South Courtyard Improvements for:
**RACINE COUNTY COURTHOUSE**
730 Wisconsin Avenue
Racine, WI 53402

RFA Project #59-22
Bid Plans and Specifications dated 5-1-2024

RUDIE | FRANK
ARCHITECTURE
920 Goold Street
Racine, Wisconsin 53402

## TABLE OF CONTENTS

**END OF TABLE OF CONTENTS**

# SECTION 01 11 00 – SUMMARY OF WORK

## PART 1 GENERAL

### 1.01 SCOPE

A. The OWNER will perform OWNER'S administrative and management responsibilities so as to complete the Project to the satisfaction of the OWNER. Where the documents indicate items to be provided by "the OWNER", the OWNER shall pay any costs involved.

B. The work shall be done under a Contract as outlined in the Owner's RFP.

C. CONTRACTORS, subcontractors, or material suppliers shall become familiar with all conditions relating to execution of the work. Neglect of this requirement will not be accepted as cause for additional compensation or time.

D. GENERAL CONTRACTOR shall be responsible for scheduling operations to coordinate the work of their forces, other Contractors, subcontractors, and suppliers so as to meet the project schedule and completion date.

## PART 2 PRODUCTS (NOT USED)

## PART 3 EXECUTION

### 3.01 MUTUAL RESPONSIIBILITY

A. CONTRACTOR shall perform work in proper sequence in relation to that of other CONTRACTORS. Utility contractors shall fit their piping into structure as job conditions may demand. Final decisions as to right-of-way shall be made by the ARCHITECT or their representatives at regularly prearranged meetings with responsible representatives of contractors.

B. Project meetings shall be held at times designated by the ARCHITECT. CONTRACTORS and subcontractors, when requested, must attend these meetings and the individual representing firm must be responsible representative of the applicable CONTRACTOR who is empowered to bind said CONTRACTOR to decision at the meeting.

C. Each CONTRACTOR and subcontractor shall obtain complete data at the site and inspect surfaces scheduled to receive work before proceeding with such work; shall be solely responsible for obtaining and verifying the accuracy of all measurements and layout of work; and shall make good errors or defects due to faulty measurements taken, information obtained, layout or due to failure to report discrepancies.

D. CONTRACTOR shall notify the ARCHITECT in writing in case of discrepancies between existing work and drawings or defects in such surfaces that are to receive work. Starting of work or failure to notify ARCHITECT of such discrepancies and/or defects shall constitute CONTRACTOR'S acceptance of same. Removal and replacement of work applied to defective surfaces, in order to correct defects, shall be done at expense of CONTRACTOR who applied work to defective surfaces.

E. Each CONTRACTOR shall give due notice and proper information to other CONTRACTORS regarding any special provisions necessary for placing and setting of work coming in contact with the work of other CONTRACTORS. CONTRACTORS who fail to do so in proper time shall be held responsible and shall pay for any and all alterations and repairs necessitated by such neglect at no cost to OWNER.

## 3.02 PROJECT MANUAL EXPLANATION

A. For convenience of reference and to facilitate letting of contracts, the Project Manual is separated into Sections. Each Section may contain "Work Included" lists which merely serve as a reference for items described in the section at a minimum and is not intended to limit or restrict volume of work required by such Sections of the Project Manual.

B. Omitted phrases or words, such as "The CONTRACTOR shall", "in conformity with", "as noted on drawings", "according to the plans", "the", "all", are intentional and shall be supplied by inference.

C. Where the word "CONTRACTOR" occurs in Sections of Project Manual, it shall imply CONTRACTOR, subcontractor, erector, fabricator, or material supplier for that section.

D. Reference to 'standard specifications' or 'manufacturer's directions' shall mean the latest edition thereof at date of this Project Manual.

## 3.03 CONSTRUCTION PROCEDURES

A. Use of Site

1. The CONTRACTOR, prior to starting work, must consult with the OWNER who shall designate locations for offices and material storage within the construction limits for use by the CONTRACTORS.

2. CONTRACTOR shall confine equipment, storage of materials, and operations of workers to limits indicated and shall not bring materials onto the site until reasonably required for progress of work. No area outside of construction limits may be used for any purpose by CONTRACTOR or subcontractors.

3. Store, place and handle material and equipment to protect from any damage. Should it be necessary at any time to move materials, it shall be done at CONTRACTOR'S own expense.

4. OWNER assumes no responsibility for materials or equipment stored on-site or off-site. CONTRACTOR assumes full responsibility for damage due to storing of materials.

5. It is the responsibility of the CONTRACTOR to schedule work, storage of materials, etc., to minimize interference with the use of the site.

**END OF SECTION 01 11 00**

# SECTION 01 11 16 – WORK BY OWNER or OTHERS

## PART 1 GENERAL

### 1.01 SECTION INCLUDES

A. OWNER may perform additional work related to the Project by themself, and will let other direct contracts which, therefore shall contain General Conditions similar to those applicable to this Contract.

B. CONTRACTOR shall afford the other contractors who are parties to such direct contracts (or OWNER, if they are performing the additional work themself), reasonable opportunity for the introduction and storage of materials and equipment, and the execution of work, and shall properly connect and coordinate their work with others.

C. If any part of CONTRACTOR'S Work depends on proper execution/results of work of any other CONTRACTOR (or owner), CONTRACTOR shall inspect and promptly report to the OWNER in writing any defects or deficiencies in such work that renders it unsuitable for such proper execution and results. Failure to report shall constitute an acceptance of the other work as fit and proper for the relationship of their Work, except as to defects and deficiencies which may appear on other work after the execution of their Work.

## PART 2 PRODUCTS (Not Applicable)

## PART 3 EXECUTION

### 3.01 WORK BY OTHERS

A. Work by Others shall be governed by the provisions, if any, listed in the Owner's RFP.

### 3.02 WORK BY OWNER

A. The following work shall be performed by the Owner:

1. Computer Wiring
2. Telephone wiring and installation
3. Furniture
4. Pictures, drapes, and other forms of decoration
5. Any items specifically noted as "By Owner" on Drawings.

**END OF SECTION 01 11 16**

# SECTION 01 25 00 – PRODUCTS AND SUBSTITUTIONS

RELATED DOCUMENTS:

Drawings and Division 1 Specification sections apply to work of this section.

## PART 1 - GENERAL:

A. Definitions: Definitions used in this paragraph are not intended to negate the meaning of other terms used in the construction documents, including such terms as “specialties”, “systems”, “structure”, “finished”, “accessories”, “furnishings”, “special construction” and similar terms. Such terms are self-explanatory and have recognized meanings in the construction industry.

B. “Products” are items purchased for incorporation in the Work, regardless of whether they were specifically purchased for the project or taken from the Contractor’s previously purchased stock. The term “product” as used herein includes the terms “material”, “equipment”, “system” and other terms of similar intent.

C. “Named Products” are products identified by use of a manufacturer’s name for a product, including such items as a make or model designation, as recorded in published product literature, of the latest issue as of the date of the contract documents.

D. “Materials” are products that must be substantially cut, shaped, worked, mixed, finished, refined or otherwise fabricated, processed, or installed to form units of work.

E. “Equipment” is defined as a product with operational parts, regardless of whether motorized or manually operated, and in articular, a product that requires service connections such as wiring or piping.

F. Substitutions: The Contractor’s requests for changes in the products, materials, equipment and methods of construction required by the contract documents are considered requests for “substitutions” and are subject to the requirements specified herein. The following are not considered as substitutions:

1. Revisions to the contract documents, where requested by the Owner, Architect or Engineer is considered as “changes” not substitutions.

2. Substitutions requested during the bidding period, which have been accepted prior to the Bid Date, are included in the contract documents and are not subject to the requirements for substitutions as herein specified.

3. Specified Contractor options on products and construction methods included in the Construction Documents are choices available to the Contractor and are not subject to the requirements for substitutions as herein specified.

4. Except as otherwise provided in the Construction Documents, the Contractor's determination of and compliance with governing regulations and orders as issued by governing authorities do not constitute "substitutions" and do not constitute a basis for change orders.

## PART 2 - QUALITY ASSURANCE:

A. Source Limitations: To the fullest extent possible, provide products of the same generic kind, from a single source, for each unit of work.

When it is discovered that specified products are available only from sources that do not or cannot produce an adequate quantity to complete project requirements in a timely manner, consult with the Architect for a determination of what product qualities are most important before proceeding. The Architect will designate those qualities, such as visual, structural, durability, or compatibility, that are most important. When the Architect's determination has been made, select products from those sources that produce products that possess the most important qualities to the fullest extent possible.

B. Compatibility of Options: Compatibility of products is a basic requirement of product selection. When the Contractor is given the option of selecting between two or more products for use on the project, the product selected must be compatible with other products previously selected, even if the products previously selected were also Contractor options. The complete compatibility between the various choices available to the Contractor is not assured by the various requirements of the Contract documents but must be provided by the Contractor.

C. Foreign Product Limitations: "Foreign products" as distinguished from "domestic products" are defined as products that are either manufactured substantially (50% or more of value) outside of the United States and its possessions, or produced or supplied by entities known to be substantially owned (more than 50%) by persons who are not citizens for nor living within the United States and its possessions.

D. Except under one or more of the following conditions, select and provide domestic, not foreign products for inclusion in the Work:

1. There is no domestic product available that complies with the requirements of the contract documents.

2. Available domestic products that comply with requirements of the contract documents are available only at prices or other procurement terms that are substantially higher (25 percent or more) than for available foreign products that comply with the requirements of the contract documents.

## PART 3 – PRODUCTS:

A. General

1. Requirements for individual products are indicated in the construction documents; compliance with these requirements is in itself a contract requirement. These requirements may be specified in any one of several different specifying methods, or in any combination of these methods. These methods include the following:

   a. Proprietary and Semi-Proprietary

   b. Descriptive

   c. Performance

   d. Compliance with Reference Standards.

   e. Compliance with codes, compliance with graphic details, allowances, and similar provisions of the contract documents also have a bearing on the selection process.

B. Procedures for Selecting Products: The Contractor's options in selecting products are limited by requirements of the construction documents and governing regulations. They are not controlled by industry traditions or procedures experienced by the Contractor on previous construction projects. Required procedures include but are not limited to the following for the various indicated methods of specifying:

1. Proprietary and Semi-Proprietary Specification Requirements:

   a. Single Product Name: Where only a single product or manufacturer is named, provide the product indicated, unless the specification indicates possible consideration of other products. Advise the Architect before proceeding when it is discovered that the named product is not reasonable or a feasible solution.

   b. Two or More Product Names: Where two or more products or manufacturers are named, provide one of the products named, at the Contractor's option. Exclude products that do not comply with specification requirements. Do not provide or offer to provide an unnamed product, unless the specification indicates possible consideration of other products. Advise the Architect before proceeding where none of the named products comply with specification requirements or are feasible for use.

   c. Where products or manufacturers are specified by name, accompanied by the term "or-equal" or similar language, comply with the "SUBSTITUTIONS" provisions within this specification section to obtain approval from the Architect for the use of an unnamed product.

2. Descriptive Specification Requirements: Where the specifications describe a product or assembly generically, in detail, listing the exact characteristics required, but without use of a brand or trade name, provide products or assemblies that provide the characteristics indicated and otherwise comply with contract requirements.

3. Performance Specification Requirements: Where the specifications require compliance with indicated performance requirements, provide products that comply with the specific performance requirements indicated, and that are recommended by the manufacturer for the application indicated. The manufacturer's recommendations may be contained in published product literature, or by the manufacturer's individual certification of performance. General overall performance of a product is implied where the product is specified for specific performance.

4. Compliance with Standards, Codes and Regulations: Where the specifications require only compliance with an imposed standard, code or regulation, the Contractor has the option of selecting a product that complies with specification requirements, including the standards, codes and regulations.

5. Visual Matching: Where matching an established sample is required, the final judgment of whether a product proposed by the Contractor matches the sample satisfactorily will be determined by the Architect.

6. Allowances: Refer to individual sections of the specifications and "Allowances" provisions in Division-1 sections for an indication of product selections that are controlled by established allowances, and for the procedures required for processing such selections.

7. Producer's Statement of Applicability: Where individual specification sections indicate products that require a "Statement of Applicability" from the manufacturer or other producer, submit a written-certified statement from the producer stating that the producer has reviewed the proposed application of the product on the project. This statement shall state that the producer agrees with or does not object to the Architect's specification and the Contractor's selection of the product for use in the Work. The statement shall also state that the proposed application of the product on the project is suitable and proper.

C. Product Requirements:

1. General: Provide products that comply with the requirements of the Construction Documents and that are undamaged and, unless otherwise indicated, unused at the time of installation. Provide products that are complete with all accessories, trim, finish, safety guards and other devices and details needed for a complete installation and for the intended use and effect.

2. Standard Products: Where they are available, provide standard products of types that have been produced and used successfully in similar situations on other projects.

3. Continued Availability: Where, because of the nature of its application, the Owner is likely to need replacement parts or additional amounts of a product at a later date, either for

maintenance and repair or replacement, provide standard, domestically produced products for which the manufacturer has published assurances that the products and its parts are likely to be available to the Owner at a later date.

4. Nameplates: Except as otherwise indicated for required labels and operating data, do not permanently attach or imprint manufacturer's or producer's nameplates or trademarks on exposed surfaces of products which will be exposed to view either in occupied spaces or on the exterior of the completed project.

5. Labels: Locate required product labels and stamps on a concealed surface or, where required for observation after installation, on an accessible surface which, in occupied spaces, is not conspicuous.

6. Equipment Nameplates: Provide a permanent nameplate on each item of service-connected or power-operated equipment. Locate the nameplate on an easily accessible surface which is inconspicuous in occupied spaces. The nameplate shall contain the following information and other essential operating data.

    a) Name of manufacturer

    b) Name of product

    c) Model number

    d) Serial number

    e) Capacity

    f) Speed

    g) Ratings

D. Product Delivery, Storage and Handling:

1. Deliver, store, and handle products in accordance with manufacturer's recommendations, using means and methods that will prevent damage, deterioration and loss, including theft. Control delivery schedules to minimize long-term storage at the site and to prevent overcrowding of construction spaces. In particular coordinate delivery and installation to ensure minimum holding or storage times for items known or recognized to be flammable, hazardous, easily damaged, or sensitive to deterioration, theft and other sources of loss.

2. Deliver products to the site in the manufacturer's sealed container or other packaging system, complete with labels and instructions for handling, storing, unpacking, protecting and installing.

3. Store products at the site in a manner that will facilitate inspection and measurement of quantity or counting of units.

4. Store heavy materials away from the project structure in a manner that will not endanger the supporting construction.

E. Installation Of Products:

1. Except as otherwise indicated in individual sections of these specifications, comply with the manufacturer's instructions and recommendations for installation of the products in the applications indicated. Anchor each product securely in place, accurately located and aligned with other work. Clean exposed surfaces and protect surfaces as necessary to ensure freedom from damage and deterioration at time of acceptance.

## PART 4 – SUBSTITUTIONS:

A. Substitution Request Submittal: **(MUST be requested prior to submission of bids. Any request made within 3 days of bid date will not be considered)**

1. Request for Substitutions: Submit 3 copies (or 1 electronic copy in .pf format) of each request for substitution. In each request identify the product or fabrication or installation method to be replaced by the substitution; include related specification section and drawing numbers, and complete documentation showing compliance with the requirements for substitutions. Include the following information, as appropriate, with each request:

   a) Provide complete product data, drawings and description of products, and fabrication and installation procedures.

   b) Provide samples where applicable or requested.

   c) Provide a detailed comparison of the significant qualities of the proposed substitution with those of the work originally specified. Significant qualities include elements such as size, weight, durability, performance and visual effect where applicable.

   d) Provide complete coordination information. Include all changes required in other elements of the work to accommodate the substitution, including work performed by the Owner and separate Contractors.

   e) Provide a statement indicating the effect the substitution will have on the work schedule in comparison to the schedule without approval of the proposed substitution. Include information regarding the effect of the proposed substitution on the Contract Time.

   f) Provide certification by the Contractor to the effect that, in the Contractor's opinion, after thorough evaluation, the proposed substitution will result in work that in every significant

respect is equal-to or better than the work required by the Contract documents, and that it will perform adequately in the application indicated.

i. Include in this certification, the Contractor's waiver of rights to additional payment or time, which may subsequently be necessary because of the failure of the substitution to perform adequately.

2. Architect/Engineer's Action: Upon receipt of the Contractor's request for substitution, the Architect/Engineer will respond with an approval or rejection. Said response will be made no later than two (2) days prior to the bid date.

B. Substitutions During Construction:

1. The Contractor's request for a substitution during the Construction Phase will be considered when extensive revisions to the construction documents are not required, when the proposed changes are in keeping with the general intent of the contract documents, when the requests are timely, fully documented and properly submitted, **and when one or more of the following conditions is satisfied, all as judged by the Architect; otherwise the requests will be returned without action except to record non-compliance with these requirements.**

a) The Architect will consider a request for substitution where the specified product or method cannot be provided within the Contract Time. However, the request will not be considered if the product or method cannot be provided as a result of the Contractor's failure to pursue the work promptly or to coordinate the various activities properly.

b) The Architect will consider a request for substitution where the specified product or method cannot receive necessary approval by a governing authority, and the requested substitution can be approved.

c) The Architect will consider a request for a substitution where a substantial advantage is offered the Owner, in terms of cost, time, energy conservation or other considerations of merit, after deducting offsetting responsibilities the Owner may be required to bear. These additional responsibilities may include such considerations as additional compensation to the Architect for redesign and evaluation services, the increased cost of other work by the Owner or separate contractors, and similar considerations.

d) The Architect will consider a request for substitution when the specified product or method cannot be provided in a manner which is compatible with other materials of the work, and where the Contractor certifies that the substitution will overcome the incompatibility.

e) The Architect will consider a request for substitution when the specified product or method cannot be properly coordinated with other materials in the work, and where the Contractor certifies that the proposed substitution can be properly coordinated.

f) The Architect will consider a request for substitution when the specified product or method cannot receive a warranty as required by the construction documents and where the contractor certifies that the proposed substitution receive the required warranty.

C. Work-Related Submittals: The Contractor's submittal of and the Architect's acceptance of shop drawings, product data or samples which relate to work not complying with requirements of the contract documents, does not constitute an acceptable or valid request for a substitution, nor approval thereof.

**END OF SECTION 01 25 00**

# SECTION 01 31 00 – PROJECT ADMINISTRATION

## PART 1 - GENERAL

Drawings and Division 01 Specification sections apply to work specified in this section.

### 1.01 – SCOPE

A. Refer to Drawings, these specifications and conduct all phases of work as if these requirements were written in full within this Section.

### 1.02 – PROJECT MEETINGS

A. Progress meetings will be conducted by the GENERAL CONTRACTOR for the purpose of coordinating and expediting the work. The date and hour will be announced by the GENERAL CONTRACTOR at least forty-eight (48) hours before the scheduled assembly time or on a regular basis as determined by the GENERAL CONTRACTOR. The meetings shall be held at the PROJECT SITE unless announced otherwise.

B. It is mandatory that each CONTRACTOR be represented at each meeting by a principal member of his staff, authorized to make decisions on their behalf. From time to time, the GENERAL CONTRACTOR may direct certain Subcontractors to attend the meeting. Failure to attend a meeting does not relieve the GENERAL CONTRACTOR from acting on the contents of the meetings.

C. The essence of the discussions of each meeting shall be entered into the minutes as a matter of record. The GENERAL CONTRACTOR shall take the minutes of the job meetings. The minute recorder shall, on or before the next meeting, distribute copies of the minutes to all interested parties, namely:

1. The OWNER
2. The ARCHITECT
3. The CONTRACTORS
4. Subcontractors present at the specific meeting.

D. Special meetings may be called at the discretion of the OWNER or the ARCHITECT for the purpose of resolving problems concerning the work. Attendance at the special meetings is mandatory upon those CONTRACTORS, subcontractors, or other parties notified by the OWNER or the ARCHITECT to attend.

### 1.04 – REPORTS

A. Each on-site CONTRACTOR shall be responsible for submitting a progress report to the OWNER each week on the day prior to the regularly scheduled progress meeting. The weekly report shall include the following:

1. Brief description of work completed each week.
2. List of work contemplated for following week.
3. List of number of supervision and craft people on site by craft.
4. Review of conditions affecting execution of work, including encountered or anticipated problem areas. (Materials delivery delays, workmen shortage, etc.)

1.05 – PROJECT PROCEDURES

A. Each CONTRACTOR shall be required, if requested by the OWNER or ARCHITECT, to submit special reports, including but not limited to:

1. Test Reports Records
2. Equipment Check Reports
3. Service Reports
4. Accident Reports
5. Work Stoppage/Dispute Reports
6. System Operable Reports
7. Contractor's Invoices
8. Schedule of Values
9. Weekly Employee Safety Meeting Reports

B. Construction administration procedure forms and instructions shall be used to protect administration. These include, but are not limited to:

1. Directive(s)
2. Field Order
3. Certification Request
4. Change Order Proposal
5. Change Order
6. Certificate of Contract Completion
7. Certificate of Substantial Completion

**PART 2 – PRODUCTS (not applicable)**

**PART 3 – EXECUTION (not applicable)**

**END OF SECTION 01 31 00**

# SECTION 01 32 16 – PROGRESS SCHEDULE

## PART 1 – GENERAL

### 1.01 – SCOPE

A. Refer to Drawings and Division 1 of these specifications and conduct all phases of work as if those requirements were written in full within this Section.

B. A detailed schedule will be prepared by the General Contractor after award of the contract.

C. If it is apparent a Contractor is not going to complete its work in the time allotted, said Contractor must notify the Owner within five days after publication of the schedule. Adjustment may be made to accommodate a Contractor if the above notification is received and is within the stated milestone dates. Otherwise, the schedule shall be deemed accepted by all parties and becomes the schedule for the Contractor.

D. The General Contractor shall periodically update the schedule and display same at the job site. Each Contractor shall be responsible to familiarize itself with the schedule and how it will affect or modify its operations, including its coordination with the activities of other Contractors. Contractors shall notify the General Contractor within five days of any inability to comply with schedule. Otherwise, the revised schedule shall be deemed accepted by all parties and becomes the schedule for that Contractor.

E. It is expressly agreed that time is of essence for the completion of work under its Contract and the Contractor agrees to perform the work within the time and in the manner specified or within the time extensions the Owner may grant, provided however, that the Contractor shall be liable for any damages suffered by Owner due to failure of the Contractor to perform the specified work within the specified time.

F. The Contractor, within five calendar days after notice to proceed, agrees to commence work in the field at such points as the Owner may designate and to continue diligently to perform the work and to fully complete all of its work to the satisfaction of the Owner. The work shall be carried to completion with the utmost speed.

G. If the Contractor delays progress for any reason, other than those allowed by the Owner or the General Conditions, the Contractor shall take all necessary steps to expedite its contract work to maintain milestone target dates and shall be responsible for damages resulting from its delay.

H. If, in the opinion of the Owner, the Contractor is behind schedule and is so notified by the Owner in writing, the Contractor shall employ such means as overtime work, multiple work shifts, provide additional equipment, and the like all without additional compensation and shall continue to do so until the progress of the Work is, in the opinion of the Owner, in conformance with the construction schedule.

I. If, in the opinion of the Owner, the Contractor fails to maintain the approved schedule, the Contractor may be required to furnish the Owner a weekly schedule of its work showing location, number of persons, and crew required to accomplish the schedule.

J. The contractor agrees that whether or not any delay shall be the basis for an extension of time, it shall have no claim against the Owner or Architect for an increase in the Contract Price, nor a claim against the Owner or Architect for a payment or allowance of any kind of damage, loss or expense resulting from delays; nor shall the Contractor have any claim for damage, loss or expense resulting from reasonable interruptions to, or necessary suspension of, its work to enable other Contractors to perform their work.

K. Close coordination will be required between all construction trades in order that individual areas of construction can be completed by their scheduled time.

L. The final schedule will be developed after award of contractors.

**PART 2 – PRODUCTS (not applicable)**

**PART 3 – EXECUTION (not applicable)**

**END OF SECTION 01 32 16**

# SECTION 01 33 00 – SUBMITTAL PROCEDURES

## PART 1 GENERAL

### 1.01 SECTION INCLUDES

A. Where required by the Specifications, CONTRACTOR shall submit descriptive information that will enable ARCHITECT to determine whether CONTRACTOR's proposed materials, equipment, and work methods are in general conformance to the design concept and in accordance with the Drawings and Specifications. The information submitted may consist of drawings, specifications, descriptive data, certificates, samples, test results, product data, and such other information, all as specifically required in the Drawings and Specifications. In some instances, specified submittal information describes some, but not all features of the material, equipment, or work method.

### 1.02 PROCEDURES

A. Direct all submittals to ARCHITECT unless specified otherwise.

B. General Contractor Review

1. Prior to submitting to Architect, the General Contractor shall review each submittal and provide comments and their review stamp with signature and date.

2. Submittals without a General Contractor review stamp will be returned and not reviewed by the Architect.

C. Coordination of Submittals

1. Prior to submittal for review, use means necessary to coordinate material, including the following procedures.

   a. Determine and verify the field dimensions and conditions, materials, catalog numbers and similar data. Indicate deviations from Contract Documents.

   b. Coordinate as required with CONTRACTORS involved. Submit a copy to other CONTRACTORS whose work is affected.

   c. Secure necessary approvals from others and signify by stamp or other means that they have been secured.

D. Format

1. Submittals regarding material and equipment shall be presented directly to the ARCHITECT and must be accompanied by a transmittal form.

   a. A separate form shall be used for each specific item, class of material, equipment, and items specified in separate SPECIFICATIONS for which the submittal is required.

b. Submittals for various items shall be made with a single form when the items taken together constitute a manufacturer's package or are so functionally related that expediency indicates checking or review of the group or package as a whole.

2. Submittals that are related to or affect each other shall be forwarded simultaneously as a package to facilitate coordinated review. Uncoordinated submittals will be rejected.

3. When catalog pages are submitted, applicable items must be clearly identified.

E. Timing of Submittals

1. Make submittals far enough in advance of scheduled dates of installation to provide required time for reviews, for securing necessary approvals, for possible revision and resubmittal, and for placing order and securing delivery.

4. Cost of delays resulting from late submittals be assessed to the submitting CONTRACTOR as determined by the OWNER.

F. Certificates

1. Submit all certifications as required by the Contract Documents not less than 15 days before such portions of the work requiring certificates are scheduled to begin.

2. Certificates shall be signed by a qualified officer of the company and duly notarized.

G. Samples

1. Samples shall consist of physical examples furnished by the CONTRACTOR in sufficient size and quantity to illustrate materials, equipment or workmanship and to establish standards by which the work will be judged.

2. Unless otherwise specified, within ten (10) days after contract is awarded, submit samples in duplicate of adequate size showing quality, type, color range, finish, and texture. Label each sample stating materials type, color, thickness, size, project name, and CONTRACTOR'S name.

3. Along with samples, submit transmittal letter requesting selection(s) and prepay all transportation charges to ARCHITECT'S office on samples forwarded. CONTRACTOR shall submit new samples as required until approved.

4. Order no material until receipt of written selection(s) of samples submitted. No selection of samples shall be taken in itself to change material or modify contract requirements beyond the express stipulation of the selection letter.

H. Colors

1. Unless the precise color and pattern is specifically described in the Contract Documents, whenever a choice of color or pattern is available in a specified product, submit accurate color charts and pattern charts to the ARCHITECT as directed for review and selection.

2. Electronic format color charts sent via email or similar means are not acceptable. Only physical color charts or samples will be accepted.

3. Submit colors as described in samples above. Failure to submit colors or patterns will be cause for rejection and replacement at no cost to the OWNER.

I. Manufacturer's Instructions

1. Where installation of work is required to be performed in accordance with the product manufacturer's instructions, directions or recommendations, the CONTRACTOR shall, unless otherwise specified, procure and distribute electronic copies of such instructions to the OWNER before installing materials or performing work.

2. Manufacturer's instructions shall be subject to review and/or modification by the ARCHITECT.

3. A minimum of one (1) set of required manufacturer's instructions shall be maintained in the CONTRACTOR'S field office.

4. When manufacturer's instructions contain "recommended procedures" or similar phrases, these shall be considered as mandatory requirements unless otherwise specified or unless modifications have been transmitted to the CONTRACTOR.

5. CONTRACTOR shall not make modifications to manufacturer's instructions unless prior approval is obtained from the ARCHITECT and in the event such approval is obtained, CONTRACTOR agrees to warrant modified work in accordance with Contract Documents.

## 1.03 SUBMITTALS / SHOP DRAWINGS

A. Submittals shall be complete when submitted to the ARCHITECT. No partial lists will be considered.

**B. Submit in PDF format as a single file, with the Transmittal Sheet as the cover page.** If a shop drawing or submittal consists of multiple sheets or multiple documents, combine all into one PDF document.

C. Prior to submitting to the Architect, the General Contractor shall review each submittal, provide comments as necessary, and affix their signed and dated Review Stamp. The Architect will not review any submittals that have not been reviewed and stamped as such by the General Contractor.

D. The architect will make every effort to review and return submittals in a prompt manner. Contractor shall assume return of submittals in 10 to 12 business days. Contractors who require their submittals returned by a certain date to meet product lead times or project deadlines shall submit accordingly. The architect will not be responsible for delays caused by the contractor's failure to submit on time.

E. Shop drawings shall layout, locations, details, attachment means, abutment, joint conditions, installation, schedules, setting and manufacturer's literature and technical data of such parts of work as specified. Make shop drawings accurately to a scale to show pertinent features of the item and the connection to work.

F. CONTRACTOR shall note corrections or changes requested by ARCHITECT on previous submission and shall note revision. Shop drawings or product data not bearing the approval stamp of the CONTRACTOR or containing deviations from the Contract Documents, will be returned to the CONTRACTOR for resubmittal with necessary requirements. Corrections indicated on shop drawings or product data shall not be considered reviewed unless it bears stamp of review and signature of ARCHITECT.

G. Submittals returned "APPROVED AS NOTED" shall have all review comments made by the ARCHITECT or ENGINEER incorporated into the work. It shall be the CONTRACTOR's responsibility to review all comments and ensure incorporation into the project. Corrections to work in place due to failure to incorporate submittal review comments into the work will be done at the CONTRACTOR's expense, with no cost to the OWNER, and without delay to the project schedule.

## PART 2 PRODUCTS (NOT APPLICABLE)

## PART 3 EXECUTION (NOT APPLICABLE)

**END OF SECTION 01 33 00**

# SECTION 01 35 25 – SAFETY

## PART 1 – GENERAL

### 1.00 – RELATED DOCUMENTS

Drawings and Division 1 Specification sections apply to work of this section.

### 1.01 – GENERAL RESPONSIBILITY

A. Each CONTRACTOR shall be totally responsible for instituting, maintaining, and enforcing a job site safety program and shall comply with all applicable federal, state and local regulations.

B. The following list of general safety requirements are to be enforced to protect the OWNER's and ARCHITECT's personnel from serious injury as well as the CONTRACTOR's own personnel. These requirements are not intended to replace any other laws or ordinances in effect at the time of execution of this agreement but shall merely serve as a supplement to those requirements.

1. Personal Automobiles: Personal automobiles shall be parked in specified locations. No parking on the site shall be allowed without prior approval.

2. General Housekeeping: The jobsite must be kept clean and orderly at all times. Sidewalks, entrances, passageways and stairs kept clear, projecting nails removed, and scrap and debris removed continuously, by respective CONTRACTORS.

3. Trash Fires: Fires for burning of trash or rubbish are absolutely prohibited.

4. Barricades: Barricades and adequate warning signs are required to keep personnel away from hazardous areas such as excavations, overhead work, etc.

5. Ladders: Ladders must be free of any broken rungs or other defects, must have proper shoes, be used at the proper pitch, be tied off at the top with suitable strength material and must have sidewalls extending 36 inches above the landing area.

6. Scaffolds: Standard guardrails and toe boards are required on all scaffolds and platforms more than six (6) feet high. Where scaffolds or platforms span aisles or exits/entrances, suitable protection from falling objects must be provided.

7. Stairways: All stairways, whether temporary or permanent, must be equipped with railings and handrails.

8. Welding Tanks: Cylinders of oxygen and acetylene, both in use and in storage, shall be handled in accordance with applicable OSHA safety codes.

9. Guarding of Moving Parts: Moving equipment such as drive belts, pulleys, gears, etc., must be properly guarded.

10. Liquified Petroleum Gases and Flammable Liquids: Storage, use and handling of LPG and flammable liquids must be in accordance with OSHA regulations.

11. Safety Meetings: Weekly "Toolbox Talks" must be conducted by each CONTRACTOR for his employees with a report listing the attendees, topics discussed, and comments made, submitted to the OWNER.

12. Personal Protective Gear: In addition to the OSHA requirements, all CONTRACTOR'S employees or personnel of the OWNER, ARCHITECT or other visitors to the site shall at all times wear hard hats. In addition, safety glasses must be worn whenever work is performed that could endanger eyesight as determined by OSHA regulations.

13. Job Cleanup: Each CONTRACTOR shall maintain in force during the duration of their work, a daily cleanup program. This includes but is not limited to: Picking up all scrap materials, sweeping of respective work areas, and removing rubbish from site on a daily basis. Should any CONTRACTOR not maintain their work areas in a neat, orderly, and safe way to the OWNER'S satisfaction, the OWNER reserves the right to employ forces on the OWNER'S behalf to do the cleanup. Any accumulated charges will be filed as a change order to the violating party. See Section 01 74 00 for additional cleanup requirements.

C. Enactment of safety precautions and regulations; placement and provision of safety material, barricades, etc., and use or provision of all required safety equipment shall be the sole responsibility of the CONTRACTOR whose employees or Subcontractors are exposed to the applicable hazard, or whose work endangers surrounding persons, property, equipment, CONTRACTORS, etc.

**PART 2 – PRODUCTS (not applicable)**

**PART 3 – EXECUTION (not applicable)**

**END OF SECTION 01 35 25**

# SECTION – 01 45 23 TESTING AND INSPECTION SERVICES

## PART 1 – GENERAL

### 1.00 – RELATED DOCUMENTS

Drawings and Division 1 Specification sections apply to work specified in this section.

### 1.01 – SCOPE

A. WORK INCLUDED

1. Selection of Testing Agency shall be by General Contractor with final approval of agency subject to approval by Owner and/or Architect.

2. General Contractor shall coordinate and schedule all testing specified in the Project Manual.

3. Provide such other testing and inspecting as is specified to be furnished by the Contractor in this Section and/or elsewhere in the Contract Documents.

### 1.02 – TESTING

A. PAYMENT FOR TESTING

1. Payment for testing shall be by the General Contractor.

B. CODE COMPLIANCE TESTING

1. Inspections and tests required by codes or ordinances, or by a plan approval authority, and which are made by legally constituted authority, shall be the responsibility of and shall be paid for by the Contractor, unless otherwise provided in the Contract Documents.

C. SUBCONTRACTOR'S CONVENIENCE TESTING

1. Inspecting and testing performed exclusively for the Contractor's convenience shall be the sole responsibility of the Contractor.

