipped galvanized finish).
 - 3. Liquid-tight Flexible Metal Conduit Connectors: OZ/Gedney Co.'s 4Q-TG Series (hot-dip/mechanically galvanized), or Thomas & Betts Corp.'s 3322 Series (PVC coated).
- B. Conduit Bodies (Threaded): Malleable iron or cast iron alloy bodies and covers with hot dipped galvanized or other specified corrosion resistant finish; Cooper/Crouse-Hinds' Condulets (Corro-free epoxy powder coat), Thomas & Betts Corp.'s Conduit Bodies (hot dipped galvanized), or OZ/Gedney Co.'s Conduit Bodies (hot dipped galvanized). Stainless steel cover screws, covers gasketed to suit application.

- C. Expansion Fittings: Cooper/Crouse-Hinds XJG (Corro-free epoxy powder coat), OZ Gedney Co.'s AX, EXE (end type, hot dipped galvanized), or Thomas & Betts Corp.'s XJG (hot dipped galvanized).
- D. Deflection Fittings: Ductile iron couplings with hot dipped galvanized finish, neoprene sleeve, and stainless steel bands, Appleton Electric Co.'s CF; or bronze couplings, neoprene sleeve, and stainless steel bands, OZ/Gedney Co.'s Type DX.
- E. Sealing Fittings: Malleable iron body with hot dipped/mechanically galvanized finish, neoprene sleeve, and stainless steel bands, Appleton electric Co.'s CF; or bronze couplings, neoprene sleeve, and stainless steel bands, OZ/Gedney Co.'s Type DX.
 - 1. Horizontal: Cooper/Crouse-Hinds' EYS with Chico A sealing compound and Chico X filler, OZ/Gedney Co.'s EYD with EYC sealing compound and EYF damming fiber, or Thomas & Betts Corp.'s. EYS w/Chico A sealing compound and Chico X filler.
 - 2. Vertical (with Drain): Cooper/Crouse-Hinds with Chico A sealing compound and Chico X filler, OZ/Gedney Co.'s EY, EYA with EYC sealing compound and EYF damming fiber, or Thomas & Betts Corp.'s. w/Chico A sealing compound and Chico X filler.
 - 3. Other Type Fittings. As required to suit installation requirements, by Cooper/Crouse-Hinds, OZ/Gedney Co., or Thomas & Betts Corp. with hot dipped/mechanically galvanized finish or epoxy powder coat.
- F. Service Entrance Caps/Heads: Hot dipped/mechanically galvanized finish; OZ/Gedney Co.'s 17-50G Series.
- G. Vertical Conductor Supports: Kellems/Hubbell Inc.'s Conduit Riser Grips (stainless steel or tin coated bronze), or OZ/Gedney Co.'s hot dipped galvanized finish Type CMT or Type W.
- H. Conduit Clamps and Back Spacers: Malleable iron, hot dipped/mechanically galvanized finish; Cooper/Crouse-Hinds' 510 and CB1 Series, OZ/Gedney Co.'s 14-G and 141G Series, or Thomas & Betts Corp.'s 1275 and 1350 Series.
- I. Drains and Breathers: Stainless steel; Appleton Electric Co.'s ECBD, Cooper/Crouse-Hinds' ECD, OZ/Gedney Co.'s Type DB, or Thomas & Betts Corp.'s Type ECD.

PART 3 EXECUTION

3.01 RACEWAY INSTALLATION - GENERAL

- A. Number of Raceways: Do not change number of raceways to less than the number indicated on the drawings.
 - 1. Each raceway shall enclose one circuit unless otherwise indicated on the drawings.

- B. Conduit Size: Not smaller than 1/2 inch electrical trade size. Where type THWN, THWN-2, XHHW, or XHHW-2 conductors are specified for use under Section 260519, the minimum allowable conduit size for new Work shall be based on Type THW conductors.
- C. Conduit Bends: For 1/2 and 3/4 inch conduits, bends may be made with manual benders. For all conduit sizes larger than 3/4 inch, manufactured or field fabricated offsets or bends may be used. Make field fabricated offsets or bends with an approved hydraulic bender.
- D. Conduit Exposed In Indoor Wet Locations: Install entire wiring system including conduit, boxes, and fittings so that there is a 1/4 inch air space between it and the wall or supporting surface.

3.02 RACEWAY SCHEDULE - TYPES & USE

- A. Rigid Ferrous Metal Conduit: Install in all wet locations unless otherwise specified or indicated on the drawings.
- B. Rigid Nonmetallic PVC Conduit: Use at locations indicated on drawings.