D. COOPERATION WITH TESTING LABORATORY

1. Representatives of the testing laboratory shall always have access to the Work and at all locations where the Work is in progress. Provide facilities for such access to enable the laboratory to perform its functions properly.

E. TAKING SPECIMENS

1. All specimens and samples for testing, unless otherwise provided in the Contract Documents, shall be taken by the testing personnel. All sampling equipment and personnel will be provided by the testing laboratory. All deliveries of specimens and samples to the testing laboratory will be performed by the testing laboratory.

F. SCHEDULES FOR TESTING

1. Establishing Schedule

   a. By advance discussion with the testing laboratory, determine the time required for the laboratory to perform its tests and to issue each of its findings.

   b. Provide all required time within the construction schedule.

2. Revising Schedule

   a. When changes of construction schedule are necessary during construction, coordinate all such changes with the testing laboratory as required.

3. Adherence to Schedule

   a. When the testing laboratory is ready to test according to the established schedule but is prevented from testing or taking specimens due to incompleteness of the Work, all extra charges for testing attributable to the delay are the responsibility of the General Contractor.

G. SOIL TESTING

1. The General Contractor shall hire an independent soil testing laboratory as a consultant to provide testing. Laboratory shall designate a professional, registered soils engineer to the project for observation of soils conditions and recommendations concerning soils related methods on the project, and determination of number and location for soils tests.

2. Provide testing for filling operation.

   a. Monitor moisture contents of fill material during filling operations.

   b. Test each lift of fill.

      i. Tests shall be made on a 50’ grid and at changes in fill material types.

   c. Examine subgrade before filling.

3. Testing method shall be soil density test per ASTM D1557, method D or ASTM D4523 or D4254 as applicable.

H. CONCRETE TESTING

1. Concrete testing shall be provided by the Contractor as outlined in Section 03 30 00 of the Specifications.

I. WELD TESTING

1. All weld testing shall be in conformity to American Welding Society requirements as given in AWS D1.1, "Structural Welding Code – Steel".

2. Shop Welds

   a. Testing of shop welds is to be done by the Fabricator who shall maintain complete records of such testing for the Owner's review upon request.

   b. All fillet welds shall be visually examined for conformity to AWS and Project Requirements.

   c. All partial and full penetration welds shall be nondestructively tested by ultrasonic testing or by radiography.

   d. The Owner may also hire an independent testing laboratory to make periodic visits to the Fabrication Plant to confirm the conformity to the above cited requirement.

3. Field Welds

   a. The testing laboratory shall examine and approve all welding procedures prior to the commencement of welding.

   b. The testing shall verify daily that all welding is being performed by properly certified welders.

   c. The testing laboratory shall confirm that welding procedures are being followed including but not limited to:

      i. Joint fit up.
      ii. Backer bar and runoff tab installation.
      iii. Preheating.
      iv. Interpass temperatures.
      v. Welding material storage and use.
      vi. Welding deposition, pass dimension and number.
      vii. Backer bar removal.

   d. The testing laboratory shall examine welds per the following schedule:

i. Visual examination of all fillet welds.
ii. Non-destructive testing of all partial and full penetration weld by ultrasonic or by radiographic testing.

J. BOLT TESTING

1. All bolt testing (inspection) shall conform to the requirements of the "Specification for Structural Joints Using ASTM A325 or A490 Bolts" approved by the Research Council on Structural Connections of the Engineering Foundation, November 13, 1985.

   a. In the above cited document in para 9(b) change the following phrase from "… the following arbitration procedure may be used" to "… the following procedure shall be used".

2. Bolting inspection and testing is to be contemporaneous with the work, not delayed.

3. Bolting on this project is to be tightened as required for slip critical connections.

4. Bolting in rigid frame top and bottom moment connections has direct tension applied and shall be testing accordingly.

5. The testing laboratory shall examine and approve all bolting procedures prior to the commencement of bolting.

6. Shop Bolts

   a. Shop bolting shall be tested by the Fabricator who shall maintain complete records for the Owner's review upon request.

   b. The Owner may also hire an independent testing laboratory to make periodic visits to the Fabrication Plant to confirm conformity to the above cited requirement.

7. Field Bolts

   a. Field bolts shall be tested as outlined in the RCSC Specification cited in Item 1.

   b. All field bolted joints shall be inspected.

**PART 2 – PRODUCTS (not applicable)**

**PART 3 – EXECUTION (not applicable)**

**END OF SECTION 01 45 23**

# SECTION 01 51 00 – TEMPORARY UTILITIES

## PART 1 GENERAL

### 1.01 SECTION INCLUDES

A. Each CONTRACTOR as designated shall pay for all costs for general services and temporary facilities including operations, maintenance, fuel or energy consumed and removal of same when no longer required, except as otherwise specified.

B. Maintain temporary facilities and controls as long as needed for the safe and proper completion of the work. Remove temporary facilities and controls as rapidly as progress of work will permit and restore surfaces, damaged by temporary facilities and controls, to their original conditions.

### 1.02 SITE CONDITIONS

A. Visit site to verify location of existing temporary facilities.

### 1.03 UTILITIES & SERVICES

A. TEMPORARY TOILET FACILITIES

1. The GENERAL CONTRACTOR shall provide a portable toilet unit for use by all workers on the project.
2. The unit shall be serviced weekly.
3. The location of the unit shall be approved by the Owner.

B. TEMPORARY WATER

1. A source for construction water shall be provided by Plumbing Contractor. Distribution of construction water shall be the responsibility of each CONTRACTOR.

C. TEMPORARY LIGHTING & POWER

1. The ELECTRICAL CONTRACTOR shall furnish, install, and remove after construction is completed, a temporary power system adequate for the construction of this project and in accordance with OSHA requirements for construction projects.

2. Contractors requiring power for equipment requiring more than 20 ampere, 120 volt, single phase; for either radiant or resistance type electrical heating equipment; or other than single phase, portable, fractional horsepower, motorized equipment shall make separate arrangements with the ELECTRICAL CONTRACTOR for installation and related costs of same, including separate metering, energy charges, etc.. This shall be at CONTRACTOR’s own expense.

3. All energy charges for 100 ampere, 120/240 volt, single phase, three wire electric current used for temporary lighting and power shall be paid by the Owner. All energy charges for greater electric current used for temporary power to be paid for by Contractor requiring same.

4. GENERAL CONTRACTOR shall provide and pay for installation of temporary service for power and lighting of their temporary offices and/or jobsite trailer.

5. CONTRACTORs shall furnish their own extension cords.

6. CONTRACTORs shall be allowed to use the service provided for general lighting and fractional horsepower hand tools at no cost to them.

D. TEMPORARY WEATHER PROTECTION

1. Each Contractor shall provide temporary protection necessary to allow its work to continue during cold weather.

2. Cold Weather Protection

   a. Heating required during the construction period prior to enclosure of the building shall be classified as “Cold Weather Protection”.

   b. CONTRACTOR shall provide temporary enclosures, coverings, protection, and heating as may be required to properly protect various parts of the building from damage during the construction period prior to the time it is enclosed including:

   c. The heating of materials (such as water and aggregate) as well as space heating for protection of newly placed of built construction at required temperature and for specified time.

   d. Flame-proof tarpaulins and other materials used for temporary enclosure.

   e. Heat shall be provided by smokeless UL approved portable unit heater, using fuels, of types and kinds approved by Underwriter’s Laboratories, Factory Mutual, and the Fire Marshall.

   f. CONTRACTOR shall provide fuel, power, maintenance, and attendant required for operation of portable heaters.

   g. Interior or exterior surfaces damaged by the use of portable heating units shall be replaced by CONTRACTOR with new materials.

E. TEMPORARY HEAT

1. All heating required in the building addition after the building is enclosed with a roof and door and window enclosures until the Owner accepts or occupies the building (whichever occurs first) shall be classified as “Temporary Heat”. The Heating Contractor shall have the permanent heating system or a similar system in readiness for furnishing temporary heat

to project. It is not required that the system be balanced or that temperature controls be in final calibration. The Owner shall furnish all fuel and electricity for the operation of the system. Except as otherwise called for, 65 degrees in the building shall be maintained during the work hours. At all other times the temperature in all parts of the building shall be kept above 40 degrees. At completion of the project, that is, at the time the Owner moves into the building, the Heating Contractor shall install all new filters, clean all equipment, clean out ductwork, and provide final calibration and adjustments to the permanent system.

2. Minimum Temperatures – To be maintained for the application of the work of the various trades shall be in conformance with item and/or material manufacturer's recommendations, and in conformance with the best and most satisfactory results.

**PART 2 PRODUCTS (NOT APPLICABLE)**

**PART 3 EXECUTION (NOT APPLICABLE)**

**END OF SECTION 01 51 00**

# SECTION 01 73 29 – CUTTING AND PATCHING

## PART 1 – GENERAL

### 1.00 - RELATED DOCUMENTS

Drawings and Division 1 Specification sections apply to work specified in this section.

### 1.01 – GENERAL

A. Where conflict occurs between mechanical and electrical specifications and this Section, the requirements stated in this Section shall take precedence over statements made in mechanical and electrical specifications.

B. If AIA General Conditions are used on this project, Article 3.14 shall be supplemented as specified hereinafter.

C. Patching required because of excessive, careless or unnecessary cutting will be charged to responsible contractor. The Architect will decide when such charges are justified.

### 1.02 – NEW WORK

A. During Construction: All openings, chases and lintels in new construction required and/or shown on architectural, structural, and mechanical drawings shall be provided by the Prime Contractor(s) whose work is involved. The mechanical and electrical contractors shall be responsible for providing sleeves, anchors and inserts, and for establishing sizes and locations at proper time as to avoid cutting and patching. Provide applicable contractors with location drawings for all items specified above.

B. After Construction: For openings, anchors and inserts required in new construction, after work is completed the following will apply:

1. The applicable contractor or respective subcontractor shall provide cutting, coring, excavating, and subsequent backfilling for his work. Such contractor shall cut and frame openings at expense of contractor requiring same. Coordinate all openings with Architect and General Contractor. Holes shall not exceed pipes and conduit sizes by more than 2”.

2. The applicable contractor shall provide all patching for work specified in subparagraph B.1 at expense of contractor who requires it. Patching shall be done by persons skilled in such patching in accordance with contract requirements.

3. Where construction or other requirements in the opinion of the Architect will not allow the use of air hammers or similar methods, openings shall be made by coring, sawing or other methods as reviewed by Architect.

1.03 – EXISTING AREAS

A. All cutting and patching required to permit new construction in existing areas or structures shall be the responsibility of the Contractor performing such new construction. Existing areas shall be defined as material, equipment, structures, etc. which were in existence prior to the Contractor starting the Work under the Contract Documents.

1.04 – FIRE WALL PENETRATIONS

A. All penetrations through smoke and fire separations shall be installed and sealed per codes with 3M fire and smoke barrier caulk.

**PART 2 – PRODUCTS (not applicable)**

**PART 3 – EXECUTION (not applicable)**

**END OF SECTION 01 73 29**

# SECTION 01 74 00 – CLEANING

## PART 1 – GENERAL

### 1.01– SCOPE

A. Drawings and Division 1 Specification sections apply to work specified in this section, conduct all phases of work as if those requirements were written in full within this section.

### 1.02 – GENERAL

A. If AIA General Conditions are used on this project, Article 3.15 shall be supplemented as specified hereinafter.

### 1.03 – SAFETY CLEANING

A. Each Contractor is responsible for safety cleaning, which includes but is not limited to the following:

1. Keep work areas free of debris and scrap.

2. Scrap lumber shall have nails withdrawn or bent over and lumber shall be stacked or removed.

3. Remove spills of oil, grease, or other liquids immediately or sprinkle with sand.

4. Broom-clean work area on a daily basis or as directed by Owner.

5. All garbage such as lunch trash, etc., shall be removed on a daily basis.

### 1.04 – PROGRESS CLEANING

A. Each CONTRACTOR and Subcontractor shall remove his rubbish and debris from construction site on a daily basis or as directed by the OWNER.

B. Combustible waste shall be stored in fire resistive containers and disposed of regularly.

C. Oily, flammable or hazardous wastes such as caustics, acids, harmful dusts, etc., shall be stored in appropriate covered containers.

### 1.05 – DISPOSAL

A. No burning of rubbish or debris will be allowed at site. No rubbish shall be thrown through openings or from heights without proper protection.
B. Where dust will be generated, provide means to control dust.

1.06 – FINAL CLEANING

A. Immediately prior to substantial completion.

B. Each CONTRACTOR shall expedite or perform cleaning of their work and remove equipment, waste materials, rubbish, debris, foreign matter, spots, etc. leaving the work in condition ready for final inspection or Punch List review by the OWNER and/or ARCHITECT.

1.07 – CHARGES

A. If CONTRACTORS do not remove rubbish or clean as specified above, OWNER reserves right to have work done by others at CONTRACTOR'S expense. The cleaning requirement for this project will be strictly enforced.

**PART 2 – PRODUCTS (not applicable)**

**PART 3 – EXECUTION (not applicable)**

**END OF SECTION 01 74 00**

# SECTION 01 77 00 – PROJECT CLOSEOUT

## PART 1 – GENERAL

### 1.00 – GENERAL

Drawings and Division 1 Specification sections apply to work specified in this section.

### 1.01 – SCOPE

A. Refer to Drawings and these Specifications and conduct all phases of work as if the above requirements were written in full within this section.

### 1.02 – RECORD DOCUMENTS

A. The CONTRACTOR shall maintain, at the site for the OWNER, one record copy of all drawings, specifications, addenda, approved shop drawings, change orders, and other modifications, in good order and marked to record all changes applicable to the work made during construction. The OWNER shall be advised by the CONTRACTOR, on a regular basis, of all changes. All changes made during construction must be recorded by the CONTRACTOR.

B. The daily record of changes shall be the responsibility of CONTRACTOR'S Field Manager/Superintendent. No arbitrary mark-ups will be permitted.

C. During the first week of each month, each CONTRACTOR shall present, at the project site, the job copy showing variations and changes to date to the OWNER for his review.

D. At completion of the project, each CONTRACTOR shall transfer the above recorded information onto CAD generated prints to be turned over to the OWNER. The daily records and the corrected prints shall be turned over to the OWNER prior to issuance of the final payment.

### 1.03 – AIA DOCUMENTS

A. CONTRACTORS shall submit the following documents:

1. AIA Documents
   a. G704 – Certificate of Substantial Completion
   b. G706 – Contractor's Affidavit of Payment of Debts & Claims
   c. G706A- Contractor's Affidavit of Release of Liens
   d. G707 – Consent of Surety Company to Final Payment

## PART 2 – PRODUCTS (not applicable)

## PART 3 – EXECUTION (not applicable)

## END OF SECTION 01 77 00

# SECTION 02 24 00 – SPECIAL ENVIRONMENTAL CONTROLS

## PART 1 – GENERAL

### 1.00 – RELATED DOCUMENTS

A. Drawings and Division 1 Specification sections apply to work specified in this section.

### 1.01 – DESCRIPTION

A. Work Included: This Section covers the furnishing of all labor, materials and equipment and performing all work required for the protection of the environment during construction operations.

B. Definitions: Environmental protection is defined as the retention of the environment in its natural state to the greatest possible extent during project construction and to enhance the natural appearance in its final condition. Environmental protection requires consideration of air, water, and land, and involves noise, solid waste management as well as other pollutants.

### 1.02 – QUALITY ASSURANCE

A. Codes and Standards: In order to prevent and to provide for abatement and control of any environmental pollution arising from the construction activities in the performance of this Contract, the CONTRACTOR and his subcontractors shall comply with all applicable federal, state, and local laws and regulations concerning environmental pollution control and abatement.

### 1.03 – JOB CONDITIONS

A. Environmental Requirements

1. Recording and Preserving Historical and Archaeological Finds

    a. All items having any apparent historical or archaeological interest which are discovered in the course of any construction activities shall be carefully preserved. The CONTRACTOR shall leave the archaeological find undisturbed and shall immediately report the find to the OWNER so the proper authorities may be notified.

2. Noise Control: The work shall be conducted in such manner that noise will not be excessive. Proper mufflers shall be provided for equipment and the mufflers shall be kept in good order.

3. Dust Control: The CONTRACTOR will be required to maintain all disposal areas, stockpiles, and all other work areas within the project boundaries free from dust which would cause any federal, state, or local law pertaining to air pollution to be violated, or which would cause a hazard or nuisance to others. Dust control shall be performed as the work proceeds and whenever a dust nuisance or hazard occurs, will not be made the basis for claim.

4. Smoke Control: No combustible waste materials will be burned at the project site. Internal combustion engines shall be tuned and kept in good repair for maximum efficiency to reduce emissions. Boilers should have proper attention to draft and other controls to reduce smoke.

**PART 2 – PRODUCTS (not applicable)**

**PART 3 – EXECUTION (not applicable)**

**END OF SECTION 02 24 00**

# SECTION 02 41 00 – SELECTIVE DEMOLITION

## PART 1 – GENERAL

### 1.00 – RELATED DOCUMENTS

A. Drawing and Division 1 Specification sections apply to work of this section.

### 1.01 – SCOPE OF THE WORK

A. In general, the work of this section includes all labor, materials, equipment and services necessary to provide the demolition and work shown on Drawings and specified hereinafter in this section.

B. It shall be the CONTRACTOR's responsibility to include all demolition work necessary to complete the project. The Demolition Plan shows a general scope of work and is not intended to be all inclusive.

### 1.02 – CONDITIONS OF PREMISES

A. Bidders shall visit site and examine building as type of construction and its condition.

B. Accept premises as found. Assume risk regarding damage or loss whether by reason of fire, theft or other casualty or happening from and after notification of acceptance of proposal. No such damage or loss shall relieve Contractor from contract obligation to complete work.

## PART 2 – PRODUCTS (not applicable)

## PART 3 – EXECUTION

### 3.01 – PROTECTION

A. Endure safe passage of persons around area of demolition. Conduct operations to prevent injury to adjacent buildings, structures, other facilities, and persons.

1. Erect temporary covered passageways as required by authorities having jurisdiction.

2. Provide interior shoring, bracing, or support to prevent movement, settlement or collapse of selective portions of existing construction to be demolished and adjacent facilities to remain.

B. Repair damage done to Owner's or other's property on or off premises by reason of required work.

C. Remove all protection when work is complete and when authorized to do so by the Architect.

D. Utility Services: Maintain existing utilities indicated to remain, keep in service, and protect against damage during demolition operations.

1. Do not interrupt existing utilities serving occupied or used facilities, except when authorized in writing by authorities having jurisdiction. Provide temporary services during interruptions to existing utilities, as acceptable to governing authorities.

2. Disconnecting and sealing indicated utilities before starting demolition operations is part of this work.

## 3.02 – SELECTIVE DEMOLITION

A. Demolish selective portions of building as indicated and as may be required for final results shown on the Drawings and remove from site. Use such methods as required to complete work within limitations of governing regulations.

B. Personal property and equipment will remain property of and will be moved by this Contractor at the direction of the Owner.

C. Sequence of Work:

1. Demolition work shall be carried out in accordance with sequence as established and coordinated with Owner.

D. Demolition:

1. This work shall be executed in an orderly and careful manner with due consideration for personnel and the public.

2. Dust chutes shall be erected and used for removal of material, rubbish and debris.

E. Demolish Concrete and Masonry in Small sections:

F. Existing Items and Equipment:

1. All items and equipment removed by Contractor and not reused in the remodeled work shall be temporarily stored on the site for Owner inspection. Items and equipment to be retained by the Owner will be removed from the site by the Owner. All items and equipment that are not retained by the Owner shall become the property of the Contractor and shall be removed from the premises.

## 3.03 – MAINTAIN TRAFFIC

A. Do not close or obstruct flow of traffic of normal operations.

B. If the situation arises where normal traffic or operations must be closed or obstructed, notify Owner 48 hours in advance.

3.04 – DEBRIS

A. All materials, rubbish and debris, except as otherwise specified, shall be promptly removed from the building and from the premises as it accumulates.

B. Do not store materials or permit debris to accumulate on site, other than those items and equipment referred to in 3.02(F) above.

C. If Contractor fails to remove debris promptly, the OWNER reserves the right to cause same to be removed at Contractor's expense.

3.05 – CLEANING

A. Upon completion of work, remove all tools, materials apparatus, and rubbish.

B. Leave premises neat, clean, and orderly.

**END OF SECTION 02 41 00**

# SECTION 03 20 00 – CONCRETE REINFORCING

## PART 1 – GENERAL

### 1.00 – RELATED DOCUMENTS

A. Drawings and Division 01 Specification Sections apply to work of this section.

### 1.01 – SCOPE OF WORK

A. Include all materials, labor, services, and incidentals necessary for the completion of this section of the Work.

B. Work includes reinforcement for interior slab-on-grade exterior slabs, footing, retaining walls, etc.

C. Work includes fabrication and placement of reinforcement for cast-in-place concrete including curb/gutter and sidewalks, including bars, welded wire fabric, ties, dowels, stirrups, supports and accessories required.

### 1.02 – QUALITY ASSURANCE

A. General

1. Industry Standards, Specifications and Codes

    a. Comply with all provisions of the following codes and standards except as modified herein.
    b. Referenced codes and standards, including all revisions and commentaries shall be the most currently adopted as of the date of these contract documents.

2. American Concrete Institute (ACI)

    a. ACI 301 Specification for Structural Concrete for Buildings.
    b. ACI 318 Building Code Requirements for Reinforced Concrete.
    c. ACI 315 Details and Detailing of Concrete Reinforcement.

3. Concrete Reinforcing Steel Institute (CSI)

    a. Manual of Standard Practice.
    b. Recommended Practice for Placing Reinforcing Bars.

4. American Society for Testing and Materials (ASTM)

    a. Specific ASTM numbers are noted in later text.

1.03 – QUALIFICATIONS

A. Acceptable Manufacturers

1. Regularly engaged in manufacture of steel bar and welded wire fabric reinforcing.

B. Installer Qualifications

1. Shall have three years' experience in installation of steel bar and welded wire fabric and reinforcing.

C. Source Quality Control

1. Mill test certificates identifying chemical and physical analysis of each load of reinforcing steel delivered.

1.04 – SUBMITTALS

A. Submit in accordance with Section 01300.

B. Submit certification of grade chemical analysis and tensile properties of steel furnished.

C. Shop Drawings

1. Show sizes and dimensions for fabrication and placing of reinforcing steel and bar supports.

2. Show type size and locations of all accessories.

3. Indicate bar schedules, stirrup spacing, and diagrams of bent bars, arrangements, and assemblies.

4. Show required bar laps on all strings of horizontal bars.

5. All lap splices shall develop the full strength of the bar unless lesser laps are specified on drawings.

D. Manufacturer's Literature

1. Manufacturer's specifications and installation instructions for splice devices.

## PART 2 – PRODUCTS

2.01 – REINFORCING

A. Reinforcing Bars

1. Shall conform to ASTM A615 “Standard Specification for Deformed and Plain Billet-Steel Bars for Concrete Reinforcement”.

2. All reinforcing bars shall be deformed, except that plain bars may be used for spirals.

3. All column ties, beam stirrups, hairpins and dowels shall be Grade 60.

4. All main reinforcing bars and other bars not listed above shall be Grade 60, unless noted otherwise on the Contract Documents.

B. Welded Wire Fabric

1. Shall conform to ASTM A1064, Standard Specification for Carbon-Steel Wire and Welded Wire Reinforcement, Plain and Deformed, for Concrete.

2. Welding wire fabric shall be electrically welded and 65,000 psi yield strength.

## 2.02 – ACCESSORIES

A. Supports for Reinforcement

1. Bolsters, chairs, spacers, and other devices for spacing, supporting and fastening reinforcement in place.

2. Use wire bar type supports complying with CRSI recommendations unless otherwise indicated. Do not use wood, brick, and other unacceptable materials.

3. For exposed-to-view concrete surfaces, where legs of supports are in contact with forms, provide supports with legs which are plastic protected. For sandblasted or bush-hammered concrete, provide stainless steel protected or special bar supports.

4. Over waterproof membrane, use chairs with plates to prevent penetration of the membrane.

## 2.03 – FABRICATION

A. Shop-fabricate reinforcing bars to conform to required shapes and dimensions. In case of fabricating errors, do not re-bend or straighten reinforcement in a manner that will injure or weaken the materials.

B. All reinforcement shall be bent cold.

C. Unacceptable Materials

1. Reinforcement with any of the following defects are not acceptable.

2. Bar lengths, depths and bends exceeding specified fabrication tolerances.

3. Bends or kinks not indicated on drawings or final shop drawings.

4. Bars with reduced cross-section due to excessive rusting or other cause.

2.04 – PRODUCT DELIVERY, STORAGE AND HANDLING

A. General

1. Deliver reinforcement to project site in bundles marked with metal tags indicating bar size, lengths and other information corresponding to markings shown on placement drawings.

2. Handle and store materials to prevent dirt or excessive rust.

## PART 3 – EXECUTION

3.01 – INSPECTION

A. Examine the formwork and other conditions under which concrete reinforcement is to be placed and notify the General Contractor of unsatisfactory conditions. Do not proceed with the work until unsatisfactory conditions have been corrected in a manner to your satisfaction.

3.02 – PLACEMENT

A. General

1. Comply with the specified codes and standards, and CRSI recommended practice for "Placing Reinforcing Bars" for details and methods of reinforcement placement and supports, and as herein specified.

2. Clean reinforcement to remove loose rust and mill scale, earth, ice, and other materials which reduce or impair bond with concrete.

3. Position, support, and secure reinforcement against displacement by formwork, construction, or concrete placement operations. Locate and support reinforcing by metal chairs, runners, bolsters, spacers, and hangers, as required.

4. Place reinforcement to obtain coverages for concrete protection as indicated. Arrange, space and securely tie bars and bar supports together with 16-gauge wire to hold reinforcement accurately in position during concrete placement operations. Set wire ties so that ends are directly away from exposed concrete surfaces.

5. Welded wire reinforcement shall lap on full mesh at side and end laps and must be wired together. Do not place welded wire on grade, it shall be raised at least 2" on chairs or other supports prior to concrete pour. Minimum requirement for all concrete slabs shall be 6X6 W1.4 X W1.4 unless specifically noted otherwise on drawings.

6. Provide sufficient number of supports and sizes as required to carry reinforcement. Do not place reinforcing bars more than 2" beyond the last leg of any continuous bar support. Do not use supports as bases for runaways for concrete conveying equipment and similar construction loads.

7. Concrete cover for reinforcement shall be in accordance with ACI 301 unless specified otherwise on drawings.

3.03 – FIELD QUALITY CONTROL

A. Notify Architect when reinforcing is in place so he may review the reinforcing reinforcement placement. Architect shall have a minimum of 24-hour notice prior to placement of concrete.

B. Tend to reinforcing at all times during concrete placement and make necessary adjustments to reinforcing which has been dislodged by concrete placement or workmen.

C. Bar placement tolerances shall be in accordance with ACI 117, unless noted otherwise on drawings.

**END OF SECTION 03 20 00**

# SECTION 03 30 00 – CAST-IN-PLACE CONCRETE

## PART 1 – GENERAL

### 1.01 – SCOPE

A. WORK INCLUDED

1. Include all materials, labor, services, and incidentals necessary for the completion of this section of the Work.

2. The extent of cast-in-place concrete work is shown on the Drawings.

3. Concrete bases for equipment of Mechanical and Electrical Divisions are not included in this work, except as shown or called for on the drawings.

4. Notify and coordinate with other trades with regards to the date of concrete placement in ample time for each to install his/her own work.

5. Install inserts and similar items furnished by other trades.

6. Fill slab over precast concrete second floor plank.

B. NOTIFICATION

1. This Contractor shall notify the Architect at least 24 hours prior to any major concrete pour.

C. PROTECTION OF ADJACENT WORK

1. This Contractor shall be responsible to see that due care is exercised and avoid staining any adjacent finished material during concrete work. Any such damage shall be made good by this Contractor without expense to the Owner.

### 1.02 – QUALITY ASSURANCE

A. INDUSTRY STANDARDS, SPECIFICATIONS AND CODES

1. GENERAL

a. Comply with all provisions of the following codes and standards except as modified herein.

b. All referenced codes and standards, including all revisions and commentaries, shall be the most currently adopted as of the date of these contract documents.

2. AMERICAN CONCRETE INSTITUTE (ACI)

    a. ACI 301 Specifications for Structural Concrete for Buildings.

    b. ACI 302.1R Guide to Concrete Floor and Slab Construction for Buildings.

    c. ACI 318 Building Code Requirements for Structural Concrete.

    d. Additional ACI sections are noted in later text.

3. AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

    a. Specific ASTM numbers are noted in later text.

## 1.03 – ALLOWABLE TOLERANCES

A. Tolerances shall be in accordance with ACI 117, unless noted otherwise.

## 1.04 – SUBMITTALS

A. Submit in accordance with Section 01 33 00.

B. MIX DESIGNS

1. Mix design shall be in accordance with ACI 301. Furnish mix designs by independent testing laboratory based upon schedule herein with test reports for each mix. Submit material content per cubic yard of each class concrete furnished including:

    a. Dry weights of cement.
    b. Saturated surface-dried weights of fine and coarse aggregates.
    c. Quantities, type and name of admixtures.
    d. Weight of water.

2. Submit to Architect and obtain approval prior to placing concrete.

C. TEST REPORTS

1. Submit reports of concrete, compression, yield, air content and slump tests. Furnish copies to Architect.

D. TESTS

1. AGGREGATE TESTS: The Chloride content in the aggregate shall be tested in accordance with ASTM D1411. The tests shall be made, and the results must be approved by the Architect before the aggregate is used in concrete.

2. SLUMP AND AIR CONTENT TESTS: Slump tests shall be made at the option of the Architect, following the procedure in ASTM C143. When air-entrained concrete is used, air content tests shall be made at the option of the Architect in accordance with ASTM C231.

3. STRENGTH TESTS:

   a. A strength test for any class of concrete shall consist of four standard cylinders made from a composite sample secured from a single load of concrete in accordance with ASTM C172, except that when in the opinion of the Architect, he may require additional specimens.

   b. All Concrete:

      1) Make test cylinders in conformity with ASTM C31.

      2) After 24 hours three cylinders to be carefully transported to the testing laboratory for moist curing and one cylinder to be field cured.

      3) One laboratory cured and one field cured cylinder to be tested 7 days and two laboratory cured cylinders to be tested at 28 days.

   c. The test results at 28 days shall be the average strength of the specimens determined in accordance with ASTM C39.

   d. Strength test shall be made for: Each day's pour; each class of concrete; each change of supplies or sources; and for each 100 cubic yards of concrete or fraction thereof.

   e. The average of all strength tests representing each class of concrete, as well as the average of any three consecutive strength tests for each class of concrete, shall be equal to or greater than the specified strength.

   f. Testing shall be performed at the contractor's expense by an approved testing laboratory which shall submit complete reports of all tests to the Architect and Construction Manager.

   g. If the Architect has reason to believe that cylinder strength tests are not representative of the strength of concrete in place, he shall require drilled cores to be cut and tested at the Contractor's expense. This coring and testing shall be in accordance with ASTM C42 Standard Test Method for Obtaining and Testing Drilled Cores and Sawed Beams of Concrete.

## PART 2 – PRODUCTS

### 2.01 – MATERIALS

A. CEMENT

1. For normal concrete, cement shall meet the requirements of ASTM C150 Type I Portland Cement.

2. For air-entrained concrete, cement shall meet the requirements of ASTM C150 Type IA Portland Cement, or the cement specified for normal concrete may be used with an air-entering admixture conforming to ASTM C260.

B. AGGREGATES

1. Comply with requirements of ASTM C33 (normal weight concrete).

2. Fine aggregate shall consist of natural sand.

3. Coarse aggregate shall be crushed stone or gravel.

C. WATER

1. Use clean, fresh, free from oil, acid, organic matter or other deleterious substances.

D. ADMIXTURES

1. No other admixtures will be allowed except those listed without Architect's approval.

2. AIR-ENTRAINING: Shall conform to ASTM C260. The entrained air content shall be controlled at 6 percent for ¾" aggregate concrete and 4 ½" percent for 1 ½" aggregate concrete within limits of plus or minus 1 ½ percent each.

3. WATER REDUCING:

   a. Shall conform to ASTM C494, Type A

4. RETARDING DENSIFIER:

   a. Shall conform to ASTM C494, Type D

5. SUPER PLASTICIZER: Shall conform to ASTM C494, Type F

6. CALCUIM CHLORIDE: Not permitted as additive and not permitted in admixtures

E. EVAPORATION RETARDANT AND FINISHING AID

1. MasterKure ER50 by Master Builders, or equivalent.

F. CURING MATERIALS

1. MOISTURE-RETAINING COVER: Shall conform to ASTM C171

2. LIQUID MEMBRANE:

a. Shall conform to ASTM C309, Type 1

G. CHEMICAL HARDENER

1. MasterKure HD300 WB by Master Builders, or equivalent.

H. EXPANSION JOINT FILLER

1. Any industry standard expansion joint filler capable of expansion and contraction.

I. ISOLATION JOINT FILLER

1. Shall be bituminous (1/2" and ¼" thickness), conforming to ASTM D994.

J. CONTROL JOINT INSERT

1. Shall be hardboard or fiberboard.

K. WATER-VAPOR BARRIER AND BOND BREAKER

1. Use 10 mil clear polyethylene, resistant to decay when tested in accordance with ASTM E154, Section 13.

## 2.02 – REDI-MIX CONCRETE

A. GENERAL

1. Ready-mix concrete shall be measured, mixed and delivered according to ASTM C94, except as modified herein.

2. Design mixes so that the average of any five consecutive strength tests of laboratory cured specimens will be at least 15% greater than minimum strength specified. No more than 10% of strength tests may have values less than specified minimum. No test may have less than 90% of the specified minimum strength.

3. Delete the references for allowing additional water to be added to the batch for material with insufficient slump. Addition of water to the batch NOT permitted.

4. During hot weather, or under conditions contributing to rapid setting of concrete, a shorter mixing time than specified in ASTM C94 may be required.

5. When the air temperature is between 85 degrees F. and 90 degrees F., reduce the mixing and delivery time from 1 ½ hours to 75 minutes, and when the air temperature is above 90 degrees F., concrete cannot be placed.

B. READY-MIX DELIVERY-TICKETS

1. Furnish with each batch of concrete before unloading at the site, two delivery tickets, one for Contractor and one for Architect, on which is printed, stamped, or written the following information:

   a. Name of ready-mix batch plant.
   b. Serial number of ticket.
   c. Date and truck number.
   d. Name of Contractor.
   e. Job name and location.
   f. Specific class or designation of concrete.
   g. Amount of concrete (cubic yards).
   h. Time loaded or of first mixing of cement and aggregates.
   i. Type, name and amount of admixture.
   j. Type, brand and amount of cement.
   k. Total water content by producer (or W/C ratio).
   l. Maximum size aggregate.
   m. Weights of fine and coarse aggregates.