3.03 FITTINGS AND ACCESSORIES SCHEDULE

- A. General:
 1. Use malleable iron or cast iron alloy fittings and accessories having hot dipped/mechanically galvanized finish or other specified corrosion resistant finish in conjunction with ferrous raceways unless otherwise specified or indicated on the drawings.
 2. Use caps or plugs to seal ends of conduits until wiring is installed (to exclude foreign material).
 3. Use expansion fittings:
 - a. Where raceways cross expansion joints.
 - b. At intervals not exceeding 75 feet in straight runs (outside installations).
 - c. Between fixed equipment (outside installations).
 4. Use deflection fittings where raceways cross expansion joints that move in more than one plane.
 5. Use watertight hub on end of each conduit entering cabinets or boxes that are not constructed with integral threaded hubs.
 6. Use back spacers behind each conduit clamp to keep raceway off surface to which it is attached and arranged to allow raceway to move due to expansion and contraction (outside installations).
 7. Use drains in low points of the system to drain condensation, keeping interior of raceway system free of moisture. Also use breather at high point of the system for outside installations.
- B. For Rigid Metal Conduit: Use threaded fittings.

- C. For Rigid Nonmetallic PVC Conduit: Use conduit manufacturer's corrosion resistant fittings and accessories.

END OF SECTION

SECTION 260534

OUTLET, JUNCTION, AND PULL BOXES

PART 1 GENERAL

1.01 REFERENCES

- A. NEMA, and UL.

1.02 SUBMITTALS

- A. Product Data: Catalog sheets, specifications and installation instructions.
 - 1. For fire rated construction, prove that materials and installation methods proposed for use are in accordance with the listing requirements of the classified construction.

PART 2 PRODUCTS

2.01 FIBERGLASS HANDHOLES, PULLBOXES, and SPLICE BOXES

- A. Fiberglass Handholes and Boxes: Molded of fiberglass-reinforced polyester resin, with covers made of polymer concrete.
 - 1. Below Grade: Cason Industries LLC Fibrelyte, Nordic Fiberglass Inc GSHH , Quazite: Hubell Power System, Inc.
 - 2. Above Grade: Cason Industries LLC, Nordic Fiberglass Inc PRMC, Quazite: Hubell Power System, Inc.

PART 3 EXECUTION

3.01 PREPARATION

- A. Before proceeding with the installation of junction and pull boxes, check the locations with the Director's Representative and have them approved.

3.02 INSTALLATION

- A. Install handholes and boxes level and plumb and with orientation and depth coordinated with connecting ducts, to minimize bends and deflections required for proper entrances. Use box extension if required to match depths of ducts, and seal joint between box and extension as recommended by manufacturer.
- B. Coordinate replacement handhole installation with position of existing underground conduits.
- C. Unless otherwise indicated, support units on a level bed of crushed stone or gravel, graded from ½-inch sieve to No. 4 sieve and compacted to same density as adjacent undisturbed earth.
- D. Elevation: Unless otherwise indicated, set covers of handholes 1 inch above finished grade.

- E. Field cut openings for ducts and 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.

END OF SECTION

SECTION 262416

PANELBOARDS

PART 1 GENERAL

1.01 REFERENCES

- A. NEMA, UL.

1.02 SUBMITTALS

- A. Waiver of Submittals: The “Waiver of Certain Submittal Requirements” in Section 013300 does not apply to this Section.
- B. Submittal Packages: Submit the shop drawings, product data, and the quality control submittals specified below at the same time as a package.
- C. Shop Drawings; include the following for each panelboard:
 - 1. Cabinet and gutter size.
 - 2. Voltage and current rating.
 - 3. Panelboard short circuit rating. Indicate if rating is Fully Rated Equipment Rating, or where acceptable, UL listed Integrated Equipment Short Circuit Rating.
 - 4. Circuit breaker enumeration (frame, ATE, poles, I.C.).
 - a. Indicate if circuit breakers are suitable for the panelboards’ Fully Rated Equipment Rating, or where acceptable, are series connected devices that have been test verified and listed with UL (include documentation proving the compatibility of the proposed circuit breaker combinations). Circuit breakers do not have to be listed as series connected devices when all of the circuit breaker interrupting ratings are equal to, or greater than, the short circuit rating of the panelboard.
 - 5. Accessories.
- D. Product Data:
 - 1. Catalog sheets, specifications and installation instructions.
 - 2. Bill of materials.
- E. Quality Control Submittals:
 - 1. List of Completed Installations: If brand names other than those specified are proposed for use, furnish the name, address, and telephone number of at least 5 comparable installations that can prove the proposed products have operated satisfactorily for one year.
 - 2. Company Field Advisor Data: Include:
 - a. Name, business address and telephone number of Company Field Advisor secured for the required services.
 - b. Certified statement from the Company listing the qualifications of the Company Field Advisor.
 - c. Services and each product for which authorization is given by the

Company listed specifically for this project.

- F. Contract Closeout Submittals:
1. System acceptance test report.
 2. Certificate: Affidavit, signed by the Company Field Advisor and notarized, certifying that the system meets the contract requirements and is operating properly.
 3. Operation and Maintenance Data: Deliver 2 copies, covering the installed products, to the Director's Representative.

PART 2 PRODUCTS

2.01 PANELBOARDS

- A. As produced by Cutler-Hammer/Eaton Corp., Challenger Electrical Equipment Corp. General Electric Co., Siemens/ITE, Square D Co., or Westinghouse Electric Corp., having:
1. Flush or surface type cabinets as indicated on the drawings.
 2. Increased gutter space for gutter taps, sub-feed wiring, through-feed wiring, oversize lugs.
 3. UL label "SUITABLE FOR USE AS SERVICE EQUIPMENT" where used as service equipment.
 - a. Where indicated, equip panelboards used as service equipment with secondary surge arresters; GE's Tranquell Series, Joslyn's Mfr. Co.'s Surge Tec Series, Intermatic Incorp.'s AG2401 or AG6503, Square D Co.'s SDSA 1175 or SDSA 3650, to suit system primary (transformer size, available current) and secondary characteristics.
 4. Door and one piece trim. Door fastened to trim with butt or piano hinges. Trim fastened to cabinet with devices having provision for trim adjustment.
 5. Yale No. 511S locks with brass cylinder rosette, blind fastened from inside of door. 2 No. 47 keys with each lock (Exception: Not more than 7 keys, total).
 6. Door lock. 2 keys with each lock (Exception: Not more than 7 keys, total).
 7. Solid copper bus bars. Ampere rating of bus bars not less than frame size of main circuit breaker.
 8. Full capacity copper neutral bus in panelboards where neutrals are required.
 9. Copper equipment grounding bus in panelboards where equipment grounding conductors are required.
 10. Sections designated "space" or "provision for future breaker" equipped to accept future circuit breakers. All panelboards installed under this project shall be 18 circuit.
 11. Provisions for padlocking circuit breaker handle in OFF position where indicated.
 12. Directory.

13. Short circuit rating not less than indicated on panelboard schedule. Furnish panelboards having Fully Rated Equipment Rating (the short circuit rating of the panelboard is equal to the lowest interrupting rating of any device installed in the panelboard). Exception:
 - a. Where indicated to be acceptable on panelboard schedule, panelboard having UL listed Integrated Equipment Short Circuit Rating may be used.
14. Molded case, bolt-on circuit breakers:
 - a. Mounting: Individually mounted main circuit breaker (when MCB is required), and group mounted branch/feeder circuit breakers to accommodate the circuit breaker style and panelboard construction.
 - b. Components: See panelboard schedule for specific components required for each circuit breaker. In addition to the specific components, equip each circuit breaker with additional components as required to achieve a coordinated selective scheme between the main circuit breaker and the branch/feeder circuit breakers when indicated on the panelboard schedule that a coordinated selective scheme is required.
 - c. All circuit breakers installed under this project shall be 3 pole, 60A unless otherwise indicated on the drawings.
15. Panelboard construction shall be NEMA 3R unless otherwise indicated on the drawings.

2.02 NAMEPLATES

- A. General: Precision engrave letters and numbers with uniform margins, character size minimum 3/16 inch high.
 1. Phenolic: Two color laminated engravers stock, 1/16 inch minimum thickness, machine engraved to expose inner core color (white).
 2. Aluminum: Standard aluminum alloy plate stock, minimum .032 inches thick, engraved areas enamel filled or background enameled with natural aluminum engraved characters.
 3. Materials for Outdoor Applications: As recommended by nameplate manufacturer to suit environmental conditions.

PART 3 EXECUTION

3.01 INSTALLATION

- A. Install panelboards in accordance with NEMA Publication No. PB1.1 "General Instructions for Proper Installation, Operation and Maintenance of Panelboards Rated 600 Volts or Less".
 1. Set/program the circuit breakers.
- B. Flush Cabinets: Set flush cabinets so that edges will be flush with the finished wall line. Where space will not permit flush type cabinets to be set entirely in the wall, set cabinet as nearly flush as possible, and cover the protruding sides with the trim extending over the exposed sides of the cabinet and back to the finished wall line.

- C. Directory: Indicate on typewritten directory the equipment controlled by each circuit breaker, and size of feeder servicing panelboard. For power panelboards also include ATE rating and feeder size for each breaker.
- D. Identification:
1. Use nameplates, or stencil on front of each panelboard with white paint, "LP-1, PP-1, etc." in 1/2 inch lettering corresponding to panelboard designations on the drawings, and electrical parameters (phase, wire, voltage).
 2. Install a nameplate on each panelboard that explains the means of identifying each ungrounded system conductor by phase and system. Examples of nameplate statements:
 - a. Identification of 277/480 Volt Circuit Conductors:
2 wire circuit - natural gray**, brown.
3 wire circuit - natural gray**, brown, yellow.
4 wire circuit - natural gray**, brown, yellow, orange.
- **Natural gray is used only as neutral. Where neutral is not required, brown, yellow, or brown, yellow, orange is used for phase to phase circuits.