C. MIX PROPORTIONING

| Type of Construction | Min. Comp. Strength at 28 day (psi) | Slump (in.) | Max. Agg. Size (in.) | Air Entrainment | Notes |
|---|---|---|---|---|---|
| All Footings | 4000 | 5 | 1.5 | Yes | 2, 3, 4 |
| All Walls and Piers | 4000 | 4 | 0.75 | Yes | 2, 3, 4 |
| Interior Slab and Grade | 4000 | 3 | 0.75 | No | 4 |
| Miscellaneous Non-Scheduled Concrete Work | 4000 | 5 | 0.75 | See Note | 1, 2, 3, 4 |

NOTES:

1. Air entrained concrete: Use for all exterior walls, exterior slabs, walks, platforms, ramps, steps, all portions of the parking ramp, and all other concrete exposed to freezing and thawing.

2. Air entrainment shall be in accordance with ACI 301.

3. Limit use fly ash to not exceed 15% of cement content by weight.

4. The use of calcium chloride or admixtures containing chlorides is NOT PERMITTED. Non-chloride accelerators shall be permitted.

## PART 3 – EXECUTION

### 3.01 – GENERAL

A. Clean all mixing and transportation equipment. Wet forms thoroughly. Remove all ice, excess water, mud, and other debris from within forms and from reinforcement. Notify Architect prior to placing in ample time for inspection of forms and reinforcing.

### 3.02 – PLACEMENT OF CONCRETE

A. PRE-PLACEMENT INSPECTION

1. Before placing concrete, inspect and complete the form-work installation, reinforcing steel, and items to be embedded or cast-in. Notify other contractors to permit the installation of their work; cooperate with other trades in setting such work, as required. Thoroughly wet wood forms immediately before placing concrete, as required where form coatings are not used. Notify Architect 24 hours in advance of pouring.

B. PLACING CONCRETE IN FORMS

1. Deposit concrete in forms in horizontal layers not deeper than 18” and in a manner to avoid inclined construction joints. Maximum length of wall pour is 60’ between construction joints.

2. Place all concrete in accordance with ACI 304R Guide for Measuring, Mixing, Transporting and Placing Concrete, ACI 304.2R Placing Concrete by Pumping Method.

3. Deposit concrete continuously or in layers of such thickness that no concrete will be placed on concrete which has hardened sufficiently to cause the formation of seams or planes of weakness within the section. If a section cannot be placed continuously, provide construction joints as herein specified. Deposit concrete as nearly as practicable to its final

location to avoid segregation due to rehandling or flowing. When being deposited, concrete shall not be allowed to fall vertical distance greater than 6' from point of discharge to point of deposit. Provide parts in formwork if required for discharge points.

4. Consolidate placed concrete by mechanical vibrating equipment supplemented by hand-spacing, rodding or tamping. Use vibrators designed to operate with vibratory element submerged in concrete, maintain a speed of not less than 6,000 impulses per minute. Comply with ACI 309R, Guide for Consolidation of Concrete.

5. Do not use vibrators to transport concrete inside of forms. Insert and withdraw vibrators vertically at uniformly spaced locations not farther than visible effectiveness of the machine. Do not insert vibrators into lower layers of concrete that have begun to set. At each insertion, limit the duration of vibration to the time necessary to consolidate the concrete and complete embedment of reinforcement and other embedded items without causing segregation of the mix.

C. PLACING CONCRETE SLABS

1. Deposit and consolidate concrete slabs in a continuous operation until the placing of a panel or section is completed.

2. Place interior slabs on grade using long-strip construction techniques or other approved method.

3. Place slabs on grade over vapor barrier.

4. Place suspended slabs in sections as large as practicable to complete finishing, within limits acceptable to the Architect.

5. Consult with Architect with regard to limits of single placements prior to commencing work.

6. Consolidate concrete during placing operations so that concrete is thoroughly worked around reinforcement and other embedded items and into corners.

7. Bring slab surfaces to the correct level with a straightedge and strike off. Use bull floats or darbies to smooth the surface, leaving it free of humps or hollows. Do not disturb the slab surfaces prior to beginning finishing operations.

8. Maintain reinforcing in the proper position during concrete placement operations. All mesh shall be lifted ½ slab depth as work pouring proceeds.

D. COLD WEATHER PLACING

1. Protect concrete work from physical damage or reduced strength which could be caused by frost, freezing actions, or low temperatures, in compliance with ACI 306R, Guide to Cold Weather Concreting.

2. When air temperature has fallen to or is expected to fall below 40 degrees F., uniformly heat all water and aggregates before mixing as required to obtain a concrete mixture temperature of not less than 50 degrees F., and not more than 80 degrees F. at point of placement. When concrete is likely to be subjected to freezing temperatures within 24 hours after it has been deposited, provide temporary heating. In no case shall concrete be exposed to freezing temperatures for 72 hours after placing. Maintain concrete temperatures not less than 50 degrees F. or more than 80 degrees F. for the first three days after placing. Protect from freezing for the five days following placement.

3. Do not use frozen materials or materials containing ice or snow. Do not place concrete on frozen subgrade or on subgrade containing frozen materials.

4. Do not use calcium chloride, salt or other materials containing anti-freeze agents or chemical accelerators.

5. Do not allow carbon dioxide from heating units to contract freshly placed concrete surfaces for 48 hours. Vent all heaters outside of any enclosure.

E. HOT WEATHER PLACING

1. When hot weather conditions exist that would seriously impair the quality and strength of concrete, place concrete in compliance with ACI 305R, Guide to Hot Weather Concreting. Do not place concrete when the air temperature is above 90 degrees F.

2. Cool ingredients before mixing to maintain concrete temperature at time of placement below 90 degrees F. Mixing water may be chilled or chopped ice may be used to control the concrete temperature provided the water equivalent of the ice is calculated to the total amount of mixing water. Maintain concrete temperature not less than 50 degrees F. nor more than 90 degrees F. for the first three days after placing. Protect from temperatures over 90 degrees F. for the next five days.

3. Cover reinforcing steel with water-soaked burlap if it becomes too hot, so that the steel temperature will not exceed the ambient air temperature immediately before embedment in concrete.

4. Wet forms thoroughly before placing concrete.

5. Do not use retarding admixtures without the written permission of the Architect.

F. CONCRETE JOINTS

1. CONSTRUCTION JOINTS: Locate as directed by Architect or as shown on the Drawings. Form the keyway. Place perpendicular to main reinforcement. Continue reinforcement through joint. Locate joint so as not to affect structural integrity or appearance of the structure. Includes joint between wall and footing.

2. ISOLATION JOINTS: Form with bituminous performed filler, ¼" thick full depth of slabs. Reinforcement is non-continuous. Use ½" thick all exterior slabs on grade. Locate at all points of contract between slab on grade and vertical structural concrete. Seal with Sikaflex 15LM elastomeric sealant.

3. CONTROL JOINTS: Control joints are required in every poured concrete slab. Locate on grid lines and/or on lines as shown on the drawings. If drawings do not show Control Joint locations, bidder shall assume a maximum spacing of 15' between joints, and final layout of joints shall be as directed by the Architect. Joint size shall be ¼" wide x 1/5 to ¼ of the slab depth. Continue reinforcement through joint. Contractor's option to tool or use insert. Do not tool joints in slabs to receive a finished flooring material. Seal with Sikaflex 15LM elastomeric sealant.

## 3.03 – FINISHING

### A. GENERAL

1. Strike and level concrete. Allow to set before floating. Power float on disappearance of water sheen. Hand float areas inaccessible to power float. Applicable to all flat work to obtain smooth, uniform, granular texture. Floors shall be level with a tolerance of 1/8" in 10'-0" except where drains occur or sloped floors are indicated, in which case the tolerance applies to the planes indicated.

### B. TROWELED FINISH

1. Power trowel to smooth finish. Hand towel areas inaccessible to power trowel. Applicable to all flatwork to receive finished flooring material.

### C. BROOM FINISH

1. Draw broom across surface after floating to form a regular, parallel pattern. Applicable to all ramps, drives, and sidewalks.

### D. FORMED CONCRETE

1. TOP OF CONCRETE: Strike concrete smooth then float and trowel surface to texture comparable to formed surface.

2. FORMED SURFACE: As cast finish, patch the holes and defects after form removal. Remove fins.

3. RUBBED SURFACE: Rub surface with rubbing stone to remove all projections and round corners. Wet surface and brush evenly with cement grout mixture.

4. Slope all exterior steps down 1/8".

3.04 – CURING

A. Comply with ACI 308R.

B. FLATWORK:

1. All concrete floors to be left exposed: Cure with liquid membrane curing material.

C. FORMED SURFACES

1. Cure formed concrete surfaces, including walls, columns, underside of beams, supported slabs and other similar surfaces by moist curing with forms in place for full curing period or until forms are removed. If forms are removed, continue curing by methods specified for flatwork.

D. APPLICATION

1. Apply liquid membrane curing material uniformly in continuous operation by power-spray equipment in accordance with manufacturer's printed instructions. Recoat areas which are subjected to heavy rainfall within 3 hours after initial application. Maintain continuity of coating and repair damage during curing period.

2. Cover concrete surfaces with moisture-retaining cover for curing concrete, placed in widest practicable width with sides and ends lapped at least 3" and sealed by waterproof tape or adhesive. Immediately repair any holes or tears during curing period using cover material and waterproof tape. Keep continuously moist for period specified above.

E. SEALING AND HARDENING

1. At all concrete floors to be left exposed: Apply chemical-hardener finish in accordance with manufacturer's printed instruction for "heavy" duty floor. Verify conditions with Architect. Upon substantial completion, clean floors and apply one additional coat.

F. PROTECTION

1. Protect concrete from damaging mechanical disturbances including load stresses, heavy shock, excessive vibration, and from damage caused by rain or flowing water. Protect all finished concrete surfaces from damage by subsequent construction operations.

3.05 – REPAIRING AND PATCHING

A. Comply with ACI 301.

B. Remove and replace at no additional cost any concrete not formed as shown on plans, concrete out of alignment, surfaces beyond required tolerance or defective surfaces, which cannot be

properly repaired or patched, including any concrete failing to meet the strength requirements as determined by the testing laboratory.

C. Clean, dampen and fill all bolt and tie holes and other similar defects with patching concrete immediately after removing forms.

D. Remove to sound concrete all bulges, projections, honeycomb and all other defects in exposed concrete and patch. Thickness of patch: 1" minimum. Cut the perimeter edges of all areas to receive patching mix perpendicular to the surface or undercut. Featheredge patches will NOT be allowed. Do all patching before concrete is thoroughly dry.

E. Brush a bond of stiff neat Portland Cement and water into the pre-dampened patching area and allow to partially set. Fill area with specified patching mix in ½" layers, compact and surface-scratch to receive successive layers. Strike patching mix off leaving a slight bulge to allow for shrinkage. Hold large patches in place with forms matching original forms. Leave patched area undisturbed for 1 hour before final finishing. Keep damp for 7 days. Do not use metal tools in finishing patches on exposed surfaces.

**END OF SECTION 03 30 00**

# SECTION 04 43 13 - CUT INDIANA LIMESTONE

## PART 1 – GENERAL

### 1.00 – RELATED DOCUMENTS

Drawings and Division 1 Specification Sections apply to work of this section.

### 1.01 – SCOPE OF THE WORK

A. The work under this contract shall include all labor and material necessary to furnish and satisfactorily install the Cut Indiana Oolitic Limestone in accordance with the drawings and as hereinafter specified.

## PART 2 – PRODUCTS

### 2.00– MATERIALS

A. All limestone specified or shown on drawings shall be Indiana Oolitic Limestone, as quarried in Lawrence, Monroe, and Owen Counties, Indiana. Stone shall be 3" thickness, "BUFF" color, "LIGHT SANDBLAST" finish.

### 2.01– SAMPLES

A. The supplier or fabricator shall submit three (3) samples, 6" x 6", for approval by the architect. The samples shall in general be typical of the grade, color and finish specified. This sample and the standards established by the Indiana Limestone Institute shall form the basis of the contract agreement.

### 2.02 – STANDARD PRACTICE

A. The architect reserves the right to approve the material supplier for cut stone before this portion of the work is awarded. Stone and workmanship quality shall be in accordance with **Industry Standards and Practices** as set forth by the Indiana Limestone Institute of America, Inc., Bedford, Indiana. The stone supplier shall be a member in good standing of that organization.

### 2.03– CUTTING AND SETTING DRAWINGS

A. The cut stone supplier shall prepare and submit to the architect for approval, complete cutting and setting drawings for all of the cut Indiana Limestone work. Such drawings shall show in detail the sizes, sections, and

B. dimensions of stone, the arrangement of joints and bonding, anchoring and other necessary details. All jointing as shown by the architect on the contract drawings shall be followed, unless modifications are agreed upon in writing, or indicated upon the approved shop drawings. If the contract drawings do not show the intent of the jointing, it will be the fabricator's responsibility to establish the jointing in accordance with industry standards and practices. The general contractor shall furnish all field dimensions necessary for fabrication.

C. The cutting and setting drawings shall be based upon and follow the drawings and full-size details prepared by the architect except where it is agreed in writing or shown on the approved shop drawings that changes be made. Each stone indicated on the setting drawings shall bear the corresponding number marked on an unexposed surface.

D. Provision for the anchoring, dowelling, and cramping of work, in keeping with standard practices, and for the support of stone by shelf angles and loose steel, etc., when required, shall be clearly indicated on the cutting and setting drawings.

## 2.04 - CARVING AND MODELS

A. All carving shall be done by skilled carvers in a correct and artistic manner, in strict accordance with the spirit and intent of the approved shaded drawings, or from models furnished or approved by the architect.

## 2.05 - CUTTING

A. All stone shall be cut accurately to shape and dimensions and full to the square, with jointing as shown on approved drawings. All exposed faces shall be dressed true. Beds and joints shall be at right angles to the face, and joints shall have a uniform thickness of 3/8" unless otherwise shown or noted on drawings.

B. Reglets for flashing, etc., shall be cut in the stone where so indicated on the drawings.

C. Molded work shall be carefully executed from full size details supplied by Architect and must match satisfactorily at joints. All exposed arises shall be in true alignment and slightly eased to prevent snipping.

## 2.06 - REPAIRING DAMAGED STONE

A. Repair of stone is an accepted practice and will be per- mitted. Some chipping is expected; repair of small chips is not required if it does not detract from the overall appearance of the work or impair the effectiveness of the mortar or sealant. The criteria for acceptance of chips and repairs will be per standards and practices of the industry unless other criteria are mutually agreed upon by the limestone supplier and the architect.

## 2.07 - BACK-CHECKING AND FITTING TO STRUCTURE OR FRAME

A. Stone coming in contact with structural work shall be back-checked as indicated on the approved shop drawings. Stones resting on structural work shall have beds shaped to fit the supports as required.

B. Maintain a minimum of 1" between stone backs and adjacent structure. (**Note**: many bolted connections will require more space than this; 2" space may be more desirable. Large-scale details should illustrate and control these conditions.)

## 2.08 - CUTTING FOR ANCHORING, SUPPORTING, AND LIFTING DEVICES

A. Holes and sinkages shall be cut in stones for all anchors, cramps, dowels and other tie-back and sup- port devices per industry standard practice and/or approved shop drawings. However, expansion anchor holes shall be drilled at jobsite by mason or erector to facilitate alignment.

B. No holes or sinkages will be provided for contractor's handling devices unless arrangement for this service is made by the contractor with the stone supplier.

C. **Note:** It is not recommended that Lewis pins be used for stones less than 3½" thickness.

## 2.09 - CUTTING AND DRILLING FOR OTHER TRADES

A. Any miscellaneous cutting and drilling of stone necessary to accommodate other trades will be done by the cut stone fabricator only when necessary information is furnished in time to be shown on their shop drawings and details, and when work can be executed before fabrication. Cutting and fitting, due to jobsite conditions, will be the responsibility of the general contractor.

B. Incidental cutting such as for window frame clips, etc., which is normally not considered to be the responsibility of the stone supplier, will be provided only by arrangement by the contractor with the stone supplier.

## 2.10 - LOADING AND SHIPMENT

A. The cut Indiana Limestone shall be carefully packed for transportation with exercise of all customary and reason- able precautions against damage in transit. All cut stone under this contract shall be loaded and shipped in the sequence and quantities mutually agreed upon by the general contractor or erector and the material supplier.

## 2.11 - UNLOADING ANS STORAGE AT JOBSITE

A. All stone shall be received and unloaded at the site with necessary care in handling to avoid damaging or soiling.

B. Stone shall be stored clear of the ground on nonstaining skids (cypress, white pine, poplar, or yellow pine without an excessive amount of resin). Chemically treated wood should not be used. DO NOT use chestnut, walnut, oak, fir, and other woods containing tannin.

C. Stone shall be covered with waterproof paper, clean canvas or polyethylene.

## PART 3 – EXECUTION

### 3.00 – WORK INCLUDED

A. The work under this contract shall include all labor and materials necessary for the satisfactory installation of cut Indiana Limestone in accordance with the provisions set out herein.

### 3.01 – MORTAR

A. SETTING MORTAR: shall be ASTM C-270 Type N (indicate other type if desired) composed of (select:) one-part portland cement, one part mason's lime, and six parts sand mixed with potable water (or:) one part masonry cement and two and three-fourths part sand mixed with potable water.

B. POINTING MORTAR: shall be composed of one-part (white or other) portland cement, one-part hydrated lime, and six parts white sand passing a #16 sieve.

### 3.02 – EXPANSION JOINTS

A. Joints shall be adequate to allow for thermal and structural differential movement. Filler material for these joints shall be nonstaining.

B. When joint locations are not shown on Architectural Drawings or on the Supplier's Shop Drawings, installer shall provide joints at 20' on center minimum and shall provide a submittal drawing prior to installation for the Architect's review and approval.

### 3.03 - WEEPS

A. Plastic or other weep tubes, or felt wicks, shall be placed in joints where moisture may accumulate within the wall, such as at base of cavity, continuous angles, flashing, etc., or as shown on architectural drawings.

### 3.04 - STONE ANCHORS AND ATTACHMENTS

A. Provide anchors and attachments of type and size required to support the stonework fabricated from the following metals for conditions indicated below:

1. Stainless Steel, AISI Type 304 or 316, for anchors and expansion bolts embedded within the stone.
2. Hot-Dip Galvanized Steel as follows:
    b. Galvanized malleable iron for adjustable inserts embedded in the concrete structure.
    c. For anchor bolts, nuts and washers not in direct contact with stone; comply with ASTM A 307, Grade A, for material and ASTM C 153, Class C, for galvanizing.
    d. For steel plates, shapes and bars not in direct con- tact with stone; comply with ASTM A 36 for mate- rials and ASTM A 123 for galvanizing.
    e. For expansion bolts not in direct contact with stone use zinc plated or cadmium plated bolts with stainless steel expansion clips.
    f. For steel angles supporting limestone, comply with ASTM A 36 for materials and ASTM A 123 for galvanizing. Supports protected with one shop coat of zinc-rich or other rust-inhibiting paint, and one job coat of similar, compatible paint, may be used at the discretion of the architect.

## 3.05 - WATERPROOFING OF STONE UNITS

A. Waterproofing materials are specified in Section 07 16 13 – POLYMER MODIFIED CEMENT WATERPROOFING.

B. All stone units shall receive waterproofing applied to all unexposed surfaces (backs, beds, and joints).

C. Waterproof all adjacent concrete surfaces on which limestone will rest, including concrete or cmu haunches and ledges, as well as support angles.

D. Stones extending below grade shall be Waterproofed as above, and in addition shall be waterproofed to the level of grade on their face surfaces which are covered.

E. Cementitious coatings must be allowed to cure before treated stone is set. Due care must be exercised in handling all dampproofed stone to avoid chipping or off-setting.

## 3.06 - SETTING

**A.** All Indiana Limestone shall be set accurately in strict accordance with the contract and shop drawings.

**B.** When necessary, before setting in the wall, all stones shall be thoroughly cleaned on all exposed surfaces by washing with fiber brush and soap powder, followed by a thorough drenching with clear water.

**C.** All stone joint surfaces not thoroughly wet shall be drenched with clear water just prior to setting.

**D.** Except as otherwise specially noted, every stone shall be set in full beds of mortar with all

vertical joints slushed full. Completely fill all anchor, dowel, and similar holes. Unless otherwise noted, all bed and joint widths shall be 3/8".

**E.** Lead or plastic setting pads shall be placed under heavy stones, column drums, etc., in same thickness as joint, and in sufficient quantity to avoid squeezing mor- tar out. Heavy stones or projecting courses shall not be set until mortar in courses below has hardened sufficiently to avoid squeezing.

**F.** Joints can be tooled when initial set has occurred or raked out 1" and pointed later. If pointed with sealant, the raked depth and sealant applications shall conform to manufacturer's instructions. (See p. 25.)

**G.** Projecting stones shall be securely propped or anchored until the wall above is set.

**H.** Only the ends of lugged sills and steps shall be embedded in mortar. Balance of joint shall be left open until finally pointed.

**I.** All cornice, copings, projecting belt courses, other projecting courses, steps, and platforms (in general, all stone areas either partially or totally horizontal) should be set with unfilled vertical joints. After setting, insert properly sized backup material or backer rod to proper depth, and gun in sealant.

**J.** In cold weather, International Masonry Industry All- Weather Council recommendations for setting from 40 degrees to 20 degrees F shall be followed, except that no additives shall be used in the setting mortar, and below 20 degrees F all work shall be done in heated enclosures.

## 3.07 - PROTECTION OF FINISHED WORK

**A.** Receipt, storage, and protection of cut stonework prior to, during and subsequent to installation shall be the responsibility of the mason contractor.

**B.** During construction, tops of walls shall be carefully covered at night, and especially during any precipitation or other inclement weather.

**C.** At all times, walls shall be adequately protected from droppings.

**D.** Whenever necessary, substantial wooden covering shall be placed to protect the stonework. Nonstaining building paper or membrane shall be used under the wood. Maintain all covering until removed to permit final clearing of the stonework.

## 3.08 - CLEANING

**A.** The stone shall be washed with fiber brushes, mild soap powder or detergent and clean water or approved mechanical cleaning process.

**B.** Special consideration and protection shall be provided when brickwork is cleaned above the limestone. Strong acid compounds used for cleaning brick will burn and discolor the limestone.

**C.** Use of sand blasting, wire brushes or acids will only be permitted under special circumstances, approved by architect.

3.09– MASONRY SEALER

A. After final cleaning of masonry, install one (1) coat of Sure Klean Weather Seal "Blok-Guard & Graffiti Control" as manufactured by PROSOCO, Inc. on all new masonry.

    1. A second coat of sealer may be required for extremely porous masonry materials. It shall be this contractor's responsibility to contact the masonry manufacturer to determine if a second sealer coat will be needed, and if needed, shall include costs for a second coat in their bid.

B. Install in STRICT accordance with ALL manufacturer's application instructions.

**END OF SECTION 04 43 13**

# SECTION 07 14 00 - FLUID-APPLIED MEMBRANE WATERPROOFING

## PART 1 - GENERAL

### 1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

### 1.2 SUMMARY

A. Provide a cold fluid-applied bitumen-modified polyurethane waterproofing system on structural concrete, plywood sheathing, metal, or other substrates.

1. Work includes substrate preparation.
2. Work includes bridging and sealing air leakage and water intrusion pathways and gaps including connections of the walls to the roof air barrier, and penetrations of the building envelope including piping, conduit, ducts, and similar items.

B. Related Work: The following items are not included in this Section and are specified under the designated Sections:

1. Section 03 30 00 – CAST-IN-PLACE CONCRETE.

### 1.3 PERFORMANCE REQUIREMENTS

A. Cold fluid applied bitumen-modified polyurethane waterproofing system is intended to perform as a continuous barrier against liquid water and to flash or discharge to the exterior incidental water. Membrane system is not long-term UV resistant and is intended to receive an overburden of concrete, tile in a cementitious setting bed, pavers in a sand setting bed, pavers on supporting pedestals, or soil/growing media, and shall accommodate movements of building materials as required with accessory sealant materials at locations such as: changes in substrate, perimeter conditions and penetrations. Installed waterproofing membrane system shall not permit the passage of water and will withstand the design pressures calculated in accordance with the most current revision of ASCE 7.

B. Manufacturer shall provide all primary waterproofing materials that are physically and chemically compatible when installed in accordance with manufacturers current application requirements.

### 1.4 SUBMITTALS

A. Submittals: Comply with project requirements for submittals as specified in Division 01.

B. Product Data: For each product.

C. Shop Drawings: Manufacturer’s standard details and shop drawings for the specified system.

D. Installer’s Authorization: Installer shall provide written documentation from the manufacturer of their authorization to install the 10- and 20-year system, and eligibility to obtain the warranty specified in this section.

E. Manufacturer’ Certification: Certification showing full-time quality control of production facilities and that each batch of material is tested to ensure conformance with the manufacturer's published physical properties.

F. VOC Certification: Manufacturer’s certification that all waterproofing system products meet current Volatile Organic Compound (VOC) regulations as established by the State in which they are being installed; and stating total VOC content, in grams per liter, for all system components (i.e. primers, adhesives, coatings, etc.).

1.5 QUALITY ASSURANCE

A. Manufacturer’s Qualifications: Manufacturer shall demonstrate qualifications to supply materials of this section by certifying the following:

1. Membrane Manufacturer shall have available an in-house technical staff to assist the contractor when necessary in the application of the products and site review of the assembly.

B. Installer’s Qualifications: The Contractor shall demonstrate qualifications to perform the Work of this Section by submitting certification or license by the waterproofing membrane manufacturer as a trained and authorized applicator of the product the installer intends to use.

C. Source Limitations: All components listed in this section shall be provided by a single manufacturer or approved by the primary waterproofing manufacturer.

D. Materials Compatibility: All materials included in the waterproofing assembly, as well as associated materials adhered to/applied beneath the waterproofing membrane shall have been tested and verified to be compatible. Include written testing documentation and test reports if requested by Architect.

E. Applicable Regulations: Comply with local code and requirements of authorities having jurisdiction. Do not exceed VOC regulations as established by the State in which they are being installed, including total VOC content, in grams per liter, for all system components (i.e. primers, adhesives, coatings, and similar items).

F. Waterproofing Terminology: Refer to ASTM D1079 and the glossary of the National Roofing Contractors Association (NRCA) Roofing and Waterproofing Manual for definitions of waterproofing terms related to this section.

## 1.6 PRE-INSTALLATION CONFERENCE

A. Prior to scheduled commencement of the waterproofing installation and associated work, conduct a meeting at the project site with the installer, architect/consultant, owner, manufacturer's representative and any other persons directly involved with the performance of the Work. The Installer shall record conference discussions and to include decisions and agreements reached (or disagreements) and furnish copies of recorded discussions to each attending party. The main purpose of this meeting is to review foreseeable methods and procedures related to the Work.

## 1.7 DELIVERY, STORAGE AND HANDLING

A. Deliver all waterproofing materials to the site in original containers, with factory seals intact.

B. Store all pail goods in their original undamaged containers in a clean, dry location within their specified temperature range.

C. Do not expose materials to moisture in any form before, during, or after delivery to the site. Reject delivery of materials that show evidence of contact with moisture.

D. Remove manufacturer supplied plastic covers from materials provided with such. Use "breathable" type covers such as canvas tarpaulins to allow venting and protection from weather and moisture. Cover and protect materials at the end of each workday. Do not remove any protective tarpaulins until immediately before the material will be installed.

E. Materials shall be stored above 60-95°F (15-35°C) a minimum of 24 hours prior to application.

## 1.8 PROJECT CONDITIONS

A. Weather: Proceed with waterproofing only when existing and forecasted weather conditions permit. Membrane application should not proceed when precipitation is imminent. Ambient temperatures shall be above 36°F (2°C) when applying the waterproofing system.

B. All surfaces to receive the waterproofing membrane shall be free from visible water, dew, frost, snow, and ice. Application of waterproofing membrane shall be conducted in well ventilated areas.

C. Application on Green Concrete:
Horizontal: 48 hours or walkable conditions
Vertical: 24 hours after forms removed.

D. Waterproofing Membrane:

1. Waterproofing membrane is not intended to be exposed or in contact with a constant temperature below -25°F (-31.7°C) or in excess of 200°F (93.3°C). See technical data sheets for limitations, i.e., hot pipes and vents or direct steam venting.

2. Specified waterproofing membrane is VOC compliant. Consult container, packaging labels and Safety Data Sheets (SDS) for specific safety information.
3. Some low molecular weight alcohols can soften. Any exposure to foreign materials or chemical discharges shall be presented to membrane manufacturer for evaluation to determine any impact on the waterproof membrane assembly performance prior to warranty issuance.

E. Contractor shall ensure adequate protection during installation of the waterproofing system.

1.9 WARRANTY

A. Warranty: Provide manufacturer's standard warranty. Materials warranty shall be for a minimum of one year starting at the date of Substantial Completion. **Most warranties require the use of a protection board AND drainage mat.** Check www.usa.sika.com for the latest "Sikalastic 320 System Guidelines" for more information or contact Sika Technical Services. An 'Intent to Warrant' form should be completed prior to the start of the project. System warranty shall be for the following duration in accordance with specified system.

1. Warranty Length: 20 years 120 mil system with reinforcing.

PART 2 - PRODUCTS

2.1 MANUFACTURER

A. Basis-of-Design Manufacturer: Sika Corporation, 201 Polito Avenue, Lyndhurst NJ 07071. Toll Free 800-933-SIKA (7452), www.sikausa.com. No substitutions without prior written approval by the Architect.

2.2 WATERPROOFING SYSTEM

A. Fluid-Applied Membrane System, 20 Year System: Sikalastic 320, Sika Fleece-120, Sikalastic PF Lo-VOC Primer:

1. Horizontal surfaces receive Sikalastic PF Lo-VOC Primer applied according to the datasheet and allowed to dry. Then Sikalastic 320 SL is applied at 120 mils wet film thickness resulting in 13 SF/gal coverage.

    a. Vertical surfaces receive Sikalastic 320 NS at 90 mils wet film thickness resulting in 18 SF/gal coverage. Reinforcing fabric required for moving transitions such as between dissimilar materials, penetrations, plywood seams, joints and cracks.

## 2.3 MEMBRANES AND COATINGS

A. Base embedment coat with Sika Fleece reinforcement per the waterproofing system build shall be Sikalastic 320 NS, SG or SL by Sika Corp, a single component, cold fluid applied, moisture cure, bitumen modified, polyurethane base coat membrane.

B. Topcoat with Sika Fleece reinforcement per the waterproofing system build shall be Sikalastic 320 NS, SG or SL by Sika Corp, a single component, cold fluid applied, moisture cure, bitumen modified, polyurethane base coat membrane.

C. Base coat and topcoat membranes shall be low in VOC's and be a one component elastomeric polyurethane membrane that may be brush or roller applied. Membrane shall have the following physical properties and conforms to ASTM D7311-07: Standard Specification for a single component, cold fluid applied, moisture cure, bitumen modified, polyurethane membranes.

D. Liquid and Cured Film Property Requirements:

| Standard Measurement / Grade | SL | NS | SG |
|---|---|---|---|
| ASTM D-624, Die C: Tear Resistance (psi) | 55 ± 15 | 90 ± 15 | 90 ± 15 |
| ASTM D-412: Elongation at Break (%) | 550 ± 50 | 600 ± 25 | 600 ± 25 |
| ASTM D-412: Tensile Strength (pli) | 330 ± 20 | 350 ± 15 | 350 ± 15 |
| ASTM D-2240: Hardness (Shore A) | 30 ± 5 | 30 ± 5 | 30 ± 5 |
| ASTM D-2697: Total Volume Solids (%) | 95 ± 2 | 95 ± 2 | 86 ± 2 |
| ASTM D-236: Total Weight Solids (%) | 99 ± 2 | 96 ± 2 | 88 ± 2 |
| ASTM D-2369-81: VOCs (g/l) | 45 | 46 | 89 |
| ASTM E96-15: Water Vapor Transmission (perms) | 1 ± 0.2 | 1 ± 0.2 | 1 ± 0.2 |
| Viscosity (Poise @ 80°F) | 30 ± 10 | 350 ± 100 | 150 ± 50 |
| Specific Gravity | 1.19 | 1.19 | 1.19 |

## 2.4 REPAIR AND PATCHING

A. Cementitious repair mortar to repair bug holes, spalled areas, and other non-structural surface defects, to fill uneven areas and birdbaths, or to repitch decks shall be SikaQuick 1000 by Sika Corp., a two component, polymer-modified, Portland cement, fast-setting, trowel-grade mortar.

## 2.5 FILLET BEAD AND PENETRATION SEALANT

A. Sealant for fillet bead applications and membrane penetrations shall be any Sikaflex sealant including Sikaflex 1a, 1a+, 2c NS EZ Mix, or 11FC by Sika Corp., one and two part polyurethane sealants suitable for fillet bead transition compound to be applied prior to the installation of the membrane system at changes in substrate direction, sealing reglet terminations, cracks in the substrate and penetrations of the waterproofing system.

2.6 PRIMERS

A. Some warranties and/or substrates may require the use of a primer. See “Sikalastic 320 System Guidelines” for more information. Use: Sikalastic FTP Lo-VOC Primer for green or damp concrete (when required by warranty); Sikaflex Primer 449 for PVC; Sikalastic Recoat Primer for Fiberglass or before recoating on old Sikalastic 320; and Sikalastic PF Lo-VOC Primer for all other surfaces including concrete, EIFS, DensGlass, metal, and marine grade or high-density plywood.

2.7 MEMBRANE REINFORCEMENT - POLYESTER

A. Reinforcement for the waterproofing membrane system shall be Sika Fleece by Sika Corp., a non-woven, needle-punched polyester fleece specifically designed to provide greater impact resistance and greater resistance to excessive thermal and structural movement while maintaining elasticity and membrane film integrity.

B. Supplemental reinforcement of the waterproofing membrane system shall be Sika Flexitape Heavy by Sika Corp., a nylon mesh specifically designed for local reinforcement of the waterproofing membrane at structural cracks, expansion joints and transitions between dissimilar materials.

2.8 PROTECTION BOARD

A. Membrane should be protected as soon as possible with a protection board to protect from other trade work, backfill, overburden placement and as an added defense against water and moisture drive.

B. Most protection boards are compatible with Sikalastic 320. Kingspan PB4 is the preferred protection board. Contact Sika for approval of alternate protection boards.

2.9 DRAINAGE MAT

A. Dimpled core polystyrene drainage mat with a non-woven (420) and woven (720) polypropylene filter fabric bonded to the topside of the mat, and a bonded protection sheet on the underside of the mat. To be installed between the waterproofing membrane and extruded polystyrene insulation. Drainage mat to be Sika Drainage Mat 420 or 720.

B. Geonet polypropylene composite drainage mat with a non-woven polypropylene filter fabric bonded to the topside of the mat, and a bonded protection sheet on the underside of the mat. To be installed between the waterproofing membrane and extruded polystyrene insulation. Drainage mat to be Sika Drainage Mat 1000.