3.02 FIELD QUALITY CONTROL

- A. Preliminary System Test:
1. Preparation: Have the Company Field Advisor adjust the completed circuit breakers and then operate them long enough to assure that they are performing properly.
 2. Run a preliminary test for the purpose of:
 - a. Determining whether the circuit breakers are in a suitable condition to conduct an acceptance test.
 - b. Checking instruments and equipment.
 - c. Training facility personnel.
- B. System Acceptance Test:
1. Preparation: Notify the Director's Representative at least 3 working days prior to the test so arrangements can be made prior to the test to have a Facility Representative witness the test.
 2. Make the following tests:
 - a. Test circuit breakers that have ground fault protection in accordance with the approved information sheets and test form.
 - b. Test programmable solid state trip devices in accordance with the manufacturer's recommendations.
 3. Supply all equipment necessary for system adjustment and testing.
 4. Submit written report of test results signed by the Company Field Advisor and the Director's Representative. Mount a copy of the final report in a conspicuous location on, or inside, the panelboard door.

END OF SECTION

SECTION 265629

STREET LIGHTING AND GROUNDS LIGHTING

PART 1 GENERAL

1.01 RELATED WORK SPECIFIED ELSEWHERE

- A. Cast-In-Place Concrete: Section 033001.

1.02 SUBMITTALS

- A. Waiver of Submittals: The "Waiver of Certain Submittals Requirements" in Section 013300 does not apply to the following products specified in this Section:
 - 1. Lighting standards.
 - 2. Luminaires.
 - 3. Bases.
- B. Product Data: Catalog sheets, specifications and installation instructions. Include candlepower distribution curves for each type fixture if different from Company or catalog number specified.

1.03 QUALITY ASSURANCE

- A. Equipment Qualifications For Products Other Than Those Specified:
 - 1. At the time of submission provide written notice to the Director of the intent to propose an "or equal" for products other than those specified. Make the "or equal" submission in a timely manner to allow the Director sufficient time to review the proposed product, perform inspections and witness test demonstrations.
 - 2. If products other than those specified are proposed for use furnish the name, address, and telephone numbers of at least 5 comparable installations that can prove the proposed products have performed satisfactorily for 3 years. Certify in writing that the owners of the 5 comparable installations will allow inspection of their installation by the Director's Representative and the Company Field Advisor.
 - a. Make arrangements with the owners of 2 installations (selected by the Director) for inspection of the installations by the Director's Representative. Also obtain the services of the Company Field Advisor for the proposed products to be present. Notify the Director a minimum of 3 weeks prior to the availability of the installations for the inspection, and provide at least one alternative date for each inspection.
 - b. Only references from the actual owner or owner's representative (Security Supervisor, Maintenance Supervisor, etc.) will be accepted. References from dealers, system installers or others, who are not the actual owners of the proposed products, are not acceptable.

- 1) Verify the accuracy of all references submitted prior to submission and certify in writing that the accuracy of the information has been confirmed.
3. The product manufacturer shall have test facilities available that can demonstrate that the proposed products meet the contract requirements.
 - a. Make arrangements with the test facility for the Director's Representative to witness test demonstrations. Also obtain the services of the Company Field Advisor for the proposed product to be present at the test facility. Notify the Director a minimum of 3 weeks prior to the availability of the test facility, and provide at least one alternative date for the testing.
4. Provide written certification from the manufacturer that the proposed products are compatible for use with all other equipment proposed for use for this system and meet all contract requirements.

PART 2 PRODUCTS

2.01 LIGHTING STANDARDS

- A. Aluminum Bracket Arm Lighting Standards: Hapco/Kearney-National Inc.'s, Series 31 (31-733 single arm), Series 32 (32-709 double arm); Pfaff and Kendall's Series ALS-5 (EHT843296/SB-2 single arm, DEHT 843296/SB-2 double arm); or Pole-Lite Industries' Series TTAL (TTAL-86-32.5-8S single arm, TTAL-86-32.5-8D double arm); having:
 1. Match existing fixture mounting height with 6 foot truss arm.
 2. Minimum 4 x 6 inches handhole.
 3. One 1/8 inch and two 1/16 inch aluminum shims with each standard.
 4. Four 1 inch dia anchor bolts, 36 inches long with a 4 inch right angle leg. Threaded end hot dipped galvanized for a minimum of 10 inches. Galvanized nut, lockwasher and flatwasher with each bolt. Template for setting anchor bolts.