C. Impermeable dimpled polystyrene drainage perforated core with a bonded to a root resistant non-woven polypropylene filter fabric on the top side and non-woven polypropylene membrane protection fabric on the bottom side. The core is installed dimpled side down to allow water retention within the cups. Excess water is collected and conveyed to a proper collection system, helping to control drainage flow. To be installed between the

waterproofing membrane and extruded polystyrene insulation. Drainage mat to be Sika Drainage Mat GRS.

2.10 EXTRUDED POLYSTYRENE INSULATION

A. Extruded polystyrene foam board insulation, either flat stock or tapered, meeting the requirements of ASTM 578 Type VI (40 psi – stone ballast or pavers in sand bed/direct application), Type VII (60 psi – concrete pavers on pedestals), or Type V (100 psi – superimposed loads). Insulation shall be Sarnatherm XPS by Sika Corp.

2.11 FILTER FABRIC

A. Non-woven needle-punched polyester UV-stabilized mat, 3 oz./sq.yd., used between the extruded polystyrene insulation and overburden. Filter fabric shall be Sika 120 Fleece by Sika Corp.

2.12 SPRAY EQUIPMENT

A. Use Sikalastic® 320 SG

B. Graco GH 833 Big Rig or Titan Hydra Pro IV airless pump.

For Graco GH 833 Bare:
- (PN 287915) - 1.5" Solvent-Resistant Siphon Kit
- (PN 277253) - 1/2" Graco High Pressure Hose (4000 psi)
- (PN 277249) - 1/4" x 3' Graco High Pressure Whip (4000 psi)
- (PN LTX535) - Graco 535 Spray Tip
- (PN 287020) - Graco 15" Tip Extension Wand
- (PN 246468) - Graco Flex Plus Gun

For Titan Hydra Pro IV with 1” pick up hose:
- (PN 500450050) - 50’ ½” airless hose
- (PN 500450010) - 100’ ½”airless hose
- (PN 316-533) - 6 foot ¼” whip hose
- (PN 0550070) - S-5 airless spray gun
- (PN 662-535) - Airless spray tip
- (PN 310-390) - 3’ extension with swivel
- (PN 814-003) - 1/4” to 1/2” hose fitting
- (PN 815-005) - 3/8” to 1/2” manifold to hose fitting

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verify that surfaces and conditions are ready to accept the Work of this section. Notify Architect in writing of any discrepancies. Commencement of the Work in an area shall mean Installer’s acceptance of the substrate.

B. Surfaces shall be sound, clean, and free of standing water, oil, grease, dirt, excess mortar or other contaminants. Fill voids, gaps, and spalled areas in substrate to provide an even plane. Strike masonry joints full flush.

## 3.2 SURFACE PREPARATION

A. Verify that the deck is clean and smooth, free of depressions, waves, or projections, and properly sloped to drains, valleys, eaves, scuppers, or gutters. Verify that all openings or penetrations through the intended substrate are secured back to solid blocking. Ensure all preparatory Work is complete prior to applying membrane.

B. Mechanical fasteners used to secure sheathing boards or penetrate sheathing boards shall be set flush with sheathing and fastened into solid backing.

C. All surfaces shall be blown clean using an air compressor to remove any remaining loose debris.

D. All cracks and voids greater than 1/16 inch shall be routed and caulked with a Sikaflex sealant. Allow to cure per waterproofing membrane manufacturer's technical data sheets prior to over-coating with the specified waterproofing membrane system. Green concrete cracks or joints can be sealed with Sikaflex 1a+.

E. At all inside corners, gaps or voids at the juncture of the deck and penetrations apply a minimum 3/4-inch fillet bead of Sikaflex sealant and allow to cure per waterproofing membrane manufacturer's technical data sheets prior to installing the waterproofing membrane system.

F. Sikaflex Sealants used in detailing can be over coated with Sikalastic 320 once tack free.

G. Membrane is self-terminating but membrane terminations can be established prior to project start-up and documented in shop drawings. Terminations can occur in raked-out mortar joints, saw cut terminations or under installed counter-flashing materials.

H. Use tape lines to achieve a straight edge detail.

## 3.3 SUBSTRATE PREPARATION

A. Acceptable substrates include concrete, concrete block, solid wood/plywood sheathing, and metal.

B. Structural Concrete:

1. Acceptable concrete substrates are limited to poured in place concrete decks.
2. Minimum deck thickness for structural concrete is 4 inches (10.2 cm).
3. Concrete surface to be light broom finish or equivalent.
4. Curing agents shall be checked for compatibility with specified waterproofing materials. Most curing agents shall be completely removed from the substrate by grinding, scarifying, or other mechanical means.

5. Concrete and masonry surfaces shall be low-pressure (5,000 psi or less) power-washed in accordance with ICRI Guideline No. 03732: Selecting and Specifying Concrete Surface Preparation for Sealers, Coatings, and Polymer Overlays to remove all dirt, debris or surface contamination that would compromise bonding of the specified waterproofing membrane system. Remove oil or grease with solvents, or detergent and water. Rinse surface clean of remaining cleaning agents.

C. Metal Decking:

1. Metal profile decks shall be sound and secured to purlins, bar joists, etc. A ½" thick thermal barrier shall be installed and secured over all metal profile decks in accordance with wind uplift requirements.

D. Metal Surfaces:

1. Exposed drain bowls, pipes, and other metal surfaces shall be cleaned by power tool cleaning (SSPC SP-3) to remove corrosion deposits back to a clean, bright metal followed by a solvent wipe prior to application of the specified primer.

3.4 PRIMING

A. Metal

**1.** Apply Sikalastic PF Lo-VOC primer for metal surfaces. To clean and prepared drain bowls and other metal surfaces by brush or roller at the application rate shown on the technical data sheet to achieve an overall wet film thickness of 8 mils. **High porosity and roughness of the substrate will decrease coverage rates.**
2. Allow to cure and dry in accordance with manufacturer's technical data sheets.

B. PVC

1. Apply Sikaflex 449 Primer to clean and prepared PVC surfaces by brush or roller at the application rate of 100-150 SF/gal. **High porosity and roughness of the substrate will decrease coverage rates.**
2. Allow to cure and dry in accordance with manufacturer's technical data sheets.

3.5 MEMBRANE REINFORCEMENT

A. Reinforcement of Cracks, Plywood and Cover Board Joints/Seams, and Base/Curb Flashing Transitions:

1. For all locations where the specified membrane system is to be applied directly to the substrate surface, reinforcement of cracks and joints prior to applying the specified membrane system is conditional on the terms agreed to in a given warranty.
2. For all horizontal-to-vertical transitions, provide a ¾" x ¾" Sikaflex polyurethane sealant cant.

3. Back roll reinforcement to fully embed reinforcement into the wet liquid polyurethane membrane. Add more liquid membrane as needed to fully embed the reinforcement.
4. Ensure reinforcement is not in tension during embedment.

## 3.6 COLD FLUID APPLIED MEMBRANE APPLICATION

A. Install waterproofing membrane system in accordance with current technical data sheets and in accordance with warranty guideline requirements.

B. Apply base embedment coat to horizontal deck and vertical wall surfaces by brush or with 1/2 inch – 3/4 inch nap roller to achieve a continuous and uniform minimum wet film thicknesses as specified in warranty guideline requirements.

C. Immediately lay specified conformable reinforcement into the wet base embedment resin coat.

D. Apply pressure to the membrane reinforcement with a roller as appropriate to fully embed and saturate the membrane reinforcement into liquid waterproofing material. Remove air pockets from under the membrane by rolling them out.

E. Apply additional liquid material as required to ensure desired millage and the membrane reinforcement is fully embedded and has conformed to the substrate without tenting or visible pinholes.

F. Overlap sheets of Fleece membrane reinforcement 3 inches at side laps and 6 inches at end laps.

G. Extend membrane reinforcement vertically at adjacent wall surfaces in accordance with project details and specifications.

H. When using polyester fleece reinforcement, immediately apply the resin top coat wet-on-wet when Sikalastic 320 is mixed with water. If Sikalastic 320 is not mixed with water, apply reinforced system in two separate coats with 16-24 hours in between coats. DO NOT mix Sikalastic 320 SG with water when using an airless sprayer and/or pump. This could cause material to cure inside the pump.

I. Apply top coat by nap roller or brush to achieve a continuous and uniform minimum wet film thickness as specified in warranty guideline requirements.

J. Install all flashings in accordance with manufacturer’s construction details.

## 3.7 PARAPET AND WALL FLASHINGS

A. Clean, prepare and prime if necessary substrate surfaces ready to receive membrane.

B. All parapet, wall, and curb flashings shall be provided with a Sikaflex sealant cant bead membrane application.

C. Terminate waterproofing membrane system at raked-out mortar joints, termination saw cut joint, or under installed counter-flashing materials. Seal all mortar joints and saw cut joints with Sikaflex polyurethane sealant.

D. Install metal counter flashings in accordance with details.

3.8 DRIP EDGES AND OTHER METAL FLANGED FLASHING

A. Clean, prepare and prime metal flange surfaces ready to receive membrane.

B. Metal flanges are typically encapsulated between two membrane layers, usually by providing membrane flashing as a stripping ply over the metal flange, with the field or flashing membrane extending beneath the metal flange. It is also acceptable to install the stripping ply under the metal flange and extend the field or flashing membrane over the metal flange.

3.9 DRAINS

A. Clean, prepare and prime surfaces ready to receive membrane applications. Block drain bowl opening to avoid waterproofing material from entering the drainage system.

B. Remove strainer baskets and clamping rings from the drain bowl assembly. Temporarily replace the bolts back into assembly to avoid miss-alignment of connections after membrane applications are completed.

C. Extend the liquid waterproofing material and membrane reinforcement directly into the throat of the prepared drain.

D. Remove drain blocks and allow the waterproofing system to fully cure dry prior to re-connecting the drain bowl assembly.

3.10 PENETRATIONS

A. Clean, prepare and prime surfaces ready to receive membrane. Ensure that penetrations are secured to prevent movement.

B. Apply a cant bead of Sikaflex sealant the base of penetrations and apply Sikalastic 320 membrane vertically up the penetration 6-8 inches.

3.11 EXPANSION JOINTS

A. Expansion joints are formed separately from the Sikalastic 320 membrane.

3.12 APPLICATION OF PENETRATION SEALANT

A. Seal reglet-based membrane terminations, heads of exposed mechanical fasteners, around penetrations, duct work, electrical and other apparatus extending through the waterproofing membrane with specified penetration sealant.

## 3.13 FLOOD TEST

A. Upon the completion of the waterproofing membrane system and associated terminations the contractor shall flood test the system. Provide temporary stops and plugs for the drains within the test area. Flood test with a minimum 2 inches of water for no less than 24 hours.

B. Repair and retest the system for no less than 24 hours, report all deficiencies to the Architect. Remove temporary stops and plugs. No other Work is to proceed without prior direction from the Architect.

## 3.14 PROTECTION

A. Protect waterproofing Work from other trades until completion.

B. Stage materials in such a manner that avoids foot traffic over completed waterproofed areas.

C. Provide temporary walkways and platforms to protect completed Work from traffic and point loading during the application process.

D. Provide temporary membrane tie-ins and water-stops at the end of each workday and remove prior to commencement of work the following day.

## 3.15 PREFABRICATED COMPOSITE DRAINAGE AND PROTECTION MAT

A. Install the drainage mat when it can be followed immediately by the installation of the extruded polystyrene insulation and overburden. If the drainage mat cannot be installed within one week of membrane application, a protection course must be applied over the membrane to protect from other trade work and UV radiation.

B. Install the drainage mat on horizontal and vertical surfaces in accordance with the product data sheet. Lay out and position drainage mat and allow to lay flat. Cut and closely fit drainage mat to perimeter and penetrations.

C. Overlap filter fabric from adjacent sheets/rolls, and bond all fabric overlaps with Sikaflex sealant. Install supplemental filter fabric as required to ensure filter fabric continuity at flashing locations.

## 3.16 INSTALLATION OF EXTRUDED POLYSTYRENE INSULATION

A. Before the application of the insulation, any damage or deterioration to the composite drainage and protection mat shall be repaired.

B. Loose lay insulation in a staggered manner, and tightly butt together all insulation boards. The maximum acceptable joint width is 3/8 inch. Cut and closely fit insulation within ¾ inches to perimeter and penetrations.

C. For multi-layer insulation applications, the bottom layer shall be the thickest layer and shall be a minimum of 2 inches thick. Stagger the joints of each insulation layer.

D. Vertical insulation applications can be spot-adhered to the drainage mat and to additional insulation layers, utilizing an acceptable adhesive.

E. Do not install damaged insulation boards.

3.17 FILTER FABRIC

A. Install filter fabric on horizontal and vertical surfaces over the extruded polystyrene insulation in accordance with the product data sheet.

B. Lay out and position filter fabric. Cut and closely fit filter fabric to perimeter and penetrations, extending the filter fabric vertically to the height of the overburden.

C. Overlap filter fabric to achieve 6-inch side and end laps. As required, bond all fabric overlaps with Sikaflex sealant to ensure filter fabric continuity prior to and during overburden installation.

3.18 TRAFFIC-BEARING OVERBURDEN

A. Install traffic-bearing overburden, in accordance with specifications and as per Division 32.

3.19 CLEAN-UP

A. Work areas are to be kept clean, clear and free of debris at all times.

B. Do not allow trash, waste, and/or debris to collect on the work area. Trash, waste, and/or debris shall be removed from the work area on a daily basis.

C. All tools and unused materials shall be collected at the end of each workday and stored properly off of the finished waterproofed surface and protected from exposure to the elements.

D. Dispose of or recycle all trash and excess material in a manner conforming to current EPA regulations and local laws.

E. Properly clean the finished deck surface after completion, and make sure the drains and gutters are not clogged.

F. Clean and restore all damaged surfaces to their original condition.

**END OF SECTION 07 14 00**

# SECTION 07 16 13 - POLYMER MODIFIED CEMENT WATERPROOFING

## PART 1 - GENERAL

### 1.1 SUMMARY

A. Section Includes:.
   1. Waterproofing of all unexposed faces of Cut Indiana Limestone units as described in Section 04 43 13 – 3.05.

B. Related Sections:
   1. Section 03 30 00 – Cast-in-Place Concrete.
   2. Section 04 43 13 – Indiana Cut Limestone.

### 1.2 SUBMITTALS

A. Comply with Section 01 33 00.

B. Product Data: Submit manufacturer's technical bulletins and SDS on each product.

C. Submit list of project references as documented in this specification under Quality Assurance Article. Include contact name and phone number of the person charged with oversight of each project.

D. Quality Control Submittals:
   1. Provide protection plan of surrounding areas and non-work surfaces.

### 1.3 QUALITY ASSURANCE

A. Qualifications:
   1. Manufacturer Qualifications: Company with minimum 15 years of experience in manufacturing of specified products and systems.
   2. Manufacturer Qualifications: Company shall be ISO 9001:2015 Certified.
   3. Applicator Qualifications: Company with minimum of 5 years' experience in application of specified products and systems on projects of similar size and scope and is acceptable to product manufacturer.
      a. Successful completion of a minimum of 5 projects of similar size and complexity to specified Work.

B. Field Sample:

1. Install field sample at project site or other pre-selected area of building, as directed by architect/engineer.
2. Apply material in strict accordance with manufacturer's written application instructions.
3. Manufacturer's representative or designated representative will review technical aspects, surface preparation, application and workmanship.
4. Field sample will be standard for judging workmanship on remainder of project.
5. Maintain field sample during construction for workmanship comparison.
6. Do not alter, move or destroy field sample until work is completed and approved by architect/engineer.
7. Obtain architect/engineer written approval of field sample before start of material application, including approval of aesthetics, color, texture and appearance.

## 1.4 DELIVERY, STORAGE, AND HANDLING

A. Comply with manufacturer's ordering instructions and lead-time requirements to avoid construction delays.

B. Deliver materials in manufacturer's original, unopened, undamaged containers with identification labels intact.

C. Transport and store in unopened containers and keep in clean, dry condition protected from rain, dew and humidity. If dry onsite storage of bags is unavailable or if project is located in a very wet, humid climate, purchase product in manufacturer's packaged metal pails.

D. Do not stack bags more than two pallets high.

E. Do not allow MasterEmaco® A660 modifying admixture (formerly Acryl 60) to freeze.

## 1.5 PROJECT CONDITIONS

A. Environmental Requirements:

1. Do not apply in rain or when rain is expected within 24 hours. Do not apply above 90 degrees F (32 degrees C) or below 40 degrees F (4 degrees C) or when temperatures are expected to fall below 40 degrees F (4 degrees C) within 24 hours. For hot and cold temperature applications, store materials and water at 50 degrees F (10 degrees C) to 70 degrees F (21 degrees C) before use.

## PART 2 - PRODUCTS

### 2.1 MANUFACTURERS

A. Subject to compliance with requirements, provide products from the following manufacturer:

Master Builders Solutions
889 Valley Park Drive
Shakopee, MN 55379 USA
Customer Service: 800-433-9517
Technical Service: 800-243-6739
Direct Phone: 952-496-6000
Website: www.master-builders-solutions.com/en-us

B. Substitutions: Comply with Section 01 25 00.

C. Specifications and drawings are based on manufacturer's proprietary literature from Master Builders Solutions. Other manufacturers shall comply with minimum levels of material, color selection, and detailing indicated in specifications or on drawings. Architect will be sole judge of appropriateness of substitutions.

### 2.2 MATERIALS

A. A portland-cement based coating for concrete and masonry that resists both positive and negative hydrostatic pressure and is breathable, allowing interior moisture to escape without damaging coating.

1. Acceptable Product:
   a. Standard Coating: MasterSeal 581 by Master Builders Solutions.
   b. Plaster Mix: MasterSeal 584 by Master Builders Solutions.
   c. Foundation Coating: MasterSeal 582 by Master Builders Solutions.
   d. Waterstop: MasterSeal 590 by Master Builders Solutions.
   e. Polymer Modifier: MasterEmaco A 660 by Master Builders Solutions.

B. Performance Requirements: Provide patching material complying with the following requirements:

1. Compliances
   a. NSF/ANSI Standard 61 for potable water contact.
2. Service temperatures: Immersion, up to 140 degrees F (60 degrees C); cleaning water, up to 200 degrees F (93 degrees C); dry air, up to 220 degrees F (104 degrees C).
3. VOC: 0 lbs/gal (0 g/L) less water and exempt solvents.
4. Initial Set, minutes at 70 degrees F (21 degrees C), 50 percent relative humidity: 10 minutes per lab method.
5. Final Set, minutes at 70 degrees F (21 degrees C), 50 percent relative humidity: 90 minutes per lab method.
6. Density (cured): 129 pounds per foot (2,080 kg/m) per lab method.

7. Positive resistance to hydrostatic pressure, hrs, at 200 psi (1.4 MPa), 461 head feet, air cured at 70 degrees F (21 degrees C) 50 percent relative humidity: 752 (No leakage, no softening) per CRD C 48, modified.
8. Negative resistance to hydrostatic pressure, hours, at 200 psi (1.4 MPa), 461 head feet, air cured at 70 degrees F (21 degrees C) 50 percent relative humidity: 664 (Limited dampness) per CRD C 48, modified.
9. Potable water (direct contact): Suitable approved per BS6920 (British standard), NSF Standard 61.
10. Water absorption, boiling water submersion at 24 hours: 3.6 percent per ASTM C 67 (Section 7.3).
11. Compressive strength, ASTM C 109:
    a. 7 days: 4,200 psi (29 MPa)
    b. 28 days: 6,030 psi (42 MPa)
12. Flexural strength, ASTM C 348:
    a. 7 days: 360 psi (2.5 MPa)
    b. 28 days: 1,027 psi (7 MPa)
13. Tensile strength, ASTM C 190:
    a. 7 days: 250 psi (2 MPa).
    b. 28 days: 440 psi (3 MPa).
14. Modulus of elasticity, ASTM C 469, 28 days: 2.72 x 10 to the 6th psi (1.87 x 10 to the 4th MPa).
15. Artificial weathering, hrs:
    a. Xenon Arc: 5,000 = No failure per ASTM G 26.
    b. Carbon Arc: 500 = No failure per ASTM G 23.
16. Adhesion strength, Test by tensile bond: 418 psi (2.9 MPa).
17. Artificial weathering, Atlas Type DMC weatherometer: No cracking, loss of adhesion, checking or other defect.
18. Freeze/thaw resistance, 200 cycles: No change per ASTM C 666 (Procedure B).
19. Salt spray resistance, 300 hours: No defect per ASTM B 117.
20. Carbon Dioxide (CO2), 1/16 inch (1.6 mm) per Lab Method Diffusion. Equivalent to 3/4 inch (19 mm) new concrete.
21. Permeance:
    a. Perms: 12 (0.10698) per ASTM E 96
    b. Metric permeability 18 x 10 to the 3rd resistance (water-vapor transmission) per Swedish standard SS-02-15-82.
22. Wind-driven rain, hrs: 8 = excellent per Fed. Spec. TT-P-0035 (Para 4.4.7).
23. Coefficient of thermal expansion in/in/degree F (mm/mm/degree C), at 28 days: 6.99 x 10 to the minus 6th (5 x 10 to the minus 7th) per ASTM C 531.
24. Impact strength (Gardener impact tester): No chipping per Fed. Spec. TT-P-0035 (Cement paints para. 3.4.8)
25. Hardness, (Barber Colemen Impressor) Requirement min = 30, max = 60 (para 4.4.9) Fed. Spec. TT-P-0035:
    a. 7 days: 35.
    b. 14 days: 47.
    c. 21 days: 52.

26. Abrasion resistance 3,000 L sand: Passed per Fed. Spec. TT-P-141B.
27. Reflectance ASTM D 2244 using Hunterlab D-25 meter:
    a. Gray MASTERSEAL 581: 64.2.
    b. White MASTERSEAL 581: 88.1.
28. Fungus resistance at 21 days: No growth; meets all requirements of Fed. Spec. TT-P-29B.
29. Surface burning characteristics per ASTM E 84:
    a. Flame Spread: 0.
    b. Smoke developed: 5.
30. Fire Propagation Flame spread: Index = 1.5, Class 1 per BS476: Part 6:1981, BS476: Part 7:1971.

2.3 MIXING

A. Mix material per manufacturer instructions allowing material to rest 10 minutes before remixing and application.

B. Color:
    1. White.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Waterproofing installer shall examine limestone units and notify Architect and General Contractor of any issues with the stone substrate that would preclude them from properly applying the waterproofing material. Proceeding with the application of waterproofing constitutes the contractor's acceptance of the stone substrate.

3.2 SURFACE PREPARATION

A. Ensure that substrates are sound and free of dust, dirt, laitance, paints, oils, grease, curing compounds and other contaminants.

B. Ensure substrate has properly cured. Concrete should obtain 80 percent of design strength. If efflorescence is present, mechanically remove it before proceeding. For extreme cases where this is not adequate, contact Technical Service.

C. Patch holes and cracks before installation.

D. Relieve hydrostatic pressure in concrete block with weep holes.

E. Roughen or brush blast extremely smooth surfaces to ensure good mechanical adhesion.

F. Do not apply to substrates with active water leaks or moving cracks; patch all leaking static cracks and holes with Waterstop. Repair any other nonmoving cracks or voids with the

appropriate MASTERSEAL repair product and repair all moving cracks or voids with appropriate sealant.

## 3.3 APPLICATION - GENERAL

A. Apply coating with manufacturer recommended brush or broom or equivalent stiff fiber brush or with textured spray equipment. Spray, back-brush, or broom applications of first coat to fill voids and achieve uniformity.

B. Completely dampen substrate with water before starting application. Do not saturate substrate. Keep substrate cool and damp throughout application.

C. Work first coat thoroughly into substrate to completely fill and cover voids, holes and nonmoving cracks.

D. Allow to cure 24 hours, then apply second coat and finish with vertical stroke.

E. On concrete block or masonry walls, allow 5 to 7 days before applying second coat to eliminate joint read through.

F. Allow coating to cure 7 to 10 days before immersion in water.

## 3.4 ABOVE GRADE WITH POSITIVE SIDE WATER PRESSURE APPLICATION

A. Typical Application:
   1. First Coat: 2 pounds per square yard (1.1 kg/sm) = 225 square feet per 50 pound bag (20.9 sm/22.7 kg bag).
   2. Second Coat: 1 pounds per square yard (0.54 kg/m2) = 450 square feet per 50 pound bag (41.8 sm/22.7 kg bag)
   3. Total: 3 pounds per square yard (1.6 kg/sm), cured nominal thickness of 1/16 inch (1.6 mm).

B. Application at Struck Joints:
   1. Spray and back-brush base coat of standard coating at 2 pounds per square yard (1.1 kg/sm) and allow it to cure for 5 to 7 days.
   2. Spray apply and back trowel topcoat of plaster mix at an application rate of 9 pounds per square yard (4.9 kg/sm).

## 3.5 BELOW GRADE INTERIOR APPLICATION

A. Typical Application:
   1. Total: 3 pounds per square yard (1.6 kg/sm), cured nominal thickness of 1/16 inch (1.6 mm).

B. Application at High Hydrostatic Conditions: Refer to Drawings.
   1. Spray and back-brush coat of standard coating at 4 pounds per square yard (2.2 kg/sm) waterproofing from positive side if possible.

## 3.6 BELOW GRADE EXTERIOR APPLICATION

A. Typical Application:
   1. Apply base coat of foundation coating at 2 pounds per square yard (1.1 kg/sm) and allow to cure for 5 to 7 days.
   2. After base coat properly cures, apply topcoat of plaster mix at 12 pounds per square yard (6.5 kg/sm). Provide steel trowel finish.

## 3.7 WATERPROOFING POTABLE WATER TANKS OR RESERVOIRS

A. Install standard coating as specified in Application - General instructions.

B. After standard coating has fully cured, wash down surface with saline solution (salt brine, one pound salt per one gallon water). Leave saline solution on entire surface for at least 24 hours. Rinse off saline solution completely. If needed, reapply saline solution until final rinse water is completely clean and clear.

## 3.8 WALL/FLOOR COVE DETAILING

A. Cut out intersection of floor/wall and install waterstop cove seal at wall and floor junction prior to application of base coat.

## 3.9 RIGID INSULATION APPLICATION

A. Fully coat insulation with coating and embed into still-wet coating already in place on wall. Follow manufacturer instructions for temporary support and curing.

B. Prepare above-grade portions of insulation board by roughening or removing surface skin and coating.

## 3.10 CLEANING

A. Clean waterproofing material from tools and equipment with water. Remove cured materials mechanically.

B. Clean up and properly dispose of debris remaining on Project site related to application.

C. Remove temporary coverings and protection from adjacent Work areas.

## 3.11 PROTECTION

A. Protect system from damage during construction.

END OF SECTION 07 16 13

# SECTION 07 18 16 - VEHICULAR TRAFFIC COATINGS

## PART 1 - GENERAL

### 1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

### 1.2 SUMMARY

A. Provide a polyurethane traffic coating system as specified and as indicated on the Drawings.

B. Related Work: The following items are not included in this Section and are specified under the designated Sections:

1. Section 03 30 00 – CAST-IN-PLACE CONCRETE.
2. Section 06 16 00 – SHEATHING.
3. Section 07 60 00 – FLASHING AND SHEET METAL.
4. Section 07 92 13 – ELASTOMERIC JOINT SEALANTS.
5. Section 22 14 26 – PLAZA DRAINS.

### 1.3 PERFORMANCE REQUIREMENTS

A. Cold fluid applied polyurethane traffic waterproofing system is intended to perform as a continuous barrier against liquid water and to flash or discharge to the incidental water. Membrane system shall accommodate movements of building materials as required with accessory sealant materials at such locations, changes in substrate, perimeter conditions and penetrations.

B. Installed waterproofing membrane/surfacing system shall not permit the passage of water and will withstand the anticipated traffic wear exposures in accordance with the most current revision of ASTM C957, “High-Solids Content, Cold Liquid-Applied Elastomeric Waterproofing Membrane with Integral Wearing Surface.”

C. Intent is to bridge and seal the following air and water leakage pathways and gaps:

1. Connections of the walls to the deck.
2. Piping, conduit, duct and similar penetrations.
3. All other air leakage and water intrusion pathways to building envelope connections.

### 1.4 SUBMITTALS

A. Submittals: Comply with project requirements for submittals as specified in Division 01.

B. Product Data:

1. Materials list of items proposed to be provided under this Section.
2. Manufacturer's specifications and other data needed to prove compliance with the specified requirements.
3. Drawings or catalog illustrations in sufficient detail to show installation and interface of the work of this Section with the work of adjacent trades.
4. Manufacturer's current recommended installation procedures.

C. Mock-Ups: Provide a mock-up on site to demonstrate workmanship and final appearance. Locate in an area acceptable to the Architect. Accepted mock-up may remain in place.

1.5 QUALITY ASSURANCE

A. Installer Qualifications:

1. Installer shall have at least three years of experience in installing materials of types specified and shall have successfully completed at least three projects of similar scope and complexity.
2. Installer shall designate a single individual as project foreman who shall be on site at all times during installation.

B. Field Adhesion Test Method: Use manufacturer's standard field adhesion test methods and methods to verify proper priming and surface preparation techniques required to obtain optimum adhesion. Evaluate and report results of field adhesion testing.

C. Waterproofing Terminology: Refer to ASTM D1079 and the Sikalastic Traffic Systems Applicator Manual for definitions of waterproofing terms related to this section.

1.6 PRE-INSTALLATION CONFERENCE

A. Prior to scheduled commencement of installation and associated work, conduct a meeting at the project site with the installer, architect/consultant, owner, manufacturer’s representative and any other persons directly involved with the performance of the Work. The Installer shall record conference discussions and to include decisions and agreements reached (or disagreements) and furnish copies of recorded discussions to each attending party. The main purpose of this meeting is to review foreseeable methods and procedures related to the Work.

1.7 REGULATORY REQUIREMENTS

A. Applicable Regulations: Comply with local code and requirements of authorities having jurisdiction. Do not exceed VOC regulations as established by the State in which they are being installed; including total VOC content, in grams per liter, for all system components (i.e. primers, adhesives, coatings, and similar items.)

1.8 DELIVERY, STORAGE AND HANDLING

A. Deliver materials to the job site in the manufacturer's unopened containers with all labels intact and legible at time of use. Record all product lot numbers and expiration dates Handle and store materials in accordance with manufacturer's recommendations with proper precautions to ensure fitness of material when installed.

1.9 WARRANTY

A. Warranty: Provide manufacturer’s standard warranty for each type of product. Include written testing documentation and test reports if requested by Architect.

PART 2 - PRODUCTS

2.1 MANUFACTURER

A. Basis-of-Design Manufacturer: Sika Corporation, 201 Polito Avenue, Lyndhurst NJ 07071. Toll Free 800-933-SIKA (7452), www.usa.sika.com. No substitutions without prior written approval by the Architect.

2.2 TRAFFIC COATINGS (SIKALASTIC 720-ONE SHOT VEHICULAR POLYURETHANE)

A. Vehicular Traffic Coating: Sikalastic 720-One Shot, Integrally Textured, fast curing, aliphatic polyurethane Traffic System applied in a single step application comprised of the following:

1. **Primer:**
   Sikalastic Primer 1C fast curing PU primer (for recoat applications only)
   Sikalastic 22 Lo-Mod FS- for bare concrete

B. Detailing: detailing cracks with Sikalastic 720 Base Coat following guidelines set forth in Sika DeckPro Traffic Systems Applicator Manual.

C. Single Coat Traffic System Applied Total Film Thickness:

1. Sikalastic 720-One Shot Polyurethane Membrane: One single coat application to 48 mils wet (WFT), 45 mils dry (DFT)

D. Aggregate:

1. Sikalastic 720-One Shot Aliphatic Polyurethane Coating is integrally textured for slip resistance. Additional aggregate not to be added.

E. Two-component integrally textured, fast curing, coating applied in one single coat application: Typical Physical properties complying with the following.

1. Sikalastic 720-One Shot (Aliphatic Polyurethane)

| | | |
|---|---|---|
| 2. | Pot Life | 20 minutes |
| 3. | Total Volume Solids (ASTM D2697) | 95% (including aggregate) |
| 4. | VOC Content (ASTM D2369) | 20.9 g/l |
| 5. | Tensile Strength (ASTM D2240) | 2400 +/- 100 psi |
| 6. | Elongation at Break (ASTM D412) | 800 +/- 50% |
| 7. | Tear Resistance (Die C, ASTM D624) | 300 +/- 25 pli |
| 8. | Shore A Hardness (ASTM D2240) | 90 +/- 5 |

Tests were performed with material and curing conditions at 75F and 50% relative humidity.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verify that surfaces and conditions are ready to accept the Work of this section. Notify Architect in writing of any discrepancies. Commencement of the Work in an area shall mean Installer's acceptance of the substrate.

3.2 PREPARATION

A. Substrates shall be clean, dry, sound and free of surface contaminants, with an open texture. Remove all traces of laitance, grease, oils, curing compounds, form release agents and foreign particles by mechanical means, such as shot blast, milling, grinding or scarifying as acceptable to the Architect. Blow surface free of all dust. If using compressed air ensure compressor is equipped with an oil and moisture trap. All projections, depressions and rough spots should be removed or dressed off to achieve a level surface prior to the application.

B. Concrete shall be cleaned and prepared to achieve a laitance and contaminant free, open textured surface by shot blast or equivalent mechanical means (CSP 3-4 per ICRI guidelines).

C. Plywood shall be clean and smooth, APA and exterior grade, not less than 1/2 inch thick, and spaced and supported according to APA guidelines. Seams should be sealed with Sikaflex 2c or 1a followed with a 4" wide detail coat with embedded Sikalastic Flexitape Heavy fabric tape reinforcement centered over the seams and flashed up onto the wall(s).

D. Metal shall be thoroughly cleaned by grinding or blast cleaning followed with a solvent wipe of Xylol, Xylene or Acetone and primed with a metal primer: Sikalastic EP Primer Rapid or Sikaflex 260 Primer.

3.3 PRIMING – DO NOT PROCEED WITH MEMBRANE WORK IF DECK IS OUTGASSING. CONDUCT A RUBBER MAT TEST (OR SIMILAR) TO CONFIRM NO MOISTURE OUTGASSING IS PRESENT.

A. Concrete (<4% moisture content by weight, measured with Tramex Concrete Moisture Encounter Meter) and Plywood:

1. Apply Sikalastic Primer at 280 sf/gal with a flat squeegee or roller and work well into the substrate to insure adequate penetration and sealing. Do not allow primer to collect/puddle in surface depressions. No mixing required. Apply using phenolic resin core roller or similar. Allow primer to cure a minimum of 45 minutes at 70°F and 50% RH or until tack free before applying Sikalastic 720-One Shot System. Refer to data sheet for more detailed information, or consult Sika for other primer options.