2.02 POLES

- A. General:
 1. This specification applies to dimensions and full length treatment of wood poles of the style used by major utility companies for distribution and transmission line construction.
 2. This specification is intended for Western Red Cedar, Alaska Yellow Cedar, Pacific Coast Douglas Fir and Southern Yellow Pine Poles.
 3. Conform to American National Standard ANSI 05.1 - Specifications and Dimensions for Wood Poles, and applicable American Wood-Preservers' Association Standards.
 4. The use of anti-splitting iron is not permitted in any pole covered by this specification.
 5. The taking of increment borings, the measurement of the depth of penetration and the measurement of sapwood thickness shall all be in accordance with AWPAs Standard M2. All holes made by borings shall

be filled with tight fitting cylindrical plugs which have been thoroughly treated with preservative.

6. The preservative solution and process shall be of a type that will produce a finished surface appearance that is clean, dry and free of blooming.

B. Markings: Brand and tag poles as follows:

1. Burn brand Southern Yellow Pine poles on the face of the pole with information in accordance with ANSI 05.1, paragraph 6.5. Western Red Cedar and Alaska Yellow Cedar poles shall have this same information stamped into a 2 inch round aluminum tag recessed 1/4 inch into the pole and securely nailed. Place the center of the brand or tag on the face of the pole at a point 6 feet, plus or minus 2 inches, above the standard groundline as shown in the chart below. In addition, all poles shall have the pole length and circumference class stamped with 1/4 inch numerals into an aluminum tag which is securely affixed to the butt of the pole.

LENGTH OF POLE (FEET)	GROUNDLINE DISTANCE FROM BUTT (FEET)	BRAND LOCATION FROM BUTT (FEET)
25	4	10
30	5	11
35	5.5	11.5
40	6	12
45	6.5	12.5
50	7	13
55	7.5	13.5

C. Framing: Perform roofing, gaining, and drilling prior to treatment:

1. Roofing shall be 15 degrees one way.
2. Slab gain top 43 inches, 5/8 inch deep on face of pole.
3. Bore 11/16 inch holes on face in gain 4 inches and 12 inches from the top.

D. Treatment:

1. Western Red Cedar and Alaska Yellow Cedar Poles:
 - a. Treatment shall be by the Full Length Thermal Process in accordance with AWPA Standards C1 and C8 or by the Full Length Pressure Process in accordance with AWPA Standards C1 and C4. Prior to treatment, all cedar poles shall be incised throughout that section of the pole extending 3 feet above and 3 feet below the standard groundline to a depth of 5/8 inch, plus or minus 1/8 inch.
 - b. The preservative used shall be Pentachlorophenol-petroleum solution in accordance with AWPA Standards P8 and P9 (Heavy Petroleum Solvent).
2. Southern Yellow Pine Poles:

- a. Initial Treatment: Shortly after shaving, the poles shall receive a fungicide treatment or an accelerated seasoning cycle, or both, to prevent air-borne infection during the seasoning.
 - b. Seasoning: Pine poles shall be seasoned by the kiln drying process in accordance with ANSI 05.1, latest revision, paragraph 4.1.2.3 except the temperature shall be held to a maximum of 170 degrees F dry bulb. Moisture content shall be determined by either the moisture meter method or the oven drying method as per AWP Standard M2. The average moisture content shall be 25 percent in the outer 3 inches. A minimum of 10 percent of the number of pieces in a charge or lot shall be tested for moisture content.
 - c. Final Treatment: The treatment shall comply with AWP Standards C1 and C4 using a minimum of 5 percent solution of pentachlorophenol dissolved in a selected petroleum vehicle. The Penta solution shall conform to AWP Standards P8 and P9 (Heavy Petroleum Solvent). The treatment shall be done by the empty cell process.
 - d. Retention: The Penta retained shall be not less than 0.4 lbs. of dry chemical per cubic foot as determined by assay of the 0.5 to 2.0 inch zone per AWP Standard C4.
3. Pacific Coast Douglas Fir Poles:
- a. Seasoning: Fir poles shall be thoroughly air-seasoned under proper sanitary conditions. The moisture content of all poles shall be determined from moisture meter readings using a calibrated resistance type moisture meter with insulated needles. The insulated needles shall be driven into the center half of the pole, driven toward the pith, to a depth of 1-1/2 inches. One moisture meter test shall be made on each pole. The average moisture meter reading of all poles in any charge shall be 22 percent or less. The moisture meter reading for any one pole shall not exceed 25 percent.
 - b. Conditioning: Fir poles shall be conditioned for various lengths and classes as shown in the table below. The total hours shown, plus or minus two hours, is the combined time of the conditioning hours plus the hydraulic pressure period. Steam conditioning is not permitted.