B. Concrete (<5% moisture content by weight, measured with Tramex Concrete Moisture Encounter Meter):

1. For concrete substrates with 5% maximum moisture content by weight, apply Sikalastic PF Lo-VOC primer at 200 sf/gal. with a flat squeegee or roller and work well into the substrate to ensure adequate penetration and sealing. Puddles are to be avoided. Premix both components. Sikalastic PF Lo-VOC Primer, Part "A" is white in color. Sikalastic PF Lo-VOC Primer, Part "B" is black in color.
2. In a separate mixing vessel, add the Sikalastic PF Lo-VOC Primer, Part "B" to the Sikalastic PF Lo-VOC Part "A". Mix thoroughly with a mechanical mixer (i.e.Jiffy Mixing Paddle) for 3 minutes. This mixture will appear as a grey color.
3. Allow primer to cure a minimum of 6 hours at 70°F and 50% RH or until tack free before applying second primer or base coat.
4. Refer to data sheet for more detailed information, or consult Sika for other primer options.

C. Concrete (4% to 6% moisture content by weight, measured with Tramex Concrete Moisture Encounter Meter):

1. For concrete substrates with 5% maximum moisture content by weight, apply Sikalastic MT primer at 175 sf/gal. with a flat squeegee or roller and work well into the substrate to ensure adequate penetration and sealing. Puddles are to be avoided.
2. For concrete substrates with >5% up to 6% maximum moisture content by weight, apply a second coat of Sikalastic MT primer at 175 sf/gal.
3. Premix both components. Sikalastic MT Primer, Part "A" is red in color. Sikalastic MT Primer, Part "B" is light amber in color.
4. Add the 1.5 gallon of Sikalastic MT Primer, Part "B" to the 3 gallons of Part "A" in the short filled Part "A" pail. Mix thoroughly with a mechanical mixer (i.e.Jiffy Mixing Paddle) for 3 minutes.
5. This mixture will appear as a red transparent color.
6. Allow primer to cure a minimum of 12 hours at 70°F and 50% RH or until tack free before applying second primer or base coat.
7. For concrete substrates with 5% maximum moisture content by weight, apply Sikalastic FTP LoVOC primer at 200 sf/gal. with a flat squeegee or roller and work well into the substrate to insure adequate penetration and sealing. Puddles are to be avoided.
8. For concrete substrates with >5% up to 6% maximum moisture content by weight, apply a second coat of Sikalastic FTP LoVOC primer at 200 sf/gal.

9. Premix both components.
10. Add the 5 gallon of Sikalastic FTP LoVOC Primer, Part “B” to the 10 gallons of Part “A”. Mix thoroughly with a mechanical mixer (Jiffy) for 3 minutes.
11. This mixture will appear as a green transparent color.
12. Allow primer to cure a minimum of 12 hours at 70°F and 50% RH or until tack free before applying second primer or base coat.
13. Refer to data sheet for more detailed information, or consult Sika for other primer options.

D. Metal: Metal shall be thoroughly cleaned by grinding or blast cleaning followed with a solvent wipe of Xylol, Xylene or Acetone and primed with a metal primer: Sikalastic EP Primer or Sikaflex 260 Metal Primer. Consult manufacturer for other primer options.

3.4 DETAILING

A. Non-Structural Cracks up to 1/16 inch: Apply a detail coat of Sikalastic 720-One Shot at 23 mils wet 4” wide and centered over the crack. Allow detail coat to become tack free before overcoating.

B. Cracks and Joints over 1/16 inch up to 1 inch: Rout and seal with Sikaflex 2c Sealant and allow to skin over and cure minimum of 24 hrs. Apply a detail coat of Sikalastic 720-One Shot at 23 mils wet, 4” wide and centered over crack/sealant. Allow detail coat to become tack free before overcoating.

C. Fabric Reinforcement: An optional 3” or 6” wide Sikalastic Flexitape Heavy fabric strip may be embedded within the wet detail coat. Flexitape width shall be chosen such that a minimum of 1” tape is embedded on either side of the crack/joint. Apply additional coating as required to fully embed the Flexitape in the coating.

D. Joints over 1 inch: Treat as expansion joints and brought up through the Sikalastic Traffic System and sealed with Sikaflex Sealant or with an engineered expansion joint manufactured by Sika Emseal.

3.5 SINGLE COAT SIKALASTIC 720-ONE SHOT ALIPHATIC POLYURETHANE

A. Sikalastic 720 -One Shot Integrally Textured single coat application:

1. After opening Part A place lid face up on ground, remove aggregate insert and place insert on pail lid. Premix Part A component using a low speed (400–600 rpm) mechanical mixer and Jiffy Paddle (5-50 gal. model) at slow speed to obtain uniform color. Slowly add aggregate from tray into Part A and continue to mix, making sure to scrape the bottom and sides of the pail, ensure aggregate is fully mixed within the Part A .
2. Slowly pour Part B into Part A while mixing so that the Part B gets pulled into the vortex of the mixing paddle. Scrape the sides of the container, Mix the combined material thoroughly for 3 minutes until a homogenous mixture and uniform color is obtained. Use care not to prevent whipping air into the material while mixing - use a slow and methodical mixing approach.

3. Apply a single coat of the mixed Sikalastic 720-One Shot with a 3/8" notched squeegee or trowel at the recommended coverage rate of 33 sf/gal and backroll using a phenolic resin core roller. Extend single coat over entire area including previously detailed cracks and control joints. Coverage rate of 33 sf/gal should provide a wet film thickness yield of 48 mils.

Allow coating to cure a minimum of 36 hours before opening to vehicular traffic. Consult Sika for other weather related recommendations.

## 3.6 CLEANING

A. Remove uncured materials from tools or other surfaces with an approved solvent. Remove cured materials by mechanical means.

B. Leave finished work and work area in a neat, clean condition without evidence of spillovers onto adjacent areas.

**END OF SECTION 07 18 16**

# SECTION 07 92 00 – CAULKING

## PART 1 – GENERAL

### 1.00 – RELATED SECTIONS

A. Drawings and Division 1 Specification sections apply to work specified in this section.

### 1.01 – SCOPE OF THE WORK

A. In general, the work of this Division includes all labor, materials, equipment and services necessary to provide the caulking work indicated on the drawings and/or specified herein.

B. This Contractor shall caulk and seal all exterior and interior joints shown and/or called for on the Drawings to be caulked, including all joints of all new metal with all other materials, all joints of new doors and windows with all other materials; all construction joints, and in general, all joints as required to make the new building addition air and watertight.

C. Caulking of any precast concrete wall panels has been specified in Section 03 45 00.

### 1.02 – SUBMITTALS

A. Submit samples of all materials specified herein, in quantity directed for approval. Sealant samples shall be in the actual color proposed for use. Caulk a section of joint (at all job conditions requiring caulking) at least 7 days prior to start of caulking for review by the Architect. When approved, this sample shall be used as a standard of comparison for the remainder of the work.

### 1.03 – PRODUCT DELIVERY, STORAGE AND HANDLING

A. Deliver sealant to the job site in sealed containers, each bearing manufacturer's name and product designation.

## PART 2 – PRODUCTS

### 2.01 – MATERIALS

A. Caulking to be Tremco "DYMERIC **511**" by Tremco Manufacturing Company. Various colors as selected by Architect.

B. Primer: where required, shall be used as recommended, in writing, by the manufacturer. The primer shall have been tested for non-staining characteristics and durability on samples of actual surfaces to be sealed.

1. Tremco #6 primer shall be used on all metal surfaces.

2. Tremco #1 primer shall be used on all masonry and concrete surfaces.

C. Back-up materials and performed joint filler shall be non-staining, compatible with sealant and primer, and of a resilient nature, such as closed cell polyethylene rod, closed cell urethane or neoprene rod, or elastomeric tubing or rod (Neoprenem butyl, or EPDM). Materials impregnated with oil, butumen or similar materials shall be used. Size and shape shall be as indicated by joint details on Drawings and shall be as recommended by sealant manufacturer in writing. Sealant shall not adhere to back-up material.

D. Solvents, cleaning agents and other accessory materials shall be as recommended by sealant manufacturer in writing.

## PART 3 – EXECUTION

### 3.01 – WORKMANSHIP

A. General: All work shall be in strict accordance with Technical Data Sheets latest edition, issued by Tremco Manufacturing Company.

1. Qualified applicators shall apply sealants in conformance with manufacturer's written directions.

2. Examine all surfaces and report all conditions not acceptable.

3. Apply sealant under pressure with hand or power actuated gun or other appropriate means. Gun shall have nozzle of proper size and provide sufficient pressure to completely fill joints as designed. All joint surfaces shall be tooled to provide the contour as indicated.

B. Preparation: Thoroughly clean all joints, removing all foreign matter such as mortar, dust, oil, grease, water, surface dirt and frost. Sealant must be applied to the base surface. Previously applied paint or primer must be entirely removed. Porous materials such as concrete or masonry should be cleaned where necessary by grinding, blast-cleaning, mechanical abrading, acid washing or combination of these methods to provide a clean, sound base surface for sealant adhesion.

1. Laitance shall be removed by acid-washing, grinding or mechanical abrading.

2. Form oils shall be removed by blast-cleaning.

3. Loose particles present or resulting from grinding, abrading or blast-cleaning shall be removed by blowing out joints with oil-free compressed air (or vacuuming) prior to application of primer or sealant.

4. Non-porous surfaces, such as metal and glass, shall be cleaned either mechanically or chemically. Protective coatings on metallic surfaces shall be removed by a solvent that

leaves no residue. Solvent shall be used with clean cloths or lintless paper towerls. Do not allow solvent to air dry without wiping. Wipe dry with clean, dry cloth or lintless paper towels.

5. Prior to installing any caulking or joint backing materials, inspect surfaces which are to receive these materials and notify Architect and General Contractor in writing of any existing conditions or surface contamination that will interfere with, or prevent a first-class satisfactory caulking installation. Do not proceed with installation until such defects or conditions have been corrected. Starting installation work shall imply acceptance of surfaces to receive caulking materials.

C. Joint Preparation

1. Joint areas to be protected with masking tape strippable films shall be cleaned before application of tape or film.

2. For joints in concrete or masonry: depth of the sealant may be equal to the width in joints up to ¼" wide. For joints ½" to 1"wide: depth shall be ½". For expansion and other joints 1 to 2" wide: depth shall not be greater than ½ the applied sealant width.

3. For joints in metal and other non-porous surfaces: sealant depth shall be a minimum of ½ the applied sealant width and shall in no case exceed the applied sealant width.

4. Joints to receive sealant, back-up material or pre-formed joint filler shall be cleaned out, raked to full width and depth as required.

5. Joints shall be of sufficient width and depth to accommodate specified back-up material or performed joint filler and sealant.

D. Application: Install back-up material or joint filler, of type and size specified, at proper depth to provide sealant dimensions as detailed. Back-up material shall be of suitable size and shape; and compressed 25 to 50% to fit joints as required. Sealant shall not be applied without back-up material and/or bond breaker strip. When using back-up tubes avoid lengthwise stretching. Tube or rod shall not be twisted or braided. Joint filler shall be hand packed, WITHOUT PUNCTURING.

1. Apply masking tape, where required, with primer as recommended by sealant manufacturer.

2. Follow sealant manufacturer's instructions regarding mixing (if required), surface preparation, priming, application life, and application procedure.

3. Apply, tool and finish sealant as required. When tooling sealants, use tooling solution recommended by sealant manufacturer. Remove masking tape immediately after joints have been tooled.

4. Clean adjacent surfaces of sealant as work progresses. Use solvent or cleaning agent as recommended by sealant manufacturer. All finished work shall be left in a neat, clean condition.

3.02 – GUARANTEE

A. Submit written guarantee covering all Tremco "DYMERIC 511" caulking, labor, materials and items of equipment furnished and installed as part of the work of this Division for a period of three (3) years from date of final payment. Guarantee against color change, failure of adhesion and cohesion and weathertightness of installation. Should any defects appear within the said period, they shall be remedied and made good by the Contractor furnishing and installing same, without expense to the Owner.

**END OF SECTION 07 92 00**

# SECTION 08 36 00 – SECTIONAL OVERHEAD DOORS

## PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Commercial Sectional Overhead Doors.

1.2 RELATED SECTIONS

A. Drawings and Division 1 Specification sections apply to work specified in this section.

1.3 REFERENCES

A. ASTM International (ASTM):
   1. ASTM A 653/A 653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
   2. ASTM C 518 - Standard Test Method for Steady-State Thermal Transmission Properties by Means of the Heat Flow Meter Apparatus.
   3. ASTM E 283 - Standard Test Method for Determining the Rate of Air Leakage Through Exterior Windows, Curtain Walls, and Doors Under Specified Pressure Differences Across the Specimen.

1.4 SUBMITTALS

A. Submit under provisions of Section 01 33 00.

B. Product Data: Manufacturer's data sheets on each product to be used, including:
   1. Preparation instructions and recommendations.
   2. Storage and handling requirements and recommendations.
   3. Installation methods.

C. Performance Standards: Provide test data validating the following:
   1. Door Section: Gloss retention, fade resistance, FDA compliance, cold crack performance, load to rebound, dent resistance impact.
   2. Drive Train: Spring cycle life, track, hinges, rollers, cable assembly, cable strength.
   3. Door Assembly: Thermal performance, deflection, wind load.

D. Shop Drawings:
   1. Provide drawings indicating track details, head and jamb conditions, spring shafts, anchorage, accessories, finish colors, patterns and textures, operator mounts and other related information.
   2. Regulatory Requirements and Approvals: Provide shop drawings in compliance with local Authority having Jurisdiction (AHJ).

E. Certifications:
   1. Submit manufacturer's certificate that products meet or exceed specified requirements.
   2. Submit installer qualifications.

F. Selection Samples: For each finish product specified, two complete sets of color chips representing manufacturer's full range of available colors and patterns.

G. Verification Samples: For each finish product specified, two samples, minimum size 6 inches (150 mm) square, representing actual product, color, and patterns.

1.5 QUALITY ASSURANCE

A. Installer Qualifications: Utilize an installer having demonstrated experience on projects of similar size and complexity and trained and authorized by the door manufacturer to perform the work of this section.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Store products in manufacturer's unopened packaging until ready for installation.

1.7 PROJECT CONDITIONS

A. Maintain environmental conditions (temperature, humidity, and ventilation) within limits recommended by manufacturer for optimum results. Do not install products under environmental conditions outside manufacturer's recommended limits.

1.8 WARRANTY

A. Provide manufacturer’s standard door warranty against defects in material and workmanship, as further described in Part 2 of this Section.

B. Manufacturer’s Warranty for ControlHoist 2.0 Commercial Operators: Provide manufacturer’s standard warranty.
   1. Raynor warrants the electrical operator and component parts for two (2) years against defects in material and workmanship.

## PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Acceptable Manufacturer: Raynor, which is located at: 1101 East River Rd. P. O. Box 448; Dixon, IL 61021-0448; Toll Free Tel: 800-4-RAYNOR; Tel: 815-288-1431; Fax: 888-598-4790; Email: request info (thegarage@raynor.com); Web: www.raynor.com

B. Requests for substitutions will be considered in accordance with provisions of Section 01 25 00.

2.2 SECTIONAL DOORS & OPERATORS

A. ThermaSeal as manufactured by Raynor Garage Doors:
   1. DOORS:
      a. Operation:
         1) Provide doors designed for electric motor operation.
      b. Jamb Construction:
         1) Varies, see Architectural Drawings and Details.
      c. Structural Performance Requirements:
         1) Wind Loads: Uniform pressure of 15psf.
      d. International Energy Conservation Code (IECC) Requirements:
         1) Air Infiltration – Maximum air leakage of 0.4 cfm/ft2 is required. Testing shall be in accordance with DASMA 105 test procedure.
         2) Raynor ThermaSeal TM200 and TM220 provide an air leakage rating of 0.12 cfm/ft2 with optional IECC Compliance Package.
         3) Raynor ThermaSeal TM175 provides an air leakage rating of 0.22 cfm/ft2 with optional IECC Compliance Package.
         4) Raynor ThermaSeal TM200 and TM220 provide an installed U-factor of 0.19.
         5) Raynor ThermaSeal TM175 provides an installed U-factor of 0.21.

   2. SECTIONS:
      a. ThermaSeal TM200C:
         1) Sections shall be pressure bonded to injected polyurethane foam insulated core. Hinge reinforcement strips shall be 20-gauge galvanized steel, located within section interior. End stiles to be 20-gauge galvanized steel.
         2) Material: Steel sandwich construction, 2 inches (51 mm) thick, roll formed from commercial quality, hot-dipped galvanized (G40 exterior) steel complying with ASTM A 653. Exterior skin shall be constructed of 26-gauge steel and interior skin shall be 26-gauge steel with embossed stucco texture.
         3) Finish: Exterior skin to have two coats of paint, one primer coat and one finish coat in color to be selected from the following standard colors:
            a) Color: Almond
            b) Color: Frost White
            c) Color: Ivory
            d) Color: Desert Tan
            e) Color: Sandstone
            f) Color: Beige
            g) Color: Bronzetone
            h) Color: Brown
            i) Color: Sepia
            j) Color: Battleship Grey

k) Color: Charcoal
l) Color: Slate
m) Color: Black

4) Insulation: Expanded polyurethane with R-value of 18.

3. WINDOWS:
   a. Provide three (3) windows in Rectangular Two-Piece Black Frame:
      1) Size: 24 inches by 8 inches (610 mm by 203 mm).
         a) Insulated, two panes of 1/8 inch (3.2 mm) thick tempered glass.
      2) Location: Locate all three windows in the same door section, which shall be the third section above the floor.
4. TRACK:
   a. Material: Hot-dipped galvanized steel (ASTM A 653), fully adjustable for adequate sealing of door to jamb or weatherseal.
   b. Configuration Type: Use Vertical Lift track installation wherever possible.
   c. Track Size: 2 inches (51 mm)
   d. Finish: Galvanized.

5. COUNTERBALANCE:
   a. Counterbalance System: Provided with aircraft-type, galvanized steel lifting cables with minimum safety factor of 5. Torsion Springs consisting of heavy-duty oil-tempered wire torsion springs on a continuous ball-bearing cross-header shaft.
      1) Spring Cycle Requirements: Standard 10,000 cycles.

6. HARDWARE:
   a. Hinges and Brackets: Fabricated from galvanized steel.
   b. Track Rollers: 2 inches (50.8 mm) diameter consistent with track size, with hardened steel ball bearings.
   c. Perimeter Seal: Provide complete weather-stripping system to reduce air infiltration. Weather stripping shall be replaceable.
      1) For bracket mounted doors provide climate seal or vinyl seal with aluminum retainer.
      2) For angle mounted doors provide angle clip-on seal.

7. ThermaSeal Limited Warranty: Raynor warrants the door sections against defects in material and workmanship, and deterioration due to rust-through for ten years from date of delivery to the original purchaser. Raynor also warrants the door sections against delamination of the insulation from the steel skins for ten years from date of delivery to the original purchaser. Window components are warranted against defects in material and workmanship for one year from date of delivery to the original purchaser. Raynor warrants all hardware and spring components against defects in material and workmanship for one year (or cycle life of the springs) from date of

delivery to the original purchaser. Additional Limited Warranty requirements in accordance with manufacturer's full standard limited warranty documentation.

B. OPERATOR MODEL:
   a. Raynor ControlHoist 2.0 Standard:
      1) Type: Jackshaft.
      2) Motor Horsepower Rating: Continuous 1/2 HP.
      3) Electrical Requirements: 115volt single phase.
      4) Duty Cycle: 30 cycles/hour or 300 cycles/day.
      5) Control Wiring: Solid state circuitry with provisions for connection of safety edge to reverse, external radio control hook-up and maximum run timer. Provisions for timers to close, monitored reversing devices, mid stop and lock bar sensor capability.
         a) Provide three button momentary contact "open-stop", constant pressure on close (can be changed to momentary to close).

## PART 3 EXECUTION

3.1 EXAMINATION

A. Do not begin installation until substrates have been properly prepared. Verify that site conditions are acceptable for installation of doors, operators, controls and accessories. Ensure that openings are square, flush and plumb.

B. If substrate preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.

3.2 PREPARATION

A. Clean surfaces thoroughly prior to installation.

B. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.

3.3 INSTALLATION

A. General: Install door, track and operating equipment complete with all necessary accessories and hardware according to shop drawings, manufacturer's instructions.

B. Lubricate bearings and sliding parts, and adjust doors for proper operation, balance, clearance and similar requirements.

3.4 PROTECTION

A. Clean installed products in accordance with manufacturer's instructions prior to Owner's acceptance. Remove and legally dispose of construction debris from project site.

B. Remove temporary coverings and protection of adjacent work areas. Repair or replace installed products damaged prior to or during installation.

C. Lubricate bearings and sliding parts, assure weather tight fit around door perimeter and adjust doors for proper operation, balance, clearance and similar requirements. Protect installed products until completion of project.

D. Touch-up, repair or replace damaged products before Substantial Completion.

**END OF SECTION 08 36 00**

# SECTION 09 90 00 – PAINTING

## PART 1 – GENERAL

### 1.00 – RELATED DOCUMENTS

Drawings and Division 1 Specification Sections apply to work of this section.

### 1.01 – DESCRIPTION OF WORK

A. Extent of painting work is shown on drawings and schedules, and as herein specified.

B. The work includes painting and finishing of interior & exterior exposed items and surfaces throughout project, except as otherwise indicated.

1. Surface preparation, priming and coats of paint specified are in addition to shop-priming and surface treatment specified under other sections of work.

2. The painting and finishing work includes all woodwork as specified in Sections 06 20 00 and 08 14 00.

C. "Paint" as used herein means all coating systems materials, including primers, emulsions, enamels, stains, sealers and fillers, and other applied materials whether used as prime, intermediate or finish coats.

D. Paint exposed surfaces whether or not colors are designated in "schedules", except where natural finish of material is specifically noted as a surface not to be painted. Where items or surfaces are not specifically mentioned, paint same as adjacent similar materials or areas. If color or finish is not designated, Architect and Owner will select these from standard colors available for materials systems specified.

E. Shop Priming: Unless otherwise specified, shop priming of ferrous metal items is included under various sections for structural steel, miscellaneous metal, hollow metal work, and similar items. Also, for fabricated components such as architectural woodwork, wood casework, and shop-fabricated or factory-built mechanical and electrical equipment or accessories. See specification Sections 06 20 00 and 08 14 00.

F. Pre-Finished Items: Unless otherwise indicated, do not include painting when factory-finishing or installer finishing is specified for such items as (but not limited to) acoustic materials, finished mechanical and electrical equipment including light fixtures, switchgear and distribution cabinets.

G. Concealed Surfaces: Unless otherwise indicated, painting is not required on surfaces such as walls or ceilings in concealed areas and generally inaccessible areas, foundation spaces, furred areas, utility tunnels, pipe spaces, duct shafts and elevator shaft.

H. Finished Metal Surfaces: Metal surfaces of anodized aluminum, stainless steel, chromium plate, copper, bronze and similar finished materials will not require finish painting, unless otherwise indicated.

I. Operating Parts and Labels: Moving parts of operating units, mechanical and electrical parts, such as value and damper operators, linkages, sinkages, sensing devices, motor and fan shafts will not require finish painting, unless otherwise indicated.

J. DO NOT PAINT ANY CODE-REQUIRED LABELS, SUCH AS UNDERWRITERS' LABORATORIES AND FACTORY MUTUAL OR AND EQUIPMENT IDENTIFICATION, PERFORMANCE RATING, NAME, OR NOMENCLATURE PLATE.

K. Visit site determine what painting will be required to present building within remodeled areas. Apply paint as specified below. In remodeled areas, verify conditions of existing surfaces which are to be painted.

## 1.02 – SUBMITTALS

A. Product Data: Submit manufacturer's technical information including paint label analysis and application instructions for each material proposed for use.

B. Samples: Submit samples for Architects review of color and texture only. Provide a listing of material and application for each coat of each finish sample.

1. On actual wood surfaces, provide two 4" x 8" samples of natural and stained wood finish. Label and identify each as to location and application.

## 1.03 – DELIVERY AND STORAGE

A. Deliver materials to jobsite in original, new and unopened packages and containers bearing manufacturer's name and label, and following information:

1. Name or title of material.
2. Fed. Spec. number, if applicable.
3. Manufacturer's stock number and date of manufacturer.
4. Manufacturer's name.
5. Contents by volume, for major pigment and vehicle constituents.
6. Thinning instructions.
7. Application instructions.
8. Color name and number.

## 1.04 – JOB CONDITIONS

A. Apply water-based paints only when temperature of surfaces to be painted and surrounding air temperatures are between 50 F (10 C) and 90 F (35 C), unless otherwise permitted by paint manufacturer's printed instructions.

B. Apply solvent-thinned paints only when temperature of surfaces to be painted and surrounding air temperatures are between 45 F (7 C) and 95 F (35 C), unless otherwise permitted by paint manufacturer's printed instructions.

C. Do not apply paint in snow, rain, fog or mist; or when relative humidity exceeds 85%; or to damp or wet surfaces, unless otherwise permitted by paint manufacturer's printed instructions.

## 1.05 – COLORS AND FINISHES

A. Paint surface treatments, and finishes, are indicated in "schedules" of the contract documents.

B. Colors are called out on the drawings.

C. Color Pigments: Pure, non-fading, applicable types to suit substrates and service indicated.

D. Paint Coordination: Provide finish coats which are compatible with prime paints used. Review other sections of these specifications in which prime paints are to be provided to ensure compatibility of total coatings system for various substrates. Upon request from other trades, furnish information on characteristics of finish materials proposed for use, to ensure compatible prime coats are used. Provide barrier coats over incompatible primers or remove and reprime as required. Notify Architect in writing of any anticipated problems using specified coating systems with substrates primed by others.

## 1.06 – MATERIAL QUALITY

A. Provide best quality grade of various types of coatings as regularly manufactured by acceptable paint materials manufacturer's identification as a standard, best-grade product will not be acceptable.

B. Proprietary Names used to designate colors or materials are not intended to imply that products of named manufacturers are required to exclusion of equivalent products of other manufacturers.

C. Federal Specifications establish minimum acceptable quality for paint materials. Provide written certification from paint manufacturer that materials provided meet or exceed these minimums.

D. Provide undercoat paint produced by same manufacturer as finish coats. Use only thinners approved by paint manufacturer and use only within recommended limits.

## PART 2 – PRODUCTS

### 2.01 – MANUFACTURERS

A. Provide paint materials as manufactured by one of the following:

1. Sherwin Williams
2. PPG
3. DuPont
4. Glidden
5. Pratt and Lambert
6. Benjamin Moore

### 2.02 – SCHEDULE OF PAINT FINISHES

A. Interior Finishes – (Sherwin Williams is used as a base in the following schedule)

1. All Gypsum Drywall

    a. Primer: ProMar 200 Zero V.O.C. Interior Latex Primer B28W02600
    b. Intermediate: Same as topcoat
    c. Topcoat: ProMar 200 Zero V.O.C. Interior Latex Egg-Shell B20-2600 Series

2. Ferrous Metal – Unprimed

    a. Primer: Kem Bond HS Universal Metal Primer B50 Series
    b. Intermediate: Same as topcoat
    c. Topcoat: Pro Industrial Water Based Alkyd Urethane Enamel Semi-Gloss B53-1150/2150 Series

3. Ferrous Metal – Pre – Primed

    a. Primer: Touch up with Kem Bond HS Universal Metal Primer B50 Series
    b. Intermediate: Same as topcoat
    c. Topcoat: Pro Industrial Water Based Alkyd Urethane Enamel Semi-Gloss B53-1150/2150 Series

4. Galvanized Metal

    a. Primer: Pro Industrial Pro-Cryl Universal Primer B66-1300 Series
    b. Intermediate: Same as topcoat
    c. Topcoat: Pro Industrial Water Based Alkyd Urethane Enamel Semi-Gloss B53-1150/2150 Series

5. Wood – Transparent Stain / Varnish

    a. Stain: Minwax Performance Series Tintable Wood Stain 250 VOC
    b. Sealer: Minwax Performance Series Fast-Dry Sanding Sealer
    c. Varnish: Minwax Performance Series Fast-Dry Oil Varnish

6. Wood – Painted Finish

    a. Primer: PrepRite ProBlock Interior-Exterior Latex Primer-Sealer B51-600 Series
    b. Finish Coat: Pro Industrial Water Based Alkyd Urethane Enamel Semi-Gloss B53-1150/2150 Series

7. Interior Masonry – Standard Paint

    a. Primer: Loxon Concrete & Masonry Primer/Sealer – LX02 Series
    b. Intermediate: Same as topcoat
    c. Topcoat: Pro Industrial Water Based Catalyzed Epoxy B73-300 Series

8. Interior Masonry – Urethane Paint

    a. Primer: Pro Industrial Heavy Duty Block Filler B42W00150 White
    b. Intermediate: Same as topcoat
    c. Topcoat: Pro Industrial Acrolon 100 Water Based Urethane B65-700 Series

B. Exterior Finishes - (Sherwin Williams is used as a base in the following schedule)

1. Galvanized Metal

    a. Primer: Pro Industrial Pro-Cryl Universal Primer B66-1300 Series
    b. Intermediate: Same as topcoat
    c. Topcoat: Sher-Cryl HPA High Performance Acrylic B66-300 Series Gloss

1. Ferrous Metal, Handrails and Ladders

    a. Primer: Kem Bond HS Universal Metal Primer B50 Series
    b. Intermediate: Same as topcoat
    d. Topcoat: Sher-Cryl HPA High Performance Acrylic B66-300 Series Gloss

2. Exterior Wood – Paint

    a. Primer: Exterior Latex Water Based Wood Primer B42W08141
    b. Intermediate: Same as topcoat
    c. Topcoat: A-100 Exterior Latex Flat – A6 Series

3. Exterior Wood Stain

    a. Topcoat: Two coats of Woodscapes Solid Color Stain – A15 Series

4. Exterior Precast, Tilt – Up and Poured in Place

    a. Primer: Loxon Concrete & Masonry Primer/Sealer – LX02 Series
    b. Intermediate: Same as topcoat
    c. Topcoat: A-100 Exterior Latex Flat – A6 Series

5. Exterior Masonry

    a. Filler: Loxon Acrylic Block/Surfacer – LX01
    b. Intermediate: Same as topcoat
    c. Topcoat: A-100 Exterior Latex Flat – A6 Series

## PART 3 – EXECUTION

### 3.01 – INSPECTION

A. Applicator must examine areas and conditions under which painting work is to be applied and notify Contractor in writing of conditions detrimental to proper and timely completion of work. Do not proceed with work until unsatisfactory conditions have been corrected in a manner acceptable to Applicator.

B. Starting of painting work will be constructed as Applicator's acceptance of surfaces and conditions within any particular area.

C. Do not paint over dirt, rust, scale, grease, moisture, scuffed surfaces, or conditions otherwise detrimental to formation of a durable paint film.

### 3.02 – SURFACE PREPARATION

A. General: Perform preparation and cleaning procedures in accordance with paint manufacturer's instructions and as herein specified, for each substrate condition.

B. Existing Surfaces: Preparation of existing surfaces to receive painting shall be Contractor's responsibility. In addition to preparation stated above perform the following work. Remove and replace any existing attachments to existing surfaces that require finishing if said attachments are not to be painted with wall. Wash existing surfaces. Remove all loose, blistered, or otherwise defective paint or varnish. Sand surfaces smooth where chipped pieces occur. Remove present finish to natural wood where required to obtain finish selected. Cut out and fill cracks or other defects to match adjoining surfaces.

C. Remove hardware, hardware accessories, machined surfaces, plates, lighting fixtures, and similar items in place and not to be finish-painted or provide surface-applied protection prior to surface preparation and painting operations. Remove, if necessary, for complete painting of items and adjacent surfaces. Following completion of painting of each space or area, reinstall removed items.

D. Clean surfaces to be painted before applying paint or surface treatments. Remove oil and grease prior to mechanical cleaning. Program cleaning and painting so that contaminants from cleaning process will not fall onto wet, newly painted surfaces.

E. Cementitious Materials: Prepare cementitious surfaces of concrete, concrete block, cement plaster and cement-asbestos board to be painted by removing efflorescence, chalk, dust, dirt, grease, oils, and by roughening as required to remove glaze.

F. Determine alkalinity and moisture content of surfaces to be painted by performing appropriate tests. If surfaces are found to be sufficiently alkaline to cause blistering and burning of finish paint, correct this condition before application of paint. Do not paint over surfaces where moisture content exceeds that permitted in manufacturer's printed directions.

G. Wood: Clean wood surfaces to be painted of dirt, oil, or other foreign substances with scrapers, mineral spirits, and sandpaper, as required. Sandpaper smooth those finished surfaces exposed to view and dust off. Scrape and clean small, dry, seasoned knots and apply a thin coat of white shellac or other recommended knot sealer, before application of priming coat. After priming, fill holes and imperfections in finish surfaces with putty or plastic wood-filler. Sandpaper smooth when dried.

H. Prime, stain, or seal wood required to be job-painted immediately upon delivery to job. Prime edges, ends, faces, undersides, and backsides of such wood, including cabinets, counters, cases, paneling.

I. Seal tops, bottoms, and cut-outs of unprimed wood doors with a heavy coat of varnish or equivalent sealer immediately upon delivery to job.

J. Ferrous Metals: Clean ferrous surfaces, which are not galvanized or shop-coated, of oil, grease, dirt, loose mill scale and other foreign substances by solvent or mechanical cleaning.

    1. Touch-up shop-applied prime coats wherever damaged or bare, where required by other sections of these specifications. Clean and touch-up with same type shop primer.

K. Galvanized Surfaces: Clean free of oil and surface contaminants with non-petroleum-based solvent.

L. Plaster Surfaces: Fill cracks and holes. After patch dries apply spot primer before applying prime coat. Give suction spots second coat of primer before applying finish coat.

M. Remove markings on ducts, piping and other materials placed by mechanical trades or seal. Responsibility of preventing markings from bleeding through subsequent paint films rests with Painting Contractor.

## 3.03 – MATERIALS PREPARATION

A. Mix and prepare painting materials in accordance with manufacturer's directions.

B. Store materials not in actual use in tightly covered containers. Maintain containers used in storage, mixing and application of paint in a clean condition, free of foreign materials and residue.

C. Stir materials before application to produce a mixture of uniform density and stir as required during application. Do not stir surface film into material. Remove film and, if necessary, strain material before using.

## 3.04 – APPLICATION

A. General: Apply paint in accordance with manufacturer's directions. Use applicators and techniques best suited for substrate and type of material being applied.

B. Apply additional coats when undercoats, stains or other conditions show through final coat of paint, until paint film is of uniform finish, color and appearance. Give special attention to ensure that surfaces, including edges, corners, crevices, welds, and exposed fasteners receive a dry film thickness equivalent to that of flat surfaces.

C. Paint surfaces behind movable equipment and furniture same as similar exposed surfaces. Paint surfaces behind permanently-fixed equipment or furniture with prime coat only before final installation of equipment.

D. Paint interior surfaces of ducts, where visible through registers or grilles, with a flat, non-specular black paint.

E. Paint back sides of access panels, and removable or hinged covers to match exposed surfaces.

F. Finish interior doors on tops, bottoms and side edges same as exterior faces, unless otherwise indicated.

G. Sand lightly between each succeeding enamel or varnish coat.

H. Omit first coat (primer) on metal surfaces which have been shop-primed and touch-up painted, unless otherwise indicated.