HOURS FOR COMPLETE CONDITIONING OF DOUGLAS FIR POLES											
150 DEGREES F @ CENTER											
CLASS	H-6	H-5	H-4	H-3	H-2	H-1	1	2	3	4	5
CONDITIONING HOURS @ 200 DEGREES F AND OVER											
LENGTH											
30							10.0	8.5	7.5	6.5	5.5
35					14.0	12.5	11.0	10.0	8.5	7.5	6.0
40			19.0	17.5	15.5	14.0	12.5	11.0	9.5	8.0	7.0
45	25.0	23.0	21.0	19.0	17.5	15.0	13.5	12.0	10.5	9.0	8.0
50	27.5	25.0	22.5	20.5	19.0	16.5	15.0	13.0	11.0	10.0	8.5

HOURS FOR COMPLETE CONDITIONING OF DOUGLAS FIR POLES											
150 DEGREES F @ CENTER											
CLASS	H-6	H-5	H-4	H-3	H-2	H-1	1	2	3	4	5
CONDITIONING HOURS @ 200 DEGREES F AND OVER											
LENGTH											
55	29.5	27.0	24.5	22.0	20.0	18.0	16.0	14.0	12.0	10.5	

- c. Final Treatment: The treatment shall be in accordance with AWPA Standards C1 and C4 using a minimum of 5 percent solution of pentachlorophenol dissolved in a selected petroleum vehicle. The Penta solution shall conform to AWPA Standards P8 and P9 limited to heavy petroleum solvent. Pressure treatment shall be done by the empty cell process.
 - d. Retention: The retention of Penta shall be not less than 0.60 lbs. per cubic foot by assay in the 0.25 to 1.00 inch zone, per AWPA Standard C4, from increment borer cores taken from one foot above or below the standard face brand or tag. Also the retention shall be not less than 0.20 lbs. per cubic foot by assay in the 2.0 to 2.5 inch zone from cores taken from the incised groundline section. Retention shall be determined by lime ignition or copper pyridine assay in accordance with AWPA Standard A5.
- E. Inspection of Poles: Poles shall bear the stamp of the McCallum Inspection Co., Williams Inspection Co., or other approved inspection company. Poles not stamped will be rejected. Inspection shall consist of the following:
- 1. Inspection of treating plant.
 - 2. Physical inspection of poles-Top impressed with inspectors stamp.
 - 3. Treatment inspection of poles-Butt impressed with inspectors stamp.
 - 4. Reports.

2.03 LUMINAIRES

- A. Luminaires - Arm Mounted: Crouse-Hinds Co.'s OV Series, General Electric Co.'s M Series, ITT Outdoor Lighting's Horizontal Luminaire Series, or McGraw-Edison Co.'s Unidor Series, having:
- 1. High power factor high pressure sodium lamp ballast which maintains lamp wattage with ± 5 percent upon ± 10 percent variation in line voltage and the starting current is lower than the operating current.
 - 2. High pressure sodium lamp, 150 watt LU150/BD.
 - 3. Luminaire suitable for operation on 480 volt circuit.
 - 4. Borosilicate glass refractor.
 - 5. Type III light distribution.
- B. Luminaires - Post Top: Holophane's RSL-350 Series, ITT Outdoor Lighting's Contempo Style D, or McGraw-Edison Co.'s Style King G, having:
- 1. High power factor high pressure sodium lamp ballast which maintains

lamp wattage within ± 12 percent upon ± 5 percent variation in line voltage.

2. High pressure sodium lamp, 150 watt LU150/BD.
3. Luminaire suitable for operation on 480 volt circuit.
4. Polycarbonate refractor.
5. Type II or III light distribution.

2.03 GUYS AND ANCHORS

- A. Guy Wire: Alumoweld guy strand 7 No. 7 (7X .1443 inch dia. strands) nominal diameter of .433 inch, minimum breaking strength 19060 lbs.
- B. Guy-Grip Dead Ends: Alumoweld, 7 No. 7, 36 inches long, holding strength 19030 lbs.: A.B. Chance Co.'s 20M-AWTLG, or Preformed Line Products Co.'s AWDE-4125.
- C. Guy Guards:
 1. Galvanized: 8 feet long, full-round galvanized guard; Joslyn Corp.'s J1618, or McGraw-Edison Co.'s DG15G1.
 2. Plastic: 8 feet long, yellow, with 3 bolted strand clamps; A.B. Chance Co.'s 96PBG-3Y, or Joslyn Corp.'s J1491Y.
 3. Warning Tape: Pressure sensitive reflective warning tape 3 inches wide, black/yellow stripes.
- D. Anchor Rods: Tripleye rod, minimum 3/4 inch x 8 feet; A.B. Chance Co.'s 7558, Joslyn Corp.'s J7328, or McGraw-Edison Co.'s DA1T8.
- E. Guy Strain Insulator:
 1. 15KV Construction: ANSI Class 54-3; A.B. Chance Co.'s C909-1043, or Joslyn Corp.'s L-506.
 2. 35KV Construction: Fiberglass guy strain insulators minimum 78 inches long, minimum breaking strength 21,000 pounds; Continental Electric Co.'s GCC21-78R, or Stanley G. Flagg Co.'s 210-78.