I. Scheduling Painting: Apply first-coat material to surfaces that have been cleaned, pretreated or otherwise prepared for painting as soon as practicable after preparation and before subsequent surface deterioration.

J. Allow sufficient time between successive coatings to permit proper drying. Do not recoat until paint has dried to where it feels firm, does not deform or feel sticky under moderate thumb pressure, and application of another coat of paint does not cause lifting or loss of adhesion of the undercoat.

K. Minimum Coating Thickness: Apply materials at not less than manufacturer's recommended spreading rate, to establish a total dry film thickness as indicated or, if not indicated, as recommended by coating manufacturer.

L. Mechanical and Electrical Work: Painting of mechanical and electrical work is limited to those items exposed in mechanical equipment rooms and in occupied spaces.

M. Prime Coats: Apply prime coat material, which is required to be painted or finished, and which has not been prime coated by others.

N. Recoat primed and sealed surfaces where there is evidence of suction spots or unsealed areas in first coat, to assure a finish coat with no burn-through or other defects due to insufficient sealing.

O. Completed Work: Match approved samples for color, texture and coverage. Remove, refinish or repaint work not in compliance with specified requirements.

## 3.05 – FIELD QUALITY CONTROL

A. The right is reserved by Owner to invoke the following material testing procedure at any time, and any number of times during period of field painting.

   1. Engage services of an independent testing laboratory to sample paint being used. Samples of materials delivered to project site will be taken, identifies and sealed, and certified in presence of Contractor.

   2. Testing laboratory will perform appropriate tests for any or all following characteristics: Abrasion resistance, apparent reflectivity, flexibility, washability, absorption, accelerated weathering, dry opacity, accelerated yellowness, recoating, skinning, color retention, alkali resistance and quantitative materials analysis.

B. If test results show that material being used does not comply with specified requirements, Contractor may be directed to stop painting work, and remove non-complying paint; pay for testing; repaint surfaces coated with rejected paint; remove rejected paint from previously painted surfaces if, upon repainting with specified paint, the two coatings are non-compatible.

## 3.06 – CLEAN-UP AND PROTECTION

A. Clean-Up: During progress of work, remove form site discarded paint materials, rubbish, cans and rags at end of each workday.

B. Upon completion of painting work, clean window glass and other paint-spattered surfaces. Remove spattered paint by proper methods of washing and scraping, using care not to scratch or otherwise damage finished surfaces.

C. Protection: Protect work of other trades, whether to be painted or not, against damage by painting and finishing work. Correct any damage by cleaning, repairing or replacing, and repainting, as acceptable to Architect. Provide "Wet Paint" signs as required to protect newly painted finishes. Remove temporary protective wrappings provided by others for protection of their work, after completion of painting operations.

D. At the completion of work of other trades, touch-up and restore all damaged or defaced painted surfaces.

**END OF SECTION 09 90 00**

SECTION 26 05 00 ELECTRICAL PROVISIONS

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Work included.

B. Temporary power and lighting.

1.2 RELATED SECTIONS

A. Applicable provisions of Division 0 and Division 1 shall govern work under this section.

B. All 26 00 00 electrical sections.

C. All other sections requiring electrical work.

D. Coordinate work under provision of Division One - General Requirements.

E. Temporary light and power Section of Division 1.

F. Perform all trenching and backfilling required in connection with the work of this section in strict accordance with the provisions of Division 2 of these Specifications.

1.3 REFERENCES

A. ANSI/NFPA 70 - National Electrical Code.

B. NECA "Standard of Installation."

C. All state and local codes.

1.4 REGULATORY REQUIREMENTS

A. Conform to requirements of ANSI/NFPA 70.

B. Furnish products listed and classified by Underwriters Laboratories, Inc as suitable for purpose specified and shown.

C. Conform to all local codes.

1.5 WORK INCLUDED

A. The mention of any article, operation or method requires that the Contractor shall provide same and work in complete accordance with the conditions stated. The contractor shall provide all material, labor, equipment, tools and transportation as needed to complete the project according to contract documents. This work includes all items to complete the electrical installation of all items indicated on the drawings, specified herein, and needed for a complete and operable facility but not specifically described in any other sections of this document. Among the items required are:
   1. Temporary power.
   2. Add circuit breakers to existing branch circuit panels for power and lighting.
   3. Complete branch circuit wiring system for lighting, motors, receptacles, junction boxes and similar uses.

4. Wall switches, receptacles, controls and similar items.
5. Complete conduit and inground box system for power and low voltage cameras.
6. Lighting fixtures.
7. Necessary equipment as shown on plans.
8. All items and appurtenances necessary, reasonably incidental or customarily included, even though each and every item is not specifically called out for or shown.

B. All work shall be installed in accordance with all state and local inspection authorities having jurisdiction together with the recommendations of the manufacturer whose equipment is to be supplied and installed under this contract.

C. Before submitting his bid, each bidder shall examine the drawings relating to his work and shall become fully informed as to the extent and character of the work required and its relation to other work in the building.

D. The contractor shall coordinate with the architect and establish exact locations of all materials and equipment to be installed. Consideration shall be given to construction features, equipment of other trades and requirements of the equipment.

E. Bids to include cost of all necessary permits and review fees.

1.6 QUALITY ASSURANCE AND WARRANTY

A. Qualifications of installers: For the actual fabrication, installation and testing of the work of this section, use only thoroughly trained and experienced personnel who are completely familiar with the requirements for this work and with the installation recommendations of the Manufacturers of the specified items.

B. Perform work to meet all codes.

C. Contractor shall warranty all parts and labor, except lamps, for one year. All lamps will be working at time of substantial completion. The contractor will replace any lamps not working at time of substantial completion.

1.7 SUBMITTALS

A. Within 14 days after award of contract, and before any of the materials of this section are delivered to the job site, submit eight complete sets to the Architect in accord with the provisions of Division One - General Requirements, the following:
1. Shop drawings:
    1 Light fixtures including lamp, ballast and/or driver data
    2 Lighting controls
    3 Wiring devices
    4 Any additional data requested
2. Show variations from contract documents.

3. The contractor shall not be relieved of responsibility for executing work in accord with contract documents, even though such drawings have been approved.

B. Affidavits: The contractor shall execute the standard State Electrical Affidavit of Compliance with the Electrical Code and safe practices. Notarize and file two copies with the owner before final payment is made.

C. Record Drawings: Day by day, as installed, details shall be transferred to a set of scale tracings prepared by the electrical contractor. The completed tracings shall be turned over to the Owner upon completion.

D. Operation and Maintenance Data: The contractor shall provide two sets in loose leaf binders a compilation of catalog data of each manufactured item of equipment used in the electrical work and shall present this compilation to the Architect before final payment is made. Descriptive data and printed installation, operating and maintenance instructions and recommended spare parts list for each item of equipment shall be included.

1.8 DELIVERY, STORAGE, AND HANDLING

A. Deliver, store, protect, and handle Products to site under provisions of Division One - General Requirements.

B. All materials shall be suitably stored and protected prior to installation and all work, including equipment of other trades, shall be protected after installation, during construction and prior to acceptance.

C. The contractor shall follow the manufacturer's directions completely in the delivery, storage and handling of equipment and materials. Equipment and materials shall be tightly covered and protected against dirt, water, chemical or mechanical injury and theft. At the completion of the work, fixtures, equipment and materials shall be cleaned and polished thoroughly and shall be in a condition satisfactory to the architect.

D. Replacements: In the event of damage, immediately make all repairs and replacements necessary to the approval of the Architect and at no additional cost to the Owner.

1.9 PROJECT CONDITIONS

A. The Electrical Contractor shall visit the site of construction to familiarize himself with the site and existing conditions so as to become fully informed as to extent and character of the work and its relationship to work of other trades and existing facilities.

B. Failure to provide for the cost of all contingencies in original bid will not be accepted as an excuse for extra payment.

1.10 ALTERNATIVES

A. The work of this section is affected by alternatives as described on the drawings and in section 01030 of these specifications. All alternates must be approved before bids are submitted.

B. The Electrical Contractor shall assume full responsibility for any alternate material or item proposed, regardless if it is approved or not. This responsibility will also include any and all costs of modifying feeders, branch circuits, ceilings, finishes, supports, structural, HVAC or any other incidental changes brought about by the alternate.

PART 2 PRODUCTS

2.1 MATERIALS

A. All equipment and materials shall be new, unless specifically noted otherwise and shall bear the Manufacturer's name, trademark and ASME, UL and/or other labels in every case where a standard

has been established for the particular item. Equipment shall be the latest approved design of the standard product of a manufacturer regularly engaged in the production of the required type of equipment and shall be supported by a service organization that is, in the opinion of the architect reasonably convenient to the site.

B. It is the responsibility of the Contractor to insure that items furnished fit the space available. He shall make field measurements to ascertain space requirements, including those connections, and shall furnish and install such sizes and shapes of equipment that, in the final installation, will suit the true intent and meaning of the Drawings and Specifications.

C. The Contractor shall furnish and install all equipment accessories, connections and incidental items necessary to complete the work and operations.

PART 3 EXECUTION

3.1 SURFACE CONDITIONS

A. Inspection: Prior to all work of this section, carefully inspect the installed work of all other trades and verify that all such work is complete to the point where this installation may properly commence.

B. Verify Conditions: Verify that all electrical installation may be made in complete accord with all pertinent codes, regulations, drawings and specifications.

C. Discrepancies: In the event of discrepancy, notify the Architect and/or Engineer immediately for clarification. Do not proceed until discrepancies have been fully resolved.

3.2 PREPARATION

A. Co-ordination of Work: The Contractor shall compare the electrical drawings and specifications with the drawings and specifications of other trades and report any discrepancies for changes necessary in the electrical work. The electrical work shall be installed in cooperation with other trades installing interrelated work. Before installation, the Contractor shall make proper provisions to avoid interferences. Changes required in the work of the Contractor caused by neglect to do so, shall be made at the Contractor's own expense.

B. Verification of Dimensions: The contractor shall visit the premises to verify all dimensions in the field; and shall advise the Architect and/or Engineer of any discrepancies before performing any work.

3.3 INSTALLATION

A. It is the intent of this Specification that the Owner is presented with a complete, operable facility and the Electrical Contractor shall include ALL costs in the original bid.

B. When the Architect has reviewed equipment submittals and given instructions to precede with the installation of items of equipment that require arrangements or connection different from those shown on the drawings, it shall be the responsibility of the contractor to install the equipment to operate properly and in accord with the intent of the drawings and specifications and shall provide any additional controllers, fittings or other equipment and materials that may be required. The contractor shall be responsible for the proper location of roughing in and connections by other trades. All changes shall be made at no increase in the contract amount or additional costs to other

trades.

C. The contractor shall support work and equipment plumb, rigid and true to line. The contractor shall study the general, structural, mechanical and electrical drawings, shop drawings and catalog data to determine how equipment, fixtures, conduit, etc. are to be installed and shall provide foundations, bolts, inserts, stands, hangers, brackets and accessories for proper support whether or not shown on the drawings.

D. All materials and equipment shall be installed in accord with the approved recommendations of the manufacturer, the best practices of the trade, and in conformance with contract documents. Should the contractor perform any work that does not comply with the manufacturer's directions, the contractor shall bear all costs arising in correcting deficiencies.

E. Interferences:
   1. Locations: Locations of conduit, equipment, fixtures, etc., shall be adjusted to accommodate the work to interferences anticipated or encountered. Devices specifically dimensioned on the drawings are critical dimensions and shall installed as shown. The contractor shall determine the exact route and locations of each conduit prior to installation.
   2. Right-of-way: Lines which pitch shall have right-of-way over those which do not pitch. For example, plumbing drains shall normally have right-of-way over lines whose elevations can be changed.

   3. Offsets: Offsets and changes in direction in conduit shall be made as required to maintain proper head room and not interfere with pitch of sloping lines whether or not indicated on the drawings.

F. Location of lighting switches, outlets and equipment as shown on drawings is approximate and exact locations will be verified.

G. Minor modifications in location of switches, outlets and equipment is considered incidental up to a distance of 10 feet with no additional compensation, provided necessary instructions are given prior to rough in.

H. Existing Conditions (if applicable):
   1. Move or remove electrical connections, devices or equipment necessary for completion of project and reconnect reused existing equipment or wiring removed to accommodate new work.
   2. Existing electrical equipment indicated on the drawings as being removed, reworked or relocated, are shown for guidance and estimating purposes only; additional work found in field or changes required but not shown shall be included in the base bid.
   3. Existing equipment that is removed shall remain the property of the owner. That which the owner does not want shall be disposed of by the electrical contractor.
   4. Work involving shutdown of present service and equipment now functioning in present area shall be done at such time as to provide the least amount of inconvenience to the owner at times established by the owner.
   5. Any existing electrical devices or equipment found at the job site, but not shown on the drawings shall be reconnected to spare circuit breakers in new panels, if such circuits are necessary for operation of the remodeled portion of the building.
   6. Locations and elevations of utilities have been obtained from utility maps or other sources and are offered as a general guide only without guarantee as to accuracy. The Contractor shall verify the location and elevation of utilities and their relation to the work before beginning work.

I. Temporary electric during construction:

1. Electrical contractor shall provide temporary power to a weatherproof panel or “turtle” or “spider” power distribution box with 3 phase, 4 wire, 50 Amp feed and a minimum of six 125V, 20 Amp GFCI protected receptacles. Provide circuit breaker and feed from existing panel. Temporary power shall be mounted inside a lockable enclosure and locked during off work hours.
2. Each contractor shall provide their own extension cord for portable lamps and tools.
3. Each contractor will make their own service arrangements for heavy duty equipment and tools or other voltages.
4. Owner to pay for cost of power used.
5. Electrical contractor shall be responsible for all aspects of the temporary power unless noted otherwise.
6. Remove temporary equipment when it is no longer required.

J. Unless otherwise specified, job finish painting will be done by the electrical contractor. Electrical equipment shall have a baked enamel finish. The electrical contractor shall restore damaged painted surfaces of electrical equipment to its original condition.

## 3.4 FIELD QUALITY CONTROL

A. Control circuits, branch circuits, feeders, motor circuits and transformers:
1. Megger check of phase-to-phase and phase-to-ground insulation levels. Do not megger check solid state equipment.
2. Continuity.
3. Short circuit.
4. Operational check.

B. Wiring devices: Test receptacles with Hubbell 5200, Woodhead 1750 or equal tester for correct polarity, proper ground connection and wiring faults.

## 3.5 CLEANING

A. The electrical contractor shall daily remove crates, boxes, metal cuttings and debris from the building. At the end of the project, all electrically related debris shall be removed and the building shall be left in a clean condition.

B. The electrical contractor shall leave all electrical equipment (interior and exterior), in a clean condition.

## 3.6 EQUIPMENT START-UP AND TESTING

A. The contractor shall instruct the owner's operating personnel during start-up and separate operating test of each major item of equipment. During the operating test, the contractor shall prove the operation of each item of equipment to the satisfaction of the architect. At least two days notice shall be given to the architect of equipment start-up and operating tests.

B. Should any item of the system fail to perform in an approved manner, this test shall be repeated until the operating test is approved by the architect.

C. Following the successful completion of operating tests by the Contractor, the owner shall have the privilege of making such tests as they may desire to ascertain in detail if any corrections are to be made to the system. At the end of the testing by the owner and architect, the architect shall direct the contractor in writing to make such corrections to the system as are within the scope of the

contract.

END OF SECTION

THIS PAGE LEFT INTENTIONALLY BLANK

SECTION 26 05 19 LOW-VOLTAGE ELECTRICAL POWER CONDUCTORS AND CABLES

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Building wire and cable.

B. Underground feeder and branch circuit cable.

C. Wiring connectors and connections.

1.2 RELATED SECTIONS

A. Section 26 05 33.13 - Conduit.

B. Section 26 05 33.16 - Boxes.

C. Section 26 05 53 - Identification.

1.3 REFERENCES

A. ANSI/NFPA 70 - National Electrical Code.

1.4 SUBMITTALS

A. Submit under provisions of Division One - General Requirements. Provide upon request.

B. Product Data: Provide for each cable assembly type.

C. Test Reports: Indicate procedures and values obtained.

D. Manufacturer's Installation Instructions: Indicate application conditions and limitations of use stipulated by product testing agency specified under Regulatory Requirements.

E. Contractor shall review and stamp all shop drawings prior to submitting them for review. Engineer will not review any submittals that have not been stamped by the contractor.

1.5 QUALIFICATIONS

A. Manufacturer: Company specializing in manufacturing products specified in this Section with minimum three years experience.

1.6 REGULATORY REQUIREMENTS

A. Conform to requirements of ANSI/NFPA 70 - National Electrical Code.

B. Furnish products listed and classified by Underwriters Laboratories, Inc. as suitable for purpose specified and shown.

C. Conform to all local codes.

1.7 PROJECT CONDITIONS

A. Verify that field measurements are as shown on Drawings.

B. Wire and cable routing shown on Drawings is approximate unless dimensioned. Route wire and cable as required to meet Project Conditions.

C. Where wire and cable routing is not shown, and destination only is indicated, determine exact routing and lengths required.

1.8 COORDINATION

A. Coordinate Work under provisions of Division One - General Requirements.

B. Determine required separation between cable and other work.

C. Determine cable routing to avoid interference with other work.

PART 2 PRODUCTS

2.1 MANUFACTURERS - BUILDING WIRE

A. Carol.

B. Triangle.

C. Southwire.

D. Substitutions: Under provisions of Division One - General Requirements.

2.2 BUILDING WIRE

A. Description: Single conductor insulated wire.

B. Conductor: Copper.

C. Insulation Voltage Rating: 600 volts.

D. Insulation: ANSI/NFPA 70, Type THW,RHW, TW, THHN/THWN, XHHW.

E Insulation: Material rated 75 degrees C minimum for branch circuits or feeders in wet and damp locations. Material rated 90 degrees C for feeders in dry locations.

2.3 MANUFACTURERS – BUILDING MC CABLE

A. Anixter Brothers, Inc.

B. AFC Cable Systems, Inc.

C. General Cable Company.

D. Rome Cable Corp.

E. Substitutions: Under provisions of Division One - General Requirements.

2.4 BUILDING CABLE: MC

A. Description: Multi-conductor metal clad cable, polypropylene tape, galvanized steel armor. Lightweight steel metal clad or steel metal clad cable on branch circuits. Steel metal clad fire alarm cable on fire alarm systems.

B. Conductor: Copper. Where type MC cable carries multiple phase conductors, the cable shall include an oversized neutral conductor (150 to 200%) or one neutral conductor per phase for multi phase systems.

C. Insulation Voltage Rating: 600 volts.

D. Insulation: ANSI/NFPA 70, Type THHN, material rated 90 degrees C minimum.

E Grounding Conductors: An insulated grounding conductor, sized per code, shall be cabled with the circuit conductors and identified as a ground.

F. Type MC cable may only be used in concealed areas inside walls, above drop ceilings or at structure or joists in high bay areas. MC cable shall not be used where exposed.

2.7 WIRING CONNECTORS

A. Split Bolt Connectors:
1. Burndy.
2. T&B.
3. Blackburn.
4. Panduit.
5. Substitutions: Under provisions of Division One - General Requirements.

B. Solderless Pressure Connectors:
1. Burndy.
2. T&B.
3. Blackburn.
4. Panduit.
5. Substitutions: Under provisions of Division One - General Requirements.

C. Spring Wire Connectors:
1. 3M.
2. Ideal.
3. T&B.
4. Blackburn.
5. Panduit.
6. Substitutions: Under provisions of Division One - General Requirements.

D. Compression Connectors:

1. Burndy.
2. T&B.
3. Blackburn.
4. Blackburn.
5. Substitutions: Under provisions of Division One - General Requirements.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify that interior of building has been protected from weather.

B. Verify that mechanical work likely to damage wire and cable has been completed.

3.2 PREPARATION

A. Completely and thoroughly swab raceway before installing wire.

3.3 WIRING METHODS

A. Concealed Dry Interior Locations: Use only building wire Type THHN/THWN or type MC cable. MC cable may only be used for branch circuits or fire alarm circuits in concealed locations.

B. Exposed Dry Interior Locations: Use only building wire Type THHN/THWN, XHHW insulation, in raceway.

C. Above Accessible Ceilings: Use only building wire Type THHN/THWN, XHHW insulation, in raceway or Type MC cable as allowed by code.

D. Wet or Damp Interior Locations: Use only building wire Type THHN/THWN, XHHW insulation, in raceway.

E. Exterior Locations: Use only building wire Type THHN/THWN, XHHW insulation, in raceway.

F. Underground Installations: Use only building wire Type THW, THHN/THWN, XHHW insulation, in raceway.

G. Use wiring methods indicated on Drawings.

3.4 INSTALLATION

A. Install products in accordance with manufacturers instructions.

B. Use solid or stranded conductors for feeders and branch circuits 10 AWG and smaller.

C. Use stranded conductors for control circuits.

D. Use conductor not smaller than 12 AWG for power and lighting circuits. Use oversized neutrals on electronic loads per code.

E. Use conductor not smaller than 14 AWG for control circuits.

F. Use 10 AWG conductors for 20 ampere, 120 volt branch circuits longer than 50 feet. Size conductors for 3% voltage drop for circuits longer than 100 feet.

G. Use 10 AWG conductors for 20 ampere, 277 volt branch circuits longer than 100 feet. Size conductors for 3% voltage drop for circuits longer than 200 feet.

H. Pull all conductors into raceway at same time.

I. Use suitable wire pulling lubricant for building wire 4 AWG and larger.

J. Protect exposed cable from damage.

K. Support cables above accessible ceiling, using spring metal clips. Do not rest cable on ceiling panels.

L. Use suitable cable fittings and connectors.

M. Neatly train and lace wiring inside boxes, equipment, and panelboards.

N. Clean conductor surfaces before installing lugs and connectors.

O. Make splices, taps, and terminations to carry full ampacity of conductors with no perceptible temperature rise.

P. Use suitable reducing connectors or mechanical connector adaptors for connecting aluminum conductors to copper conductors.

Q. Use split bolt connectors for copper conductor splices and taps, 6 AWG and larger. Tape uninsulated conductors and connector with electrical tape to 150 percent of insulation rating of conductor.

R. Use solderless pressure connectors with insulating covers for copper conductor splices and taps, 8 AWG and smaller.

S. Use insulated spring wire connectors with plastic caps for copper conductor splices and taps, 10 AWG and smaller.

3.5 INTERFACE WITH OTHER PRODUCTS

A. Identify wire and cable under provisions of Section 26 05 53.

B. Identify each conductor with its circuit number or other designation indicated on Drawings.

3.6 FIELD QUALITY CONTROL

A. Perform field inspection and testing.

B. Inspect wire and cable for physical damage and proper connection.

C. Measure tightness of bolted connections and compare torque measurements with manufacturer's recommended values.

D. Verify continuity of all conductors.

END OF SECTION

SECTION 26 05 26 GROUNDING AND BONDING FOR ELECTRICAL SYSTEMS

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Grounding electrodes and conductors.

B. Equipment grounding conductors.

C. Bonding.

1.2 REFERENCES

A. ANSI/NFPA 70 - National Electrical Code.

1.3 GROUNDING ELECTRODE SYSTEM

A. Metal underground water pipe.

B. Metal frame of the building.

C. Concrete-encased electrode.

D. Rod electrode.

1.4 PERFORMANCE REQUIREMENTS

A. Grounding System Resistance: 25 ohms.

1.5 PROJECT RECORD DOCUMENTS

A. Submit upon project completion.

B. Accurately record actual locations of grounding electrodes .

C. Record overall resistance to ground.

D. Contractor shall review and stamp all shop drawings prior to submitting them for review. Engineer will not review any submittals that have not been stamped by the contractor.

1.6 QUALIFICATIONS

A. Manufacturer: Company specializing in manufacturing Products specified in this Section with minimum 3 years experience.

1.7 REGULATORY REQUIREMENTS

A. Conform to requirements of ANSI/NFPA 70 - National Electrical Code.

B. Furnish products listed and classified by Underwriters Laboratories, Inc as suitable for purpose specified and shown.

C. Conform to all local codes.

PART 2 PRODUCTS

2.1 ROD ELECTRODE

A. Manufacturers:
   1. Appleton.
   2. Crouse-Hinds.
   3. Burndy.
   4. Or approved equal.

B. Material: Copper-clad steel.

C. Diameter: 3/4 inch .

D. Length: 10 feet.

2.2 MECHANICAL CONNECTORS

A. Manufacturers:
   1. Appleton.
   2. Crouse-Hinds.
   3. Burndy.
   4. Or approved equal.

B. Material: Bronze.

2.3 EXOTHERMIC CONNECTIONS

A. Manufacturers:
   1. Cad-Weld.
   2. Or approved equal.

2.4 WIRE

A. Material: Stranded copper.

B. Foundation Electrodes: per drawing.

C. Grounding Electrode Conductor: Size to meet NFPA 70 or local requirements.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify that final backfill and compaction has been completed before driving rod electrodes.

3.2 INSTALLATION

A. Install Products in accordance with manufacturer's instructions.

B. Install rod electrodes at locations indicated. Install additional rod electrodes as required to achieve

specified resistance to ground.

C. Provide grounding electrode conductor and connect to reinforcing steel in foundation footing where indicated. Bond steel together.

D. Provide bonding to meet Regulatory Requirements.

E. Bond together metal siding not attached to grounded structure; bond to ground.

F. Bond together reinforcing steel and metal accessories in pool and fountain structures.

G. Provide isolated grounding conductor for circuits supplying electronic equipment.

H. Equipment Grounding Conductor: Provide separate, insulated conductor within each feeder circuit raceway. Terminate each end on suitable lug, bus, or bushing.

I. Ground each additional separate neutral to ground rods and water service.

J. Use 4 AWG minimum copper conductor to ground communications service.

K. Isolated ground: connect insulated ground conductor from service ground to device.

3.3 FIELD QUALITY CONTROL

A. Inspect grounding and bonding system conductors and connections for tightness and proper installation.

B. Use suitable test instrument to measure resistance to ground of system. Perform testing in accordance with test instrument manufacturer's recommendations using the fall- of-potential method.

END OF SECTION

THIS PAGE LEFT INTENTIONALLY BLANK

SECTION 26 05 29 HANGERS AND SUPPORTS FOR ELECTRICAL SYSTEMS

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Conduit and equipment supports.

B. Anchors and fasteners.

1.2 REFERENCES

A. NECA - National Electrical Contractors Association.

B. ANSI/NFPA 70 - National Electrical Code.

1.3 REGULATORY REQUIREMENTS

A. Conform to requirements of ANSI/NFPA 70 - National Electrical Code.

B. Furnish products listed and classified by Underwriters Laboratories, Inc. as suitable for purpose specified and shown.

C. Conform to all local codes.

PART 2 PRODUCTS

2.1 PRODUCT REQUIREMENTS

A. Materials and Finishes: Provide adequate corrosion resistance.

B. Provide materials, sizes, and types of anchors, fasteners and supports to carry the loads of equipment and conduit. Consider weight of wire in conduit when selecting products.

C. Anchors and Fasteners:
   1. Concrete Structural Elements: Use precast insert system, expansion anchors and preset inserts.
   2. Steel Structural Elements: Use beam clamps.
   3. Concrete Surfaces: Use self-drilling anchors and expansion anchors.
   4. Hollow Masonry, Plaster, and Gypsum Board Partitions: Use toggle bolts and hollow wall fasteners.
   5. Solid Masonry Walls: Use expansion anchors and preset inserts.
   6. Sheet Metal: Use sheet metal screws.
   7. Wood Elements: Use wood screws.

2.2 STEEL CHANNEL

A. Manufacturer:

   1. UniStrut
   2. B-Line.
   3. Allied.
   4. Kindorf.

5. Or approved equal.

B. Description: Galvanized (wet, damp locations) or painted steel (dry locations).

PART 3 EXECUTION

3.1 INSTALLATION

A. Install products in accordance with manufacturer's instructions.

B. Provide anchors, fasteners, and supports in accordance with NECA "Standard of Installation".

C. Do not fasten supports to pipes, ducts, mechanical equipment, and conduit.

D. Do not use spring steel clips and clamps.

E. Do not use powder-actuated anchors.

F. Obtain permission from Architect/Engineer before drilling or cutting structural members.

G. Fabricate supports from structural steel or steel channel. Rigidly weld members or use hexagon head bolts to present neat appearance with adequate strength and rigidity. Use spring lock washers under all nuts.

H. Install surface-mounted cabinets and panelboards with minimum of four anchors.

I. In wet and damp locations use steel channel supports to stand cabinets and panelboards one inch off wall.

J. Use sheet metal channel to bridge studs above and below cabinets and panelboards recessed in hollow partitions.

END OF SECTION

SECTION 26 05 33.13 CONDUIT FOR ELECTRICAL SYSTEMS

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Metal conduit.

B. Flexible metal conduit.

C. Liquidtight flexible metal conduit.

D. Electrical metallic tubing.

E. Fittings and conduit bodies.

1.2 RELATED SECTIONS

A. General Requirements - Division 7 - Roof penetrations and fire stopping.

B. Section 26 05 33.16 - Boxes.

C. Section 26 05 26 - Grounding and Bonding.

D. Section 26 05 29 - Supporting Devices.

E. Section 26 05 53 - Electrical Identification.

1.3 REFERENCES

A. ANSI C80.1 - Rigid Steel Conduit, Zinc Coated.

B. ANSI C80.3 - Electrical Metallic Tubing, Zinc Coated.

C. ANSI/NEMA FB 1 - Fittings, Cast Metal Boxes, and Conduit Bodies for Conduit and Cable Assemblies.

D. ANSI/NFPA 70 - National Electrical Code.

E. NECA "Standard of Installation."

F. NEMA TC 2 - Electrical Plastic Tubing (EPT) and Conduit (EPC-40 and EPC-80).

G. NEMA TC 3 - PVC Fittings for Use with Rigid PVC Conduit and Tubing.

1.4 DESIGN REQUIREMENTS

A. Conduit Size: ANSI/NFPA 70.

1.5 PROJECT RECORD DOCUMENTS

A. Submit under provisions of 26 05 00.

B. Accurately record actual routing of conduits larger than 1" inches.

1.6 REGULATORY REQUIREMENTS

A. Conform to requirements of ANSI/NFPA 70.

B. Furnish products listed and classified by Underwriters Laboratories, Inc as suitable for purpose specified and shown.

C. Conform to all local codes.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Deliver, store, protect, and handle Products to site under provisions of Division One - General Requirements.

B. Accept conduit on site. Inspect for damage.

C. Protect conduit from corrosion and entrance of debris by storing above grade. Provide appropriate covering.

D. Protect PVC conduit from sunlight.

1.8 PROJECT CONDITIONS

A. Verify that field measurements are as shown on Drawings.

B. Verify routing and termination locations of conduit prior to rough-in.

C. Conduit routing is shown on Drawings in approximate locations unless dimensioned. Route as required to complete wiring system.

PART 2 PRODUCTS

2.1 CONDUIT REQUIREMENTS

A. Minimum Size: 1/2 inch in interior, 1/2 inch exterior.

B. Underground Installations:
   1. Site: Use rigid steel conduit, intermediate metal conduit or nonmetallic PVC conduit. PVC conduit may only be used per local code.
   2. In or Under Slab on Grade: Use rigid steel conduit, intermediate metal conduit or thinwall nonmetallic conduit.
   3. Minimum Size: 1/2 inch.
   4. PVC conduit may be used below grade per code, but above grade for stub ups. PVC conduit may be run up inside light pole or generator bases if allowed by local code.

C. Outdoor Locations, Above Grade: Use rigid steel conduit.

D. In Slab Above Grade:
   1. Use rigid steel conduit, intermediate metal conduit, or electrical metallic tubing conduit.
   2. Maximum Size Conduit in Slab: 1 inch. Maintain a minimum of 2" concrete covering. Run conduits within concrete parallel to each other and spaced on center at least three times the conduit trade size. Conduits over 1 inch may not be installed in slabs without approval of Architect.

E. Interior Wet and Damp Locations: Use rigid steel, intermediate metal conduit or PVC (where not subject to damage) per code.

F. Dry Locations:
   1. Concealed: Use electrical metallic tubing.
   2. Exposed: Use electrical metallic tubing.

## 2.2 METAL CONDUIT

A. Manufacturers:

   1. Republic Steel.
   2. Allied.
   3. Substitutions: Under provisions of Division One - General Requirements.

B. Rigid Steel Conduit: ANSI C80.1.

C. Intermediate Metal Conduit (IMC): Rigid steel.

D. Fittings and Conduit Bodies: ANSI/NEMA FB 1; material to match body.

## 2.3 FLEXIBLE METAL CONDUIT

A. Manufacturers:
   1. Electri-Flex.
   2. Alflex Corp.
   3. Substitutions: Under provisions of Division One - General Requirements.

B. Description: Interlocked steel construction.

C. Fittings: ANSI/NEMA FB 1.

## 2.4 LIQUIDTIGHT FLEXIBLE METAL CONDUIT

A. Manufacturers:
   1. Electri-Flex.
   2. Alflex Corp.
   3. Substitutions: Under provisions of Division One - General Requirements.

B. Description: Interlocked steel construction with PVC jacket.

C. Fittings: ANSI/NEMA FB 1.

## 2.5 ELECTRICAL METALLIC TUBING (EMT)

A. Manufacturers:
   1. Republic Steel.
   2. Allied.
   3. Substitutions: Under provisions of Division One - General Requirements.

B. Description: ANSI C80.3; galvanized tubing.

C. Fittings and Conduit Bodies: ANSI/NEMA FB 1; set screw connectors and couplings may be used

on interior EMT conduit.

PART 3 EXECUTION

3.1 INSTALLATION

A. Install conduit in accordance with NECA "Standard of Installation."

B. Install nonmetallic conduit in accordance with manufacturer's instructions.

C. Arrange supports to prevent misalignment during wiring installation.

D. Support conduit using coated steel or malleable iron straps, lay-in adjustable hangers, clevis hangers, and split hangers.

E. Group related conduits; support using conduit rack. Construct rack using steel channel; provide space on each for 25 percent additional conduits.

F. Fasten conduit supports to building structure and surfaces under provisions of Section 26 05 29.

G. Do not support conduit with wire or perforated pipe straps. Remove wire used for temporary supports

H. Do not attach conduit to ceiling support wires.

I. Arrange conduit to maintain headroom and present neat appearance.

J. Route exposed conduit parallel and perpendicular to walls.

K. Route conduit installed above accessible ceilings parallel and perpendicular to walls.

L. Route conduit in and under slab from point-to-point.

M. Do not cross conduits in slab.

N. Maintain adequate clearance between conduit and piping.

O. Maintain 12 inch clearance between conduit and surfaces with temperatures exceeding 104 degrees F.

P. Cut conduit square using saw or pipecutter; de-burr cut ends.

Q. Bring conduit to shoulder of fittings; fasten securely.

R. Join nonmetallic conduit using cement as recommended by manufacturer. Wipe nonmetallic conduit dry and clean before joining. Apply full even coat of cement to entire area inserted in fitting. Allow joint to cure for 20 minutes, minimum.