2.04 RIGID FERROUS METAL CONDUIT AND FITTINGS

- A. Steel, galvanized on the outside and inside (conduit enameled on the inside will not be accepted), UL categorized as Rigid Ferrous Metal Conduit (identified on UL Listing Mark as Rigid Metal Conduit-Steel or Rigid Steel Conduit), as manufactured by Allied Tube & Conduit Corp., Midwest Electric, Occidental Coating Co., Robroy Industries Inc., Steelduct Conduit Products, Triangle PWC Inc., or Wheatland Tube Co.

2.05 RIGID NONMETALLIC CONDUIT

- A. PVC Plastic Conduit and Fittings: Carlon Electrical Sciences Inc.'s Plus 40, Certain Teed Corp.'s Schedule 40, National Pipe Co.'s Schedule 40, or Queen City Plastic Inc.'s Schedule 40.

2.06 FUSE HOLDERS AND FUSES

- A. Enclosed waterproof in-line fuse holders rated 600 volts, Bussmann Mfg. Div. McGraw-Edison Co.'s TRON waterproof fuseholder Symbol HEB with fuses rated 600 volts, Buss Symbol KTK.

2.07 TAGS

- A. One inch letters, embossed aluminum tags as manufactured by Emed Company Inc., Seton Name Plate Corp., or Tech Products, Inc.

2.08 GROUT

- A. L&M Const. Chemicals Inc.'s Crystex, Protex Industries Inc.'s Propak, Sonneborn's SonogROUT, or U.S. Grout Corp.'s 5 Star Grout.

2.09 THRU WALL SEALING BUSHINGS

- A. For Walls Which Have or Will Have Membrane Waterproofing:
 - 1. Cast-In-Place Installations: OZ/Gedney Co.'s Type FSK thruwall seal and Type FSKA membrane clamp adapter.
 - 2. Core Drilled or Sleeved Installations: OZ/Gedney Co.'s Type CSM and Type CSMC with membrane clamp adapter.
- B. For Walls Which Will not Have Membrane Waterproofing:
 - 1. Cast-In-Place Installations: OZ/Gedney Co.'s Type FSK.
 - 2. Core Drilled or Sleeved Installations: OZ/Gedney Co.'s Type CSM or Thunderline Corp.'s Link-Seal.

2.10 SPLICE CONNECTORS FOR EQUIPMENT GROUNDING CONDUCTOR

- A. Exothermic Type Weld: Cadweld Process (Erico Products Inc. - Cadweld Div.).
- B. Compression Connectors: Thomas & Betts Co.'s Grid and Ground Rod System.
- C. Indent Type: Burndy Corp.'s Hydent, or Thomas and Betts Corp.'s Compression Connectors.

2.11 INSULATED GROUNDING BUSHINGS

- A. Appleton Electric Co.'s GIB-50 Series, Gould Inc.'s EfcOR 56-50-8 Series, Midwest Electric Mfg. Corp.'s GLL Series, OZ-Gedney Co.'s IBC-50L Series, Raco Inc.'s 1212 Series, or Thomas & Betts Corp.'s 3870 Series.

2.12 LAMPS

- A. As manufactured by General Electric Co., GTE/Sylvania, or Westinghouse Electric Corp.

2.13 OVERHEAD ELECTRICAL CABLE

- A. Neutral-Supported Secondary and Service Drop Cable: Aluminum or copper conductors insulated with black cross-linked thermosetting polyethylene rated 600 volts phase to phase, twisted around one bare messenger neutral conductor, conforming to ICEA S-66-524/NEMA WC-7, Section 7.3: Neutral-Supported Secondary and Service Drop Cable.
- B. Preassembled Aerial Cable: Aluminum or copper insulated conductors, rated 600 volts, cabled together in a reverse lay, laid parallel to a copper covered steel messenger and the assembly bound together with a helically wrapped copper binding strip. Assembly shall conform to either of the following:
 - 1. ICEA S-19-81/NEMA WC-3 Section 7.3: Preassembled Aerial cable.
 - 2. ICEA S-68-516/NEMA WC-8, Section 7.3: Preassembled Aerial Cable.

2.14 POLE LINE HARDWARE

- A. Furnish all miscellaneous hardware such as bolts, nuts, washers, clamps, braces, clevises, brackets etc. by: A.B. Chance Co., Joslyn Corp., or McGraw-Edison Co.

PART 3 EXECUTION

3.01 PREPARATION

- A. Before installing any Work, lay out the proposed course for the overhead electrical service, location of poles, guys, etc. and have same approved by the Director’s Representative.

3.02 INSTALLATION

- A. Lighting Standards:
 - 1. Set poles not less than the depth indicated below, standing vertical, with backfill well tamped and elevated above ground to form a watershed. Use high density polyurethane foam to set poles in rock where the rock has been cut within the measurement limits specified in Section 312316.

POLE LENGTH (FEET)	30	35	40	45	50	55	60
SETTING DEPTH IN EARTH (FEET)	5.0	5.5	6.0	6.5	7.0	7.5	8.0
SETTING DEPTH IN SOLID ROCK (FEET)	4.0	4.0	4.5	5.0	5.0	5.5	6.0

- 2. Trim trees in the vicinity of the pole lines so that there will be at least an 3 foot clearance between wires and trees.
- 3. Identify poles & crossarms as follows:

- a. Poles: Dating nail indicating the year pole is installed and pole number.
- 5. Install lighting standards vertical.

B. Conduit System:

- 1. Use rigid ferrous metal conduit in all locations unless otherwise specified or indicated.
- 2. Rigid nonmetallic conduit may be used except:
 - a. Where conduits enter lighting standard bases, manholes or buildings (Use 10 foot length of rigid ferrous metal conduit at these locations).
 - b. Where conduits are jacked.
- 3. Depth: Unless otherwise indicated or directed, install conduits so that the top of the conduits are at least at the following depths:

	BELOW FINISHED GRADE (INCHES)	BELOW TOP SURFACES OF ROADS & PARKING LOTS (INCHES)
Rigid Ferrous Metal Conduit	24	24
Rigid Nonmetallic Conduit	24	30

- 4. Conduits Entering Buildings: Conduit entrances into building shall be watertight.
- 5. Cleaning Conduits: Take precautions to prevent foreign matter from entering conduits during installation. After installation, clean conduits with tools designed for the purpose.
- 6. Jacking Conduits: Rigid ferrous metal conduit may be jacked under roads, parking lots, etc. Submit jacking details for approval.
- 7. Concrete encasement is not required for street lighting and grounds lighting conduit system.

C. Grounding:

- 1. Provide a bare copper equipment grounding conductor (same size as phase conductors) installed within the conduit. Terminate and bond equipment grounding conductor with suitable fitting in panel.
- 2. Bond lighting standards, conduit and equipment grounding conductors in lighting standard base with indent type splice connectors, insulated grounding bushings and ground lug on standard.
- 3. Bond rigid ferrous metal conduit in manholes to the equipment grounding conductor.
- 4. Make grounding splice connections in manholes with exothermic type weld or compression connectors.

D. Fuse Holder and Fuses: Install in base of each lighting standard an inline fuse holder and 5 ampere fuse for each ungrounded conductor. Install fuse holders so that fuse is not energized when fuse holder is uncoupled.

- E. Wiring Inside Lighting Standards: Install No. 8 AWG Type THW, XHHW, THWN or Type USE insulated conductors from fuse holder to luminaire.
- F. Tags: Install aluminum tags with lighting standard numbers thereon. Fasten tags to standards with tamperproof screws, 4 feet above finished grade, facing roadway.

3.03 CONDUCTOR TYPES AND USES

- A. Neutral-Supported Secondary and Service Drop Cable: Secondary conductors on pole line and service drop cable from pole to weatherhead on building, for secondary systems not exceeding 250 volts.
- B. Preassembled Aerial Cable: Secondary conductors on pole line and service drop cable from pole to weatherhead on building, for secondary systems not exceeding 600 volts.

END OF SECTION

SECTION 347115

STEEL PIPE BOLLARDS

PART 1 - GENERAL

1.01 RELATED WORK SPECIFIED ELSEWHERE

- A. Cast-in-Place Concrete: Section 033001.

1.02 REFERENCES

- A. Standard: American Concrete Institute, ACI 301- 89, for concrete Work of this Section, unless otherwise indicated on the Drawings or specified.

PART 2 - PRODUCTS

2.01 MATERIALS

- A. Steel Pipe: Standard weight, Schedule 40, black or galvanized; ASTM A 53 or ASTM A 135.
- B. Bumper Post Sleeve: Model 1737 by Eagle Manufacturing Company, 2400 Charles Street, Wellsburg, WV 26070, (304) 737-3171, www.eagle-mfg.com.
 - 1. Color: Yellow.

PART 3 - EXECUTION

3.01 INSTALLATION

- A. Set pipe in center of hole and brace plumb.
- B. Fill annular space around pipe with concrete.
- C. Remove braces after concrete has set.
- D. Fill steel pipe with concrete, rounding top of bollard.
- E. Paint exterior steel and rounded concrete yellow as specified on plans.
- F. Install bumper post sleeve in accordance with the manufacturer's printed instructions.

- G. Install two Torx center pin security machine screws at the base of the bumper post sleeve to fasten sleeve to steel pipe.

END OF SECTION