S. Use conduit hubs or sealing locknuts to fasten conduit to sheet metal boxes in damp and wet locations and to cast boxes.

T. Install no more than equivalent of three 90-degree bends between boxes. Use conduit bodies to make sharp changes in direction, as around beams. Use hydraulic one-shot bender to fabricate

factory elbows for bends in metal conduit larger than 2 inch size.

U. Avoid moisture traps; provide junction box with drain fitting at low points in conduit system.

V. Provide suitable fittings to accommodate expansion and deflection where conduit crosses control and expansion joints.

W. Provide suitable pull string in each empty conduit except sleeves and nipples.

X. Use suitable caps to protect installed conduit against entrance of dirt and moisture.

Y. Ground and bond conduit under provisions of Section 26 05 26.

Z. Identify conduit under provisions of Section 26 05 53.

AA. All conduit to be concealed, except in mechanical rooms. If accessible walls and ceilings are present in mechanical rooms, conduits and devices will also be concealed. Surface wiring to be used only were absolutely necessary.

3.2 INTERFACE WITH OTHER PRODUCTS

A. Install conduit to preserve fire resistance rating of partitions and other elements, using materials and methods as recommended by manufacturer and under the general provisions. All conduits penetrating non-rated walls shall be caulked.

B. Route conduit through roof openings for piping and ductwork or through suitable roof jack with pitch pocket. Coordinate location with roofing installer.

END OF SECTION

THIS PAGE LEFT INTENTIONALLY BLANK

SECTION 26 05 33.16 BOXES FOR ELECTRICAL SYSTEMS

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Wall and ceiling outlet boxes.

B. Floor boxes.

C. Pull and junction boxes.

1.2 RELATED SECTIONS

A. General Requirements - Division 7 - Roof Penetrations and Fire Stopping.

B. General Requirements - Division 8.

C. Section 26 27 26 - Wiring Devices: Wall plates in finished areas, floor box service fittings, fire-rated poke-through fittings, and access floor boxes.

D. Section 28 31 00 - Fire Alarm and Smoke Detection Systems.

1.3 REFERENCES

A. NECA - Standard of Installation.

B. NEMA FB 1 - Fittings and Supports for Conduit and Cable Assemblies.

C. NEMA OS 1 - Sheet-steel Outlet Boxes, Device Boxes, Covers, and Box Supports.

D. NEMA OS 2 - Nonmetallic Outlet Boxes, Device Boxes, Covers and Box Supports.

E. NEMA 250 - Enclosures for Electrical Equipment (1000 Volts Maximum).

F. NFPA 70 - National Electrical Code.

1.4 SUBMITTALS

A. Submit under provisions of Division One - General Requirements if requested.

B. Contractor shall review and stamp all shop drawings prior to submitting them for review. Engineer will not review any submittals that have not been stamped by the contractor.

1.5 REGULATORY REQUIREMENTS

A. Conform to requirements of NFPA 70 - National Electrical Code.

B. Provide Products listed and classified by Underwriters Laboratories, Inc., as suitable for the purpose specified and indicated.

C. Conform to all local codes.

PART 2 PRODUCTS

2.1 OUTLET BOXES

A. Sheet Metal Outlet Boxes: NEMA OS 1, welded, galvanized steel,4” square minimum. Drawn boxes will not be accepted.
   1. Luminaire and Equipment Supporting Boxes: Rated for weight of equipment supported; include 1/2 inch male fixture studs where required.
   2. Concrete Ceiling Boxes: Concrete type.

B. Cast Boxes: NEMA FB 1, Type FD, aluminum, with threaded hubs. Provide gasketed cover by box manufacturer. Cast boxes to be used in wet or exterior locations.

C. Wall Plates for Finished Areas: As specified in Section 26 27 26.

2.2 FLOOR BOXES

A. Floor Boxes: NEMA OS 1, fully adjustable, 1-1/2 inches deep or as shown on drawings.

B. Material: Cast metal, Formed steel or PVC per drawing.

C. Shape: Round, or rectangular as shown on drawings.

D. Service Fittings: As specified in Section 26 27 26.

2.3 PULL AND JUNCTION BOXES

A. Sheet Metal Boxes: NEMA OS 1, galvanized steel.

B. Hinged Enclosures: As specified in Section 26 27 26.

C. Surface Mounted Cast Metal Box: NEMA 250, Type 4; flat-flanged, surface mounted junction box:
   1. Material: Galvanized cast iron, Cast aluminum.
   2. Cover: Furnish with ground flange, neoprene gasket, and stainless steel cover screws.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify locations of floor boxes and outlets in offices, and work areas prior to rough-in.

3.2 INSTALLATION

A. Install boxes in accordance with NECA "Standard of Installation."

B. Install in locations as shown on Drawings, and as required for splices, taps, wire pulling, equipment connections and compliance with regulatory requirements.

C. Set wall mounted boxes at elevations to accommodate mounting heights indicated and specified in section for outlet device.

D. Electrical boxes are shown on Drawings in approximate locations unless dimensioned. Adjust box location up to 5 feet if required to accommodate intended purpose.

E. Orient boxes to accommodate wiring devices oriented as specified in Section 26 27 26.

F. Maintain headroom and present neat mechanical appearance.

G. Install pull boxes and junction boxes above accessible ceilings and in unfinished areas only.

H. Inaccessible Ceiling Areas: Install outlet and junction boxes no more than 6 inches from ceiling access panel or from removable recessed luminaire.

I. Install boxes to preserve fire resistance rating of partitions and other elements, using materials and methods as required.

J. Coordinate mounting heights and locations of outlets mounted above counters, benches, and backsplashes.

K. Locate outlet boxes to allow luminaires positioned as shown on reflected ceiling plan.

L. Align adjacent wall mounted outlet boxes for switches, thermostats, and similar devices.

M. Use flush mounting outlet box in finished areas.

N. Locate flush mounting box in masonry wall to require cutting of masonry unit corner only. Coordinate masonry cutting to achieve neat opening.

O. Do not install flush mounting box back-to-back in walls; provide minimum 6 inches separation. Provide minimum 24 inches separation in acoustic rated walls.

P. Secure flush mounting box to interior wall and partition studs. Accurately position to allow for surface finish thickness.

Q. Use stamped steel bridges to fasten flush mounting outlet box between studs.

R. Install flush mounting box without damaging wall insulation or reducing its effectiveness.

S. Use adjustable steel channel fasteners for hung ceiling outlet box.

T. Do not fasten boxes to ceiling support wires.

U. Support boxes independently of conduit.

V. Use gang box where more than one device is mounted together. Do not use sectional box.

W. Use gang box with plaster ring for single device outlets.

X. Use cast outlet box in exterior locations exposed to the weather and wet locations.

Y. Use cast floor boxes for installations in slab on grade; formed steel boxes are acceptable for other installations.

Z. Set floor boxes level.

AA. Large Pull Boxes: Use hinged enclosure in interior dry locations, surface-mounted cast metal box in other locations.

## 3.3 INTERFACE WITH OTHER PRODUCTS

A. Coordinate installation of outlet box for equipment connected under Section 26 05 33.16.

## 3.4 ADJUSTING

A. Adjust floor box flush with finish flooring material.

B. Adjust flush-mounting outlets to make front flush with finished wall material.

C. Install knockout closures in unused box openings.

## 3.5 CLEANING

A. Clean interior of boxes to remove dust, debris, and other material.

B. Clean exposed surfaces and restore finish.

END OF SECTION

SECTION 26 05 53 IDENTIFICATION FOR ELECTRICAL SYSTEMS

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Nameplates and labels.

B. Wire and cable markers.

C. Conduit markers.

1.2 RELATED SECTIONS

A. Section 09900 - Painting.

1.3 REFERENCES

A. ANSI/NFPA 70 - National Electrical Code.

1.4 SUBMITTALS

A. Submit under provisions of Division One - General Requirements.

B. Product Data: Provide catalog data for nameplates, labels, and markers.

C. Manufacturer's Instructions: Indicate application conditions and limitations of use stipulated by Product testing agency specified under regulatory requirements. Include instructions for storage, handling, protection, examination, preparation and installation of Product.

1.5 REGULATORY REQUIREMENTS

A. Conform to requirements of ANSI/NFPA 70.

B. Furnish products listed and classified by Underwriters Laboratories, Inc. as suitable for purpose specified and shown.

C. Conform to all local codes.

PART 2 PRODUCTS

2.1 NAMEPLATES AND LABELS

A. Nameplates: Engraved three-layer laminated plastic, black letters on white background.

B. Labels: Embossed adhesive tape, with black letters on white background in shop/mechanical areas or black letters on clear background in office areas.

C. Locations:
   1. Each electrical distribution and control equipment enclosure.
   2. Communication cabinets.

D. Letter Size:
   1. Use 1/8 or 1/4 inch letters for identifying individual equipment and loads.
   2. Use 1/4 or 1/2 inch letters for identifying grouped equipment and loads.

2.2 WIRE MARKERS

A. Manufacturers:
   1. Brady self-laminating type.
   2. Substitutions: Under provisions of Division One - General Requirements.

B. Description: self-laminating type wire markers.

C. Legend:
   1. Control Circuits: Control wire number indicated on schematic and interconnection diagrams on drawings and/or shop drawings.

2.3 UNDERGROUND WARNING TAPE

A. Description: 6 inch wide (minimum) foil-backed detectable tape, colored yellow with suitable warning legend describing buried electrical lines; NAF-0708 Model as manufactured by Thomas & Betts or equal.

PART 3 EXECUTION

3.1 PREPARATION

A. Degrease and clean surfaces to receive nameplates and labels.

3.2 APPLICATION

A. Install nameplate and/or label parallel to equipment lines.

B. Secure nameplate to equipment front using adhesive.

C. Secure nameplate to inside surface of door on panelboard that is recessed in finished locations.

D. Identify underground conduits using underground warning tape. Install one tape per trench at 12 inches above conduit.

END OF SECTION

SECTION 26 09 23 LIGHTING CONTROL DEVICES

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Occupancy sensors and accessories.

1.2 RELATED SECTIONS

A. Section 26 09 43.13 - Digital Lighting Controls.

B. Section 26 51 00 - Interior Lighting.

C. Section 26 56 00 - Exterior Lighting.

1.3 REFERENCES

A. ANSI C78.379 - Electric Lamps - Incandescent and High- Intensity Discharge Reflector Lamps - Classification of Beam Patterns.

B. ANSI C82.1 - Ballasts for Fluorescent Lamps - Specifications.

C. ANSI C82.4 - Ballasts for High-Intensity Discharge and Low Pressure Sodium Lamps (Multiple Supply Type).

D. ANSI/NFPA 70 - National Electrical Code.

E. ANSI/NFPA 101 - Life Safety Code.

F. NEMA WD 6 - Wiring Devices-Dimensional Requirements.

1.4 SUBMITTALS

A. Submit under provisions of Division One - General Requirements.

B. Shop Drawings: Indicate dimensions and components for each control device that is not a standard product of the manufacturer.

C. Product Data: Provide dimensions, ratings, and performance data.

D. Manufacturer's Instructions: Indicate application conditions and limitations of use stipulated by product testing agency specified under Regulatory Requirements.

E. Manufacturer's Instructions: Include instructions for storage, handling, protection, examination, preparation, and installation of product.

F. Contractor shall review and stamp all shop drawings prior to submitting them for review. Engineer will not review any submittals that have not been stamped by the contractor.

1.5 OPERATION AND MAINTENANCE DATA

A. Submit under provisions of Division One - General Requirements.

B. Maintenance Data: Include replacement parts list.

1.6 QUALIFICATIONS

A. Manufacturer: Company specializing in manufacturing products specified in this Section with minimum ten years experience.

1.7 REGULATORY REQUIREMENTS

A. Conform to requirements of ANSI/NFPA 70 (National Electrical Code).

B. Conform to requirements of NFPA 101 .

C. Furnish products listed and classified by Underwriters Laboratories, Inc. as suitable for purpose specified and shown.

D. Conform to all local codes.

PART 2 PRODUCTS

2.1 OCCUPANCY SENSORS

A. Provide occupancy sensors and relay power packs as shown and described on drawing or equal from Leviton or Wattstopper.
   1. Occupancy sensor coverage area must meet or exceed the specified occupancy sensor on the drawing.
   2. Provide relay power packs as required.

2.2 PHOTOCELL CONTROL

A. Provide photocell control as shown and described on drawing or equal from Tork.

2.1 TIME CLOCK CONTROL

A. Provide time clock control as shown and described on drawing or equal from Tork.

PART 3 EXECUTION

3.1 EXAMINATION

A. Examine substrate and supporting grids for occupancy control devices.

B. Examine each occupancy sensor to determine suitability for lamps specified.

3.2 INSTALLATION

A. Install in accordance with manufacturer's instructions.

B. Occupancy sensor low voltage wiring may only be exposed along joists in high bay areas or above ceiling grid in office areas. Occupancy sensor low voltage wiring running perpendicular to joists in

high bay areas shall be in conduit. In non-high bay areas such as shops, tool rooms, parts rooms, mechanical rooms and storage areas, low voltage wiring shall be installed inside conduit and boxes.

3.3 FIELD QUALITY CONTROL

A. Operate each occupancy sensor after installation and connection. Inspect for proper connection and operation.

3.4 ADJUSTING

A. Adjust Work under provisions of Division One -General Requirements.

B. Aim and adjust occupancy sensors as required.

3.5 CLEANING

A. Clean Work under provisions of Division One - Genral Requirements.

B. Clean electrical parts to remove conductive and deleterious materials.

C. Remove dirt and debris from enclosure.

D. Clean finishes and touch up damage.

3.6 DEMONSTRATION

A. Provide systems demonstration.

END OF SECTION

THIS PAGE LEFT INTENTIONALLY BLANK

SECTION 26 27 26 WIRING DEVICES

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Wall switches.

B. Wall dimmers.

C. Receptacles.

D. Device plates and decorative box covers.

1.2 RELATED SECTIONS

A. Section 26 05 33.16 - Boxes.

1.3 REFERENCES

A. NECA - Standard of Installation.

B. NEMA WD 1 - General Requirements for Wiring Devices.

C. NEMA WD 6 - Wiring Device -- Dimensional Requirements.

D. NFPA 70 - National Electrical Code.

1.4 SUBMITTALS FOR REVIEW

A. Submit under provisions of Division One - General Requirements.

B. Product Data: Provide manufacturer's catalog information showing dimensions, colors, and configurations.

C. Contractor shall review and stamp all shop drawings prior to submitting them for review. Engineer will not review any submittals that have not been stamped by the contractor.

1.5 QUALIFICATIONS

A. Manufacturer: Company specializing in manufacturing the Products specified in this section with minimum three years experience.

1.6 REGULATORY REQUIREMENTS

A. Conform to requirements of NFPA 70.

B. Provide Products listed and classified by Underwriters Laboratories, Inc., as suitable for the purpose specified and indicated.

C. Conform to all local codes.

PART 2 PRODUCTS

2.1 WALL SWITCHES

A. Single Pole Switch:
   1. Leviton: CSB1-20 20 Amp commercial specification grade.
   2. Hubbell: 20 Amp commercial specification grade equal to Leviton.
   3. Eagle: 20 Amp commercial specification grade equal to Leviton.

B. Double Pole Switch:
   1. Leviton: CSB2-20 20 Amp commercial specification grade.
   2. Hubbell: 20 Amp commercial specification grade equal to Leviton.
   3. Eagle: 20 Amp commercial specification grade equal to Leviton.

C. Three-way Switch:
   1. Leviton: CSB3-20 20 Amp commercial specification grade.
   2. Hubbell: 20 Amp commercial specification grade equal to Leviton.
   3. Eagle: 20 Amp commercial specification grade equal to Leviton.

D. Four-way Switch:
   1. Leviton: CSB4-20 20 Amp commercial specification grade.
   2. Hubbell: 20 Amp commercial specification grade equal to Leviton.
   3. Eagle: 20 Amp commercial specification grade equal to Leviton.

E. Indicator Switch:
   1. Leviton: 1221PL, 1222PL, 1223PL 20 Amp industrial specification grade.
   2. Hubbell: 20 Amp industrial specification grade equal to Leviton.
   3. Eagle: 20 Amp industrial specification grade equal to Leviton.

F. Locator Switch:
   1. Leviton: 1221LH, 1223LH 20 Amp industrial specification grade.
   2. Hubbell: 20 Amp industrial specification grade equal to Leviton.
   3. Eagle: 20 Amp industrial specification grade equal to Leviton.

G. Substitutions: under provisions of Division One - General Requirements.

H. Color: Per architect and owner.

2.2 INCANDESCENT WALL DIMMERS

A. Manufacturers:
   1. Lithonia: per drawing.
   2. Leviton: Equal to specified.
   3. Lutron: Equal to specified.
   4. Substitutions: under provisions of Division One -General -Requirements.

B. Description: NEMA WD 1, architectural grade preset slide control dimmer for incandescent lamps.

C. Power rating as needed for circuit or as indicated on drawing.

D. Color: Per architect and owner. Switches on emergency power shall be red.

## 2.3 RECEPTACLES

A. Single Convenience Receptacle:
   1. Leviton: 5088 15 Amp, 5891 20 Amp commercial specification grade.
   2. Hubbell: commercial specification grade equal to Leviton.
   3. Eagle: commercial specification grade equal to Leviton .

B. Duplex Convenience Receptacle:
   1. Leviton: BR15 15 Amp, BR20 20 Amp commercial specification grade.
   2. Hubbell: commercial specification grade equal to Leviton.
   3. Eagle: commercial specification grade equal to Leviton.

C. USB Duplex Convenience Receptacle:
   1. Hubbell: USB15X2W 15 Amp commercial specification grade.
   2. Leviton: commercial specification grade equal to Leviton.
   3. Eagle: commercial specification grade equal to Leviton.

D. GFCI Receptacle:
   1. Leviton: Interior - 7599 Smart lock pro 15 Amp GFCI, 7899 Smart lock pro 20 Amp GFCI.
      Interior tamper resistant - T7599 Smart lock pro 15 Amp GFCI, T7899 Smart lock pro 20 Amp GFCI.
      Exterior weather resistant - W7599 Smart lock pro 15 Amp GFCI, W7899 Smart lock pro 20 Amp GFCI.
      Exterior weather and tamper resistant - W7599-TR Smart lock pro 15 Amp GFCI, W7899-TR Smart lock pro 20 Amp GFCI.
   2. Hubbell: Equal to Leviton.
   3. Eagle: Equal to Leviton.
   4. Weather resistant in damp or wet locations.

E. Isolated Ground Receptacle:
   1. Leviton: 5262-IG 15 Amp, 5362-IG 20 Amp industrial specification grade.
   2. Hubbell: industrial specification grade equal to Leviton.
   3. Eagle: industrial specification grade equal to Leviton.

F. Substitutions: Under provisions of Division One -General Requirements.

G. Color: Per architect and owner. Receptacles on emergency power shall be red.

## 2.4 WALL PLATES

A. Decorative Cover Plate: Thermoplastic (nylon).
   1. Leviton: 80700 series.
   2. Hubbell: Equal to Leviton.
   3. Eagle: Equal to Leviton.
   4. Substitutions: under provisions of Division One - General Requirements.

B. Metal Plate: Surface mount.
   1. Appleton: 8300 series or equal.
   2. Substitutions: under provisions of Division One - General Requirements.

C. Weatherproof Cover Plate: Gasketed aluminum with hinged gasketed in-use aluminum device cover.

1. Red Dot: CKMG series wet location in-use receptacle cover or equal.
2. Red Dot: CCT series raintight switch cover or equal.
3. Substitutions: Under provisions of Division One - General Requirements.

PART 3 EXECUTION

3.1 EXAMINATION

A. Division 1 - Coordination and Meetings: Verification of existing conditions prior to beginning work.

B. Verify that outlet boxes are installed at proper height.

C. Verify that wall openings are neatly cut and will be completely covered by wall plates.

D. Verify that floor boxes are adjusted properly.

E. Verify that branch circuit wiring installation is completed, tested, and ready for connection to wiring devices.

F. Verify that openings in access floor are in proper locations.

3.2 PREPARATION

A. Provide extension rings to bring outlet boxes flush with finished surface.

B. Clean debris from outlet boxes.

3.3 INSTALLATION

A. Install in accordance with NECA "Standard of Installation."

B. Install devices plumb and level.

C. Install switches with OFF position down.

D. Install wall dimmers to achieve full rating specified and indicated after derating for ganging as instructed by manufacturer.

E. Do not share neutral conductor on load side of dimmers.

F. Install receptacles with grounding pole on bottom.

G. Connect wiring device grounding terminal to outlet box with bonding jumper or branch circuit equipment grounding conductor.

H. Install decorative plates on switch, receptacle, and blank outlets in finished areas.

I. Connect wiring devices by wrapping conductor around screw terminal.

J. Use jumbo size plates for outlets installed in masonry walls.

K. Install galvanized steel plates on outlet boxes and junction boxes in unfinished areas, above

accessible ceilings, and on surface mounted outlets.

L. Install protective rings on active flush cover service fittings.

## 3.4 INTERFACE WITH OTHER PRODUCTS

A. Coordinate locations of outlet boxes provided under Section 26 05 33.16 to obtain mounting heights [specified and] indicated on drawings.

B. Install top of wall switch box 48 inches above finished floor.

C. Install bottom of convenience receptacle box 18 inches above finished floor.

D. Install bottom of convenience receptacle box 6 inches above counter or backsplash of counter.

E. Install top of box dimmer 48 inches above finished floor.

F. Install bottom of telephone jack box 18 inches above finished floor.

G. Install top of telephone jack box for side-reach wall telephone to position top of telephone at 54 inches above finished floor.

H. Install top of telephone jack box for forward-reach wall telephone to position top of telephone at 48 above finished floor.

I. Coordinate installation of access floor boxes with access floor system provided under Division One - General Requirements.

J. Coordinate the installation of wiring devices with underfloor duct service fittings.

## 3.5 FIELD QUALITY CONTROL

A. Inspect each wiring device for defects.

B. Operate each wall switch with circuit energized and verify proper operation.

C. Verify that each receptacle device is energized.

D. Test each receptacle device for proper polarity.

E. Test each GFCI receptacle device for proper operation.

F. Verify that each telephone jack is properly connected and circuit is operational.

## 3.6 ADJUSTING

A. Adjust devices and wall plates to be flush and level.

## 3.7 CLEANING

A. Clean exposed surfaces to remove splatters and restore finish.

END OF SECTION

SECTION 26 56 00 EXTERIOR LIGHTING

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Exterior luminaires and accessories.

B. Poles.

1.2 RELATED SECTIONS

A. Section 03300 - Cast-in-Place Concrete: Foundations for poles.

1.3 REFERENCES

A. ANSI C78.379 - Electric Lamps - Incandescent and High- Intensity Discharge Reflector Lamps - Classification of Beam Patterns.

B. ANSI C82.1 - Ballasts for Fluorescent Lamps- Specifications.

C. ANSI C82.4 - Ballasts for High-Intensity-Discharge and Low-Pressure Sodium Lamps (Multiple-Supply Type).

D. ANSI O5.1 - Specifications and Dimensions for Wood Poles.

E. ANSI/NFPA 70 - National Electrical Code.

F. ANSI/IES RP-8 - Recommended Practice for Roadway Lighting.

G. ANSI/IES RP-20 - Lighting for Parking Facilities.

1.4 SYSTEM DESCRIPTION

A. Parking lot, roadway lighting per drawings.

B. Exterior building lighting per drawings.

1.5 SUBMITTALS

A. Submit under provisions of Division One - General Requirements.

B. Shop Drawings: Indicate dimensions and components for each luminaire which is not a standard product of the manufacturer.

C. Product Data: Provide dimensions, ratings, and performance data.

D. Manufacturer's Instructions: Include instructions for storage, handling, protection, examination, preparation, installation, and starting of product.

1.6 PROJECT RECORD DOCUMENTS

A. Submit under provisions of Division One - General Requirements.

B. Accurately record actual locations of each luminaire and conduit.

1.7 OPERATION AND MAINTENANCE DATA

A. Submit under provisions of Division One - General Requirements.

B. Maintenance Data: Include instructions for maintaining luminaires.

1.8 QUALIFICATIONS

A. Manufacturer: Company specializing in manufacturing products specified in this Section with minimum three years experience.

1.9 REGULATORY REQUIREMENTS

A. Conform to requirements of ANSI/NFPA 70.

B. Furnish products listed and classified by Underwriters Laboratories, Inc. as suitable for purpose specified and shown.

C. Conform to all local codes.

1.10 DELIVERY, STORAGE, AND HANDLING

A. Deliver, store, protect, and handle products to site under provisions of Division One - General Requirements.

B. Accept products on site. Inspect for damage.

C. Protect poles from finish damage by handling carefully.

D. Store and handle solid wood poles in accordance with ANSI O5.1.

1.11 COORDINATION

A. Furnish bolt templates and pole mounting accessories to installer of pole foundations.

PART 2 PRODUCTS

2.1 LUMINAIRES

A. Furnish products as specified in schedule on Drawings.

B. Substitutions: No substitutes accepted after bids are turned in.

C. Mounting: As specified on drawings.

D. Accessories:
1. Provide control per drawings.

2.2 BALLASTS/DRIVERS

A. Fluorescent Ballast:

1. Advance.
2. GE.
3. Or equal.
4. Description: ANSI C82.1, high power factor type electromagnetic ballast.
5. Provide ballast suitable for lamps specified.
6. Voltage: Match luminaire voltage.
7. Source Quality Control: Certify ballast design and construction by Certified Ballast Manufacturers, Inc.

B. High Intensity Discharge (HID) Ballast:
1. Advance.
2. GE.
3. Or equal.
4. Description: ANSI C82.3.4, mercury vapor, metal halide, low pressure sodium, high pressure sodium lamp ballast.
5. Provide ballast suitable for lamp specified.
6. Voltage: Match luminaire voltage.

C. LED drivers as specified.

2.3LAMPS

A. Incandescent Lamp Manufacturers:
1. Phillips
2. GE.
3. Sylvania.
4. Or approved equal.

B. Fluorescent Lamp Manufacturers:
1. Phillips.
2. GE.
3. Sylvania.
4. Or approved equal.

C. High Intensity Discharge (HID) Lamp Manufacturers:
1. Phillips.
2. GE.
3. Sylvania.
4. Or approved equal.

D. Reflector Lamp Beam Patterns: ANSI C78.379.

2.4 LED LUMINAIRES

A. LED luminaires shall be equal to the specified LED luminaire by the following criteria:
1. Fixture must be of similar construction and aesthetics.
2. Delivered lumen range: -2% to +8% of lumens listed on light fixture schedule.
3. Luminaire Efficacy: up to -5%
4. Energy consumption: maximum wattage listed on light fixture schedule.
5. Color temperature: +/- 200K of color temperature listed in light fixture schedule.
6. Color rendering index: minimum 80 CRI interior, minimum 70 CRI exterior.
7. Energy consumption: maximum wattage listed on light fixture schedule.
8. Beam Spread: +/- 4%
9. Spacing ratio: +/- 0.1

10. Physical size: must be the same size or smaller.
11. Exterior IES distribution pattern: match specification or provide point by point calculations matching specified intent.
12. BUG: match or exceed specified BUG rating.

2.5 POLES

A. Manufacturers:
   1. Per schedule on drawings.

B. Material and Finish: per drawing.

C. Accessories:
   1. Handhole.

D. Loading Capacity Ratings:
   1. Verify pole loading capacity is not exceeded.

PART 3 EXECUTION

3.1 EXAMINATION

A. Examine excavation and concrete foundation for lighting poles.

B. Examine each luminaire to determine suitability for lamps specified.

3.2 INSTALLATION

A. Install in accordance with manufacturers' instructions.

B. Install lighting poles at locations indicated.

C. Install poles plumb. Provide double nuts to adjust plumb. Grout around each base.

D. Install lamps in each luminaire.

E. Bond luminaires, metal accessories and metal poles to branch circuit equipment grounding conductor. Provide supplementary grounding electrode at each pole.

3.3 FIELD QUALITY CONTROL

A. Operate each luminaire after installation and connection. Inspect for improper connections and operation.

3.4 ADJUSTING

A. Adjust work under provisions of Division One - General Requirements.

B. Aim and adjust luminaires to provide illumination levels and distribution indicated on Drawings or as directed.

C. Relamp luminaires which have failed lamps at Date of Substantial Completion.

3.5 CLEANING

A. Clean work under provisions of Division One - General Requirements.

B. Clean electrical parts to remove conductive and deleterious materials.

C. Remove dirt and debris from enclosure.

D. Clean photometric control surfaces as recommended by manufacturer.

E. Clean finishes and touch up damage.

END OF SECTION

THIS PAGE LEFT INTENTIONALLY BLANK

# SECTION 31 23 00 – EARTH WORK, EXCAVATING & FILL

## PART 1 – GENERAL

### 1.00 – RELATED DOCUMENTS

Drawings and Division 1 Specification sections apply to work of this section.

### 1.01 – SCOPE OF THE WORK

A. In general, the work of this section includes all labor, materials, equipment and services necessary to provide the excavating, backfill, perimeter insulation, compacted fill and grading as shown on the Drawings and specified hereinafter in this section.

B. Contact DIGGER'S HOTLINE prior to doing any excavation work.

C. Notify corporations, companies, individuals or authorities owning conduit, wires or pipes running to property or encountered during excavating operations. Cap or remove services in accordance with instructions of above Owners. Protect, support and maintain all conduits, drains, sewers, pipes and wires that are to remain.

D. Replace as specified for new work, or as directed, any damage to curbs, pavement. Additional fill and topsoil, if required, shall be provided under this Section as part of contract price.

E. Work Not Included:

1. Earth work required for heating and electrical work installed underground is included in other contracts.

2. Asphalt paving.

3. Landscaping.

## PART 2 – PRODUCTS

### 2.01 – PERIMETER INSULATION

A. Furnish and install perimeter insulation around the exterior perimeter of the building as indicated on various wall sections and details on the drawings.

B. Perimeter insulation is required at all slab on grade areas on the inside of exterior foundation walls, wherever exterior insulation does not occur.

C. Perimeter insulation shall be closed-cell extruded polystyrene foam with an R-Value of 5 per inch and a minimum Compressive Strength of 30psi.

D. Thickness of perimeter insulation is as indicated on various wall sections and details on the drawings.

2.02 – FILL MATERIALS

A. Use no frozen material, material subject to decomposition or cave-in, or cinders for backfill.

B. General Fill: For filling all landscaped areas outside of the building lines may be broken stone, sand, bank run gravel, earth or approved material from excavation. All such fill shall be free from peat, wood, large stones or boulders, roots, cinders, trash or other similar objectionable material.

C. Structural Fill: For filling and backfilling all interior and exterior excavated areas under concrete slabs, sidewalks, drives, and asphalt paved areas. Fill shall consist of a granular material or low plasticity cohesive soils free from loam, ash, wood or other foreign materials. Compact to 95% modified proctor. All structural fill must be approved by Soils Engineer prior to use. Submit representative 50-pound samples.

D. Granular Drainage Fill: For use as a base course under all concrete slabs on grade, interior floor slabs, and exterior walks, ramps, steps, drives, etc. Depth shall be as shown or 8" minimum bed of compacted, granular free-draining fill material consisting of clean bank-run gravel, sand, gravel, or crushed stone of full range of sizes. Maximum size of aggregate to be ¾". Of that portion, by weight, of fill passing the No. 4 mesh sieve, not more than 5% shall pass the No. 40 mesh sieve and none shall pass the No. 200 sieve except one percent allowable for dust. Compact to 95% modified proctor. All granular drainage fill must be approved by Soils Engineer prior to use. Submit representative 50-pound samples.

## PART 3 – EXECUTION

3.01 – CLEARING

A. Clear area with limits to be occupied of paving, curbs, trees, shrubs, rubbish and other perishable or objectionable matter. Remove cleared material from site.

B. Break up and remove from site all walks, curbs, etc. required to be removed by building operations or required by change of grades.

3.02 – EXCAVATION

A. Excavate whatever materials encountered, as required to place within finished elevations shown, all footings, walls, trenches, pits and ground floor slabs to complete the project.

B. Excavate to elevations and dimensions indicated for footings, foundations, walks and other work shown, plus sufficient space to permit erection of forms, shoring, and inspection of foundations.

C. Excavate to proper depth. Cut out soft or spongy spots. Excavate for other areas as shown or specified.

D. Deposit excavated material required for backfilling exterior walls where directed except place no fill where trenches for sewers, water lines or other services will be located until after trench work is completed.

## 3.03 – SHORING AND PUMPING

A. Provide shoring, bracing required to support adjoining soil, buildings, walks, etc. Shoring, bracing and sheet piling shall be subject to approval, but this approval shall not relieve Contractor of responsibility for protection of life and property relating to work. Design of all shoring and excavation stability is entirely contractor's responsibility.

B. Provide, operate and maintain pumps or other equipment necessary to drain and keep excavations and entire subgrade area free of water under any circumstances that may arise. No pumping system shall be used which may loosen existing soil or cause any part of the subsoil to be removed or shifted from its original position.

## 3.04 – FILLING

A. Do all filling and backfilling and grading to landscaped area outside of building to required subgrade. Grades indicated on drawings are finished grades. Allow 4" for topsoil. See drawings for other subgrades. Provide extra material for fill if required.

B. The placing and compaction of fill under slabs after foundation walls are in place shall be coordinated with the backfilling against the outside of the walls. Place backfill around walls in horizontal layers max. of 1'-0" deep and compact as required to prevent after-settlement.

C. Deposit Select Fill each side of piers, walls and free standing structure simultaneously to approx. same elevation. Make proper provisions to prevent wedging action against structure. Deposit so that walls filled on both sides will not have differential greater than 1'-0" between levels on each side.

D. On exterior, backfill to within 12" of subgrade with select fill. 12" to subgrade at grade areas shall be clean earth.

E. Remove debris from excavations before backfilling. Backfill as soon as this work can be safely accomplished. Rough grade to divert storm water away from building.

F. Structural fill shall be placed in layers of not more than 9" in thickness, at a moisture content at or near optimum, and compacted to a minimum density of 95% of the maximum dry density as determined by the Modified Proctor Test (ASTM 1557, Method D).

G. General Fill and Granular Drainage Fill shall be placed in 8" layers and compacted with tamping rollers or vibratory equipment to 95% maximum density at optimum moisture content, as per ASTM D1557, Method D.

H. Excess fill, if any, shall be removed from the site.

3.05 – GRANULAR MAT FILL BELOW CONCRETE SLAB

A. After compaction of the subgrade, preparation work, and all required filling, compacting, and rough grading work to bring the subgrade to proper alignment and cross section at proper elevation, provide a layer of Granular Drainage Fill, as a base course for all interior and all exterior concrete slabs on grade or fill. See plans for drainage fill thickness. Fill under paved areas shall be as shown or min. of 8". This shall include entire area inside building and all concrete paved areas outside building. Compaction of base course material shall be to 95% maximum density at optimum moisture content.

3.06 – GRADING

A. Grading shall be accomplished over all areas outside the building within the property lines and over all areas which are disturbed by any work for this project. Grades indicated on the drawings are finished grades. Grading shall consist of bringing to elevations as specified and thoroughly compacting by machine or by hand as necessary.

B. Grading of all areas within the project, including excavated and filled sections and adjacent transition areas shall be reasonably smooth, compacted and free from irregular surface changes. The degree of finish shall be that ordinarily obtainable from either blade-grader or scraper operations, except as otherwise specified.

C. Excess material, if any, shall be removed from site.

3.07 – FINISH GRADING

A. Grade grounds within property lines by cutting and filling. Do no finish grading until sewers, water mains and other utilities are installed and earth has settled properly or been properly compacted.

B. Subgrade shall be scarified to depth of one inch for bonding of subsoil with topsoil and then areas shall be brought up finish grade by filling with 4" of topsoil. Topsoil shall consist of fertile friable loam, neither excessively acid nor excessively alkaline, suitable for growth of grass and plants. No topsoil is to be delivered or worked in frozen or muddy condition.

C. Topsoil shall be graded, raked, rolled and left in condition ready for seeding.

D. Excess topsoil, if any, shall be removed from the site.

3.08 – TESTING

A. All foundation and parking area excavations shall be observed by a geotechnical engineer or their representative to document the soil conditions and provide the necessary testing to determine that suitable bearing soils are exposed.

B. Perform in-place soil compaction testing on all engineered fill. At a minimum, tests shall be performed for every 2000 square foot of building area, every 5000 square foot of parking area and for every 2 vertical feet of fill placed in those areas. The actual number of tests performed shall be at the discretion of the geotechnical engineer.

C. Any filled areas found not conforming to the compaction specification herein shall be removed, replaced and recompacted by the Contractor at no cost to the Owner.

**END OF SECTION 31 23 00**

# 32 31 11 – PARKING GATE OPERATORS

## PART 1 – GENERAL

### 1.1. INCLUDED IN THIS SECTION

A. Pre-wired barrier arm gate operator, including all selected attachments and accessory equipment.

B. For further information, call Nikki Dinnel, (800) 321-9947, 210-842-6445, ndinnel@hysecurity.com with the manufacturer or visit the website at www.hysecurity.com.

### 1.2. RELATED WORK SPECIFIED ELSEWHERE

A. Fencing: See Section 32 31 19.

B. Cast in place concrete: See Section 03 30 00.

C. Electrical service and connections: See Section ?? ?? ??.

### 1.3. SUBMITTALS

A. Shop drawings: Submit shop drawings under the provisions of Section 01 33 00. Submit drawings showing connections to adjacent construction, range of travel, and all electrical and mechanical connections to the operator. All underground runs of electrical lines and inductive vehicle obstruction loop locations shall be indicated on drawings. Drawings shall also show the size and location of the concrete mounting pad.

B. Installation instructions: Submit two copies of manufacturer's installation instructions for this specific project.

C. Submit manufacturer’s completed warranty registration form to the General Contractor.

D. Project list: Submit list of product installations comparable to the subject job. Include date of product installation, installer, and owner's name and location of the project.

E. Test reports:

1. Submit affidavits from the manufacturer demonstrating that the gate operator mechanism has been tested to 2 million cycles without breakdown.
2. Each operator shall bear a label indicating that the operator mechanism has been tested to full power stress of all mechanical components and electrical tests of all overload devices.

### 1.4. QUALITY ASSURANCE

A. Manufacturer: A company specializing in the manufacture of gate operators of the type specified, with a minimum of five years of experience manufacturing gate operators of this type and design.

B. Installer: Must have a minimum of three years’ experience installing similar equipment, provide proof of attending a HySecurity Technical Training within the previous three years, or obtain other significant manufacturer endorsement of technical aptitude, if required, during the submittal process.

### 1.5. CODES AND REGULATORY REQUIREMENTS

A. Operators shall be built to UL 325 standards and be listed by a nationally recognized testing laboratory. Complete all electrical work according to local codes and National Electrical code. All fieldwork shall be performed in a neat and professional manner, completed to journeyman standards.

B. Vehicular gates should never be used by pedestrians. A separate pedestrian gate must always

be provided when foot traffic is present.

C. Current safety standards require gate operators to be designed and labeled for specific usage classes.
   1. HySecurity model StrongArmPark DC™ 14 is listed for use in UL 325 Usage Classes: I, II, III, IV.

NOTE: To be compliant with UL 325 and Industry safety guidelines, additional entrapment protection devices may need to be installed with this gate operator if the moving arm travels within 16” (406 mm) of a stationary object.

### 1.6. PRODUCT DELIVERY AND STORAGE

A. Comply with 01 6000.

B. Store products upright in the original shipping containers, covered, ventilated and protected from all weather conditions.

### 1.7. WARRANTY

A. Provide a warranty against all defects in materials or workmanship for two years or 1,000,000 gate cycles (whichever occurs first) after the date of installation. Defective materials shall be replaced at manufacturer’s discretion with new or reconditioned materials furnished by the manufacturer, at no cost to the owner. Freight, labor and other incidental costs are not covered under the factory warranty but may be covered by a separate service agreement between installing company and the owner.
   1. To ensure validation of warranty, complete warranty registration form online at www.hysecurity.com/warranty. Warranty registration form is also included in the printed materials shipped with the operator.

## PART 2 – PRODUCTS

### 2.1. GATE OPERATORS

A. HySecurity gate operator model StrongArmPark DC with Smart DC Controller, or other comparable operator, as approved by the architect or specifier. Substitute operators that are approved will be published in an addendum, not less than ten days prior to bid opening. Requests for substitution will include the amount of savings to be passed on to the owner.

### 2.2. OPERATION

A. Operation shall be by means of a brushed DC electric motor with an integral primary spur gear reducer driving a single reduction gear reducer with the gate arm mount fixed to the output shaft via a splined connection. The motor shall contain an integral position feedback encoder such that limits are set in software. The design shall include provisions for re-establishing previously set limits in the event of power failure. Operator shall be capable of handling arms up to 14 ft (4,267m) in length made from extruded aluminum, wood, or PVC. Travel time adjustable as fast as 2.5 seconds from fully closed to fully open position. Maximum arm length shall be 14 ft (4,267 mm). Gate Operator shall operate in the event of a power failure in an uninterruptible power supply mode to the extent the two 8Ah batteries can maintain adequate power. NOTE*: Select arm material and length from section G “Other Options”*

B. Minimum standard mechanical components:
   1. Chassis: shall be 14 gauge (2 mm) galvanized steel.
   2. Cover: shall be 14 gauge (2 mm) galvanized steel with keyed lock.

3. Finish: Textured TGIC polyester powder coat finish in white, proven to withstand 1,000-hour salt spray test.
4. Gear Reducer: filled with synthetic lubricant allowing operation down to -13° F (-25° C) without a heater.
5. Gear Reducer: #60 with splined output shaft.
6. Arm striping: shall be highly reflective alternating red and white vertical stripes, 16" (406 mm) intervals measured horizontally per MUTCD standards.

C. Minimum standard electrical components:
1. Motor: 140W minimum with integral gearbox and Hall effect sensors.
2. Hall effect sensor for detection of output shaft position.
3. Controls: Smart DC Controller Board containing:
   a. bi-directional traffic mode.
   b. inputs for tenant, transient, and special users
   c. 32-character LCD for reporting of functions and codes with 5 button user interface.
   d. multiple programmable output relay options including vehicle counts, arming signals, wrong-way and back-out signals.
   e. anti-tailgate mode.
   f. built-in power surge/lightning strike protection.
   g. multi-stage intelligent battery charging under microprocessor control.
   h. menu configuration, event logging and system diagnostics easily accessible with a PC and HySecurity's free Smart Touch Analyze and Retrieve Tool.
   i. RS-232 port for connection to laptop or other computer peripheral and RS-485 connection for network interface.
   j. dual gate communication connection for bi-parting, sally port, or sequenced gates.
   k. electromechanical and solid-state relays.
   l. radio option outputs.
   m. 15 inputs for site specific configurations.
4. Transformer: 250 VA, dual voltage (N/A for solar models).
5. Input power: 115V, 208V/230V Field selectable. (24V solar panels for solar models)
6. Accessory power: 12 VDC, 24 VDC

**D. Required external sensors: See 1.5B. Specify photo eyes or gate edges or a combination thereof to be installed such that the gate will reverse in either direction upon sensing an obstruction.**
1. Through Beam photo eyes.
   a. As indicated on drawings

E. Optional alert devices: None

F. Access control devices:
   1) Patriot E Series Reader by EMX complete with mounting hardware, power supply, cables and test cards.
      a) Provide Viper Credentials; 100 windshield adhesive-backed tags (TRES-900-VIPER)
      b) Furnish and install RFID Mounting Stanchion Pedestal (TRES-RFID-PS094-B); bolt to concrete island adjacent to gate controller in exact location as directed by Architect or Owner. Mount reader to stanchion per mfr. recommendations.
   2) Hy5B plug in type vehicle detectors for vehicle obstruction/free exit loops.
      a) As indicated on drawings.
      b) Loop wire: 16 or 18-gauge, XLPE or XHHW-2 which is rated for both wet and dry environments.

G. Stop switch, hold open/hold close switch.
H. Included options:
    1. Arm bracket for 2.5” (63 mm) square PCV arms.
    2. 14 ft (4,267mm) contains LED light strip on top surface and rubber bumper on lower surface. Arm to be mounted to a hinged mount with a proximity sensor that stops further arm movement and is capable of sending a signal indicating the arm has been hit.

### 2.3. FACTORY TESTING

A. Fully assemble and test, at the factory, each gate operator to assure smooth operation, sequencing and electrical connection integrity.
B. Check all mechanical connections for tightness and alignment. Check all welds for completeness and continuity.
C. Inspect finishes for completeness. Touch up imperfections prior to shipment.
D. Check all electrical wires to assure that chafing cannot occur during shipping or operation.

## PART 3 – EXECUTION

### 3.1. SITE EXAMINATION

A. Locate concrete mounting pad in accordance with approved shop drawings and in compliance with local building codes.

### 3.2. INSTALLATION

A. Install gate operator in accordance with the safety regulations and the manufacturer’s product literature and installation instructions, current at the time of installation. Coordinate locations of operators with contract drawings; other trades and shop drawings.
B. Installer shall ensure that the electrical service to the operator is at least 15A. Electrical wiring to conform to NEC and manufacturer’s installation instructions. StrongArmPark DC is 250W.

### 3.3. FIELD QUALITY CONTROL

A. Test operator through ten full open and close cycles and adjust for operation without binding, scraping or uneven motion. Test limit switches for proper open and close limit positions.
B. All anchor bolts shall be fully tightened in the finished installation.
C. Owner, or owner’s representative, shall complete “punch list” with installing contractor prior to final acceptance of the installation and submit completed warranty documentation to manufacturer.

### 3.4. CONTINUED SERVICE AND DOCUMENTATION

A. Train owner's personnel on how to safely shut off electrical power, release and manually operate the barrier. Additionally, demonstrate the general maintenance of the gate operator and accessories and provide one copy of “Programming and Operations Manual” for the owner's use. Manuals will identify parts of the equipment for future procurement. Direct maintenance personnel to the technical support sections on HySecurity’s website at www.hysecurity.com.

END OF SECTION 32 31 11

# SECTION 32 31 19 - DECORATIVE METAL FENCES AND GATES

## PART 1 - GENERAL

### 1.01 WORK INCLUDED

The contractor shall provide all labor, materials and appurtenances necessary for installation of the welded ornamental steel fence system defined herein.

### 1.02 RELATED WORK

Section 31 23 00 - Earthwork
Section 03 30 00 – Cast-In-Place Concrete

### 1.03 SYSTEM DESCRIPTION

The manufacturer shall supply a total fence system of Montage II® ***Welded and Rackable*** (ATF – All Terrain Flexibility) Ornamental Steel, Genesis™ design. The system shall include all components (i.e., panels, posts, gates and hardware) required.

### 1.04 QUALITY ASSURANCE

The contractor shall provide laborers and supervisors who are thoroughly familiar with the type of construction involved and materials and techniques specified.

### 1.05 REFERENCES

- ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy Coated (Galvannealed) by the Hot-Dip Process.
- ASTM B117 - Practice for Operating Salt-Spray (Fog) Apparatus.
- ASTM D523 - Test Method for Specular Gloss.
- ASTM D714 - Test Method for Evaluating Degree of Blistering in Paint.
- ASTM D822 - Practice for Conducting Tests on Paint and Related Coatings and Materials using Filtered Open-Flame Carbon-Arc Light and Water Exposure Apparatus.
- ASTM D1654 - Test Method for Evaluation of Painted or Coated Specimens Subjected to Corrosive Environments.
- ASTM D2244 - Test Method for Calculation of Color Differences from Instrumentally Measured Color Coordinates.
- ASTM D2794 - Test Method for Resistance of Organic Coatings to the Effects of Rapid Deformation (Impact).
- ASTM D3359 - Test Method for Measuring Adhesion by Tape Test.
- ASTM F2408 – Ornamental Fences Employing Galvanized Steel Tubular Pickets.

### 1.06 SUBMITTAL

The manufacturer’s literature shall be submitted prior to installation.

### 1.07 PRODUCT HANDLING AND STORAGE

Upon receipt at the job site, all materials shall be checked to ensure that no damage occurred during shipping or handling. Materials shall be stored in such a manner to ensure proper ventilation and drainage, and to protect against damage, weather, vandalism and theft.

**1.08 PRODUCT WARRANTY**

**A.** All structural fence components (i.e. rails, pickets, and posts) shall be warranted within specified limitations, by the manufacturer for a period of 20 years from date of original purchase. Warranty shall cover any defects in material finish, including cracking, peeling, chipping, blistering or corroding.

**B.** Reimbursement for labor necessary to restore or replace components that have been found to be defective under the terms of manufactures warranty shall be guaranteed for five (5) years from date of original purchase.

**PART 2 - MATERIALS**

**2.01 MANUFACTURER**

The fence system shall conform to Montage II® ***Welded and Rackable*** (ATF – All Terrain Flexibility) Ornamental Steel, Genesis™ design, extended picket bottom rail treatment, 3-Rail style, 5' height, manufactured by Ameristar Fence Products, Inc., in Tulsa, Oklahoma.

**2.02 MATERIAL**

**A.** Steel material for fence panels and posts shall conform to the requirements of ASTM A653/A653M, with a minimum yield strength of 45,000 psi (310 MPa) and a minimum zinc (hot-dip galvanized) coating weight of 0.90 oz/ft2 (276 g/m2), Coating Designation G-90.

**B.** Material for pickets shall be 1" square x 14 Ga. tubing. The rails shall be steel channel, 1.75" x 1. 75" x .105". Picket holes in the rail shall be spaced 4.715" o.c. Fence posts and gate posts shall meet the minimum size requirements of Table 1.

**2.03 FABRICATION**

**A.** Pickets, rails and posts shall be pre-cut to specified lengths. Rails shall be pre-punched to accept pickets.

**B.** Pickets shall be inserted into the pre-punched holes in the rails and shall be aligned to standard spacing using a specially calibrated alignment fixture. The aligned pickets and rails shall be joined at each picket-to-rail intersection by Ameristar's proprietary fusion welding process, thus completing the rigid panel assembly (Note: The process produces a virtually seamless, spatter-free good-neighbor appearance, equally attractive from either side of the panel).

**C.** The manufactured panels and posts shall be subjected to an inline electrodeposition coating (E-Coat) process consisting of a multi-stage pretreatment/wash, followed by a duplex application of an epoxy primer and an acrylic topcoat. The minimum cumulative coating thickness of epoxy and acrylic shall be 2 mils (0.058 mm). The color shall be Black. The coated panels and posts shall be capable of meeting the performance requirements for each quality characteristic shown in Table 2 (Note: The requirements in Table 2 meet or exceed the coating performance criteria of ASTM F2408).

**D.** The manufactured fence system shall be capable of meeting the vertical load, horizontal load, and infill performance requirements for Industrial weight fences under ASTM F2408.

**E.** Swing gates shall be fabricated using 1.75" x 14ga Forerunner double channel rail, 2" sq. x 12ga. gate ends, and 1" sq. x 14ga. pickets. Gates that exceed 6' in width will have a 1.75" sq. x 14ga. intermediate upright. All rail and upright intersections shall be joined by welding. All picket and rail intersections shall also be joined by welding. Gusset plates will be welded at each upright to rail intersection. Cable kits will be provided for additional trussing for all gates leaves over 6'. Gates may or may not be required, see Drawings.

**F.** Pedestrian swing gates shall be self-closing, having a gate leaf no larger than 48" width. Integrated hinge-closer set (2 qty) shall be ADA compliant that shall include a variable speed and final snap adjustment with compact design (no greater than 5" x 6" footprint). Hinge-closer set (2 qty) shall be tested to a minimum of 500,000 cycles and capable of self-closing gates up to a maximum gate weight of 260 lbs. and maximum weight load capacity of 1,500 lbs. Hinge-closer device shall be externally mounted with tamper-resistant security fasteners, with full range of adjustability, horizontal (.5" - 1.375") and vertical (0 - .5"). Maintenance free hinge-closer set shall be tested to operate in temperatures of negative 20 F to 200 F degrees, and swings to negative 2 degrees to ensure reliable final lock engagement.

## PART 3 - EXECUTION

### 3.01 PREPARATION

All new installation shall be laid out by the contractor in accordance with the construction plans.

### 3.02 FENCE INSTALLATION

Fence post shall be spaced according to Table 3, plus or minus ½". For installations that must be raked to follow sloping grades, the post spacing dimension must be measured along the grade. Fence panels shall be attached to posts with brackets supplied by the manufacturer. Posts shall be set in concrete footers having a minimum depth of 48". The "Earthwork" and "Concrete" sections of this specification shall govern material requirements for the concrete footer. Posts setting by other methods such as plated posts or grouted core-drilled footers are permissible only if shown by engineering analysis to be sufficient in strength for the intended application.

### 3.03 FENCE INSTALLATION MAINTENANCE

When cutting/drilling rails or posts adhere to the following steps to seal the exposed steel surfaces; 1) Remove all metal shavings from cut area. 2) Apply zinc-rich primer to thoroughly cover cut edge and/or drilled hole; let dry. 3) Apply 2 coats of custom finish paint matching fence color. Failure to seal exposed surfaces per steps 1-3 above will negate warranty. Ameristar spray cans or paint pens shall be used to prime and finish exposed surfaces; it is recommended that paint pens be used to prevent overspray. Use of non-Ameristar parts or components will negate the manufactures' warranty.

### 3.04 GATE INSTALLATION

Gate posts shall be spaced according to the manufacturers' gate drawings, dependent on standard out-to-out gate leaf dimensions and gate hardware selected. Type and quantity of gate hinges shall be based on the application; weight, height, and number of gate cycles. The manufacturers' gate drawings shall identify the necessary gate hardware required for the application. Gate hardware shall be provided by the manufacturer of the gate and shall be installed per manufacturer's recommendations.

### 3.05 CLEANING

The contractor shall clean the jobsite of excess materials; post-hole excavations shall be scattered uniformly away from posts.

**Table 1 – Minimum Sizes for Montage II Posts**

| Fence Posts | Panel Height | | |
|---|---|---|---|
| 2-1/2" x 12 Ga. | Up to & Including 6' Height | | |
| 3" x 12 Ga. | Over 6' Up to & Including 8' Height | | |
| | | | |
| Gate Leaf | Gate Height | | |
| | Up to & Including 4' | Over 4' Up to & Including 6' | Over 6' Up to & Including 8' |
| Up to 4' | 2-1/2" x 12 Ga. | 3" x 12 Ga. | 3" x 12 Ga. |
| 4'1" to 6' | 3" x 12Ga. | 4" x 11 Ga. | 4" x 11 Ga. |

| | | | |
|---|---|---|---|
| 6’1” to 8’ | 3” x 12 Ga. | 4” x 11 Ga. | 6” x 3/16” |
| 8’1” to 10’ | 4” x 11 Ga. | 6” x 3/16” | 6” x 3/16” |
| 10’1” to 12’ | 4” x 11 Ga. | 6” x 3/16” | 6” x 3/16” |
| 12’1” to 14’ | 4” x 11 Ga. | 6” x 3/16” | 6” x 3/16” |
| 14’1” to 16’ | 6” x 3/16” | 6” x 3/16” | 6” x 3/16” |

**Table 2 – Coating Performance Requirements**

| Quality Characteristics | ASTM Test Method | Performance Requirements |
|---|---|---|
| Adhesion | D3359 – Method B | Adhesion (Retention of Coating) over 90% of test area (Tape and knife test). |
| Corrosion Resistance | B117, D714 & D1654 | Corrosion Resistance over 1,500 hours (Scribed per D1654; failure mode is accumulation of 1/8” coating loss from scribe or medium #8 blisters). |
| Impact Resistance | D2794 | Impact Resistance over 60 inch lb. (Forward impact using 0.625” ball). |
| Weathering Resistance | D822 D2244, D523 (60˚ Method) | Weathering Resistance over 1,000 hours (Failure mode is 60% loss of gloss or color variance of more than 3 delta-E color units). |

**Table 3 – Montage II – Post Spacing By Bracket Type**

| Span | For INVINCIBLE® 8’ Nominal (91-1/2” Rail) | | | | For CLASSIC, GENESIS, & MAJESTIC 8’ Nominal (92-5/8” Rail) | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Post Size | 2-1/2” | 3” | 2-1/2” | 3” | 2-1/2” | 3” | 2-1/2” | 3” | 2-1/2” | 3” |
| Bracket Type | Industrial Flat Mount (BB301)* | | Industrial Line 2-1/2” (BB319) 3” (BB320) | | Industrial Universal 2.5” (BB302) 3” (BB303) | | Industrial Flat Mount (BB301) | | Industrial Swivel (BB304)* | |
| Post Settings ± ½” O.C. | 94-1/2” | 95” | 94-1/2” | 95” | 96” | 96-1/2” | 96” | 96-1/2” | *96” | *96-1/2” |

*Note: When using BB304 swivel brackets on either or both ends of a panel installation, care must be taken to ensure the spacing between post and adjoining pickets meets applicable codes. This will require trimming one or both ends of the panel. When using the BB301 flat mount bracket for Invincible style, rail may need to be drilled to accommodate rail to bracket attachment.

END OF SECTION 32 31 19

# SECTION 32 90 00 – LANDSCAPING

## PART 1 – GENERAL

### 1.01 – SCOPE

A. In general, the work of this section includes all labor, materials, equipment, and services necessary to furnish and install landscaping work as shown on the Drawings, and all additional work specified hereinafter in this section.

B. Work includes but is not necessarily limited to:

1. All drawings and material to complete all landscape work noted on drawings or specified as follows:

a. Fine Grading
b. Seeding (all areas disturbed by construction)
c. Sodding (as shown on landscape plan)
d. Planting, mulching, edging

### 1.02 – RELATED WORK SPECIFIED ELSEWHERE

A. Asphalt Paving

B. Excavating

C. Concrete

### 1.03 – COORDINATION AND INSPECTION

A. Examine existing conditions and related work of other Sections. Report deficiencies and discrepancies immediately and do not proceed before satisfactory correction is completed.

B. Carefully coordinate with other sections all interfacing conditions and procedures.

C. Proceeding with landscape work constitutes acceptance of soil conditions by Landscape Contractor as adequate.

### 1.04 – QUALITY ASSURANCE

A. Comply with all applicable codes and standards promulgated by governmental and trade authorities.

B. Reference Standards:

1. American Standard for Nursery Stock, ANSI Z60.1 – 1969.

2. Standardized Plant Names 1942 Edition, American Joint Committee on Horticultural Nomenclature.

1.05 – SUBMITTALS

A. Submit all shop drawings, samples, test, data certificates as required and as requested by Architect to demonstrate compliance with contract documents and proper interface with existing conditions and related work of other trades.

B. Submit descriptive list of plantings and materials for approval.

1.06 – PROTECTION AND PRODUCT HANDLING

A. Use all means necessary to protect the work and material of this and other sections before, during after installation.

B. In the event of damage, be responsible for immediate necessary repairs and replacement per approval of Architect and at no additional cost to the Owner.

## PART 2 – PRODUCTS

2.01 – GENERAL

A. Materials shall be identifiably packaged in unopened containers to indicate composition and quality; or certification of compliance to specifications shall be furnished to Architect prior to use.

2.02 – MATERIALS

A. Topsoil: Topsoil is to be furnished and spread by excavating contractor. This contractor shall include top dressing of topsoil only.

B. Fertilizer: Fertilizer shall contain nutrients in the following minimum percentages by total weight: Nitrogen 10%, phosphorix acid 10%, potash 10%. One half of the nitrogen shall be from organic sources or urea-form. Complete commercial standard product complying with State and Federal laws.

C. Peat Moss: Ground or shredded horticultural grade moss peat, shall be supplied in bales from a commercial source. Acidity shall be pH4.0-7.0. It shall contain not less than 90% organic matter by weight on an oven-dry basis. Ash content shall not exceed 10%.

D. Shredded Bark Mulch: Shall consist of either a mixed hardwood species or pine alone. Sixty (60) percent of the shredded bark particles shall range between one (1) and three (3) inches in length; the remaining forty (40) percent shall be less than one (1) inch in length. The maximum width of the particles shall not exceed one and one-half (1 ½) inches.

E. Guying and Staking: Sizes as indicated on schedule.

1. Hose: Suitable length, two ply, reinforced black rubber hose, ¾" inside diameter.

2. Wood Stakes: 2" X 2" sound, uniform oak, or clear fir, pointed at one end or steel tree stakes.

F. Plants:

1. Nomenclature: Scientific and common names used for the plants are generally in confirmity with "Standardized Plant Names". The names of varieties are generally in conformity with the names accepted in Nursery trade. See drawings for Plant List, methods of planting guying and staking.

2. Plant material size and measurement shall conform to American Standard for Nursery Stock, ANSI Z60.1, 1969.

3. Unless specifically noted otherwise, all plants shall be of selected specimen quality, exceptionally heavy and symmetrical tightly knit. All plants shall have a normal habit of growth and shall be sound healthy, vigorous plants with well developed root systems. Plants shall be free of disease, insect pests, eggs or larvae.

4. Plants shall not be pruned before delivery. Trees which have a damaged or crooked leader, or multiple leaders, unless specifically specified, will be rejected. Trees with abrasion of bark, sun-scalds, disfiguring knots, or fresh cuts of limbs over 1 ¼" which have not completely calloused, will be rejected. Plants shall be freshly dug. No heeled in plants from cold storage will be accepted.

5. Plant Name and Size: Plants shall be measured when branches are in their normal position. Height and spread dimensions specified refer to the main body of the plant and not from branch tip to branch tip. Caliper measurement shall be taken at a point on the trunk 6" above natural ground line for trees up to 4" in caliper and at a point 12" above the natural ground line for tree over 4" in caliper. If a range size is given, no plant shall be less than the minimum size and not less than 50% of the plants shall be as large as the upper half of the range specified. The measurements specified are the minimum size acceptable and are the measurements after pruning, where pruning is required. Plants that meet the measurements specified, but do not posses a normal balance between height and spread, shall be rejected. Shrubs shall be matched specimens from a single block source.

6. Plants shall be true to species and variety and shall conform to measurements specified in the Plant Lists, except that plants larger than specified may be used if approved by the Landscape Architect. Plant quantities shall conform to planting plan. Use of such plants shall not

increase the Contract Price. If larger plants are approved, the ball of earth shall be increased in proportion to the size of the plant.

7. Substitutions of plant materials WILL NOT BE permitted unless authorized in writing by the Landscape Architect. If proof is submitted that any plant specified is not obtainable, a proposal will be considered for use of the nearest equivalent size or variety with a corresponding adjustment of the Contract. Such proof shall be substantiated and submitted in writing.

8. Selection and Tagging: Plants shall be subject to inspection and approval by the Landscape architect at their place of growth and upon delivery for conformity to specification requirements.

9. Balled and Burlapped Plants: All plants shall be adequately balled with firm natural balls of earth of diameter and depth not less than that recommended by the American Standard for Nursery Stock. Balls shall be firmly wrapped with burlap. All plants which are 2" in caliper or over shall be drumlaced. All plants which are 6" in caliper or over shall be double burlapped. No balled plants shall be planted if the ball is cracked or broken either before or during the process of planting.

10. Protection Against Drying: Root balls shall be adequately protected at all times from sun and from drying winds. All balled and burlapped plants which cannot be planted immediately upon delivery shall be set on the ground and shall be well protected with soil, or other acceptable material. Plants shall not remain unplanted for longer than three days after delivery.

G. Seed: Lawn seed shall be Wisconsin State inspected for germination and weed seed content, delivered in sacks tagged by suppliers. Seed to consist of 60% Kentucky Blue 98-85 purity, 15% Chewing Fescue, 15% Red Fescue, 10% Perennial Ryegrass. Fertilizer shall be a commercial blend which contains percentages by weight of 10% nitrogen, 10% phosphorus and 10% potash.

H. Sod: Sod shall be dense well rooted and healthy grown turf containing 60% minimum of Kentucky Blue Grass and free of undesirable plants, weeds, stones, and other foreign materials. Sod shall be cut in uniform strips with a thickness of not more than 1 ½" and have grass approximately 2" high.

1. Sod shall be placed within 48 hours of cutting and shall be protected and maintained during transit, or storage site, as necessary to insure vigorous growth after placement. Sod remaining on the site unplaced after 48 hours shall be rejected. All yellowing or otherwise discolored sod will be rejected.

I. Edging: Commercial type steel medium duty edging. 3/16" X 4" min. with tapered 16" stakes at 30" o.c.. Ryerson Steel Edging.

## PART 3 – EXECUTION

### 3.01 – GENERAL

A. Personnel: Landscape work shall be performed by experienced personnel under the supervision of a qualified planting foreman.

### 3.02 – SEEDING/SODDING

A. Planting Seasons:

1. Seeded lawns shall be planted between April 15 and June 1 and/or August 15 to October 15. Weather conditions within the season shall govern actual planting periods. The Contractor, at his option and responsibility, without additional compensation may plant grass seed under unseasonable conditions subject to Landscape Architect's approval as to time of work and methods of operation.

2. Sod shall be placed between March 15 and June 30 or September 1 and November 15, unless otherwise directed by the Landscape Architect.

B. Fine Grading: Fine grading and topsoil is to be provided by the Excavating Contractor.

C. Seeding:

1. Prior to seeding operations, the areas shall be fertilized at the rate of 10 pounds per one thousand square feet. Work fertilizer into topsoil a depth of 2". The areas shall then be dragged with a float to compact and level the surface.

2. Seed at rate of 4 pounds per one thousand square feet. Additional Annual Rye shall be placed on all slopes which rise more than 1 foot in 5, at the rate of .75 pound per 1,000 sq. ft. Contractor may sod slopes in lieu of seeding, at his option.

3. After completion of seeding operations apply a uniform blanket of straw mulch. Hydroseeding is acceptable.

4. After seeding is completed, water with fine spray to penetrate soil to a depth of 3". Water as required to keep soil moist.

D. Maintenance: Maintain lawn areas until date of substantial completion of the project, or if planting occurs after this date, maintain for a minimum period of 30 days after all areas show catch or uniform stand or permanent grasses.

E. Sodding:

1. Prior to sodding operations, the areas shall be fertilized at rate of 3 pounds per 1,000 sq. ft. Work fertilizer into topsoil a depth of 2". The areas shall then be dragged with a float to compact and level the surface.

2. Lay sod snugly in horizontal strips with alternating joints and tamp firmly and evenly to assure an installation without voids.

3. Finished surface shall be true to grade, smooth and equally firm at all points. Water slowly with a fine spray to minimum depth of 4".

4. Maintenance: Damage which occurs prior to acceptance of work resulting from erosion, gulleys, washouts or other causes shall be repaired by filling with topsoil, ramping, refertilizing and resodding. At intervals, as may be required according to seasonal conditions, water grass, do necessary weeding and mow to height of two inches.

F. Acceptance:

1. An inspection of the lawn will be made upon written request to the Architect. Notify Architect at least 10 days before end of maintenance period and arrange inspection date. Inspection for acceptance will be made at end of maintenance period.

2. All areas showing a uniform stand of healthy turf will be accepted. Areas which fail to show a uniform stand for any reason whatsoever shall be replanted with such replanting repeated until areas show uniform growth. Such areas shall be maintained by the Contractor until acceptance.

## 3.03 – PLANTING

A. Personnel: The planting shall be performed by personnel familiar with accepted procedure of Planting and under the constant supervision of a qualified planting foremen.

B. Planting Season: Deciduous plants shall be planted only when dormant, that is, before leaves appear in the Spring and subsequent to their loss in the fall, unless otherwise directed by the Landscape Architect.

1. Evergreen plants may be planted in the Spring until new growth appears and any time between September 15 and November 30.

C. Planting of Trees, Shrubs, and Groundcover: Unless otherwise directed by the Landscape Architect the indication of a plant on the plan is to be interpreted as including the gidding of a hole, furnishing a plant of the specified size, the work of planting and mulching, and guying, staking, wrapping and maintenance where called for.

D. Planting Coordination: Consult the Planting plan on the drawings for type and size of trees and shrubs.

1. The Contractor shall be responsible for selection and tagging at nurseries stocking the specified materials. However, at the Landscape Architect's option, he may accompany the Contractor to nurseries to "tag" any or all materials.

2. Contractor shall inform the Landscape Architect when planting will commence, anticipated delivery date of material and have made and provided for the staking of all plants and plant beds.

3. Failure to notify the Landscape Architect in advance, in order to arrange proper scheduling may result in loss of time or removal of any plant or plants not installed as specified or directed.

4. One or more topsoil stockpiles of approved quality loam for planting shall be maintained at all times during the planting operations.

E. Staking: Locations for all plants and outlines for planting beds shall be staked on the ground and must be approved by the Landscape Architect before any excavation is made. Adjustments in locations and outlines shall be made as directed. In the event that pits or areas for planting are prepared and back-filled with topsoil to grade prior to commencement of lawn operations, they shall be so marked that when the work of planting proceeds, they can be readily located. In case underground obstructions such as ledge or utilities are encountered, locations shall be changed under the direction of the Landscape Architect without extra charge.

F. Testing Plant Material Holes: If stone, underground construction work, tree roots, poor drainage or obstructions are encountered in the excavation of tree pits, alternate locations may be selected by the Landscape Architect. Where locations cannot be changed as determined by the Landscape Architect, submit cost required to remove the obstructions to a depth of not less than 6" below the required pit depth. Proceed with work after approval of the Landscape Architect.

1. Planting Soil for trees, shrubs and groundcover shall be:

    a. 50% existing soil
    b. 50% topsoil

G. Installing Plants: All plant roots and earthballs must be kept damp and thoroughly protected from sun and drying winds at all times from the beginning until the final operation, during transportation, and on the ground until the final operation of planting. The plants shall be planted in the center of the holes and at the same depth as they previously grew. Planting soil shall be back-filled in layers of not more than 9" and each layer tamped before the next layer is put in place. Enough topsoil shall be used to bring the surfaces to finish grade when settled.

1. Cut ropes or strings from top ball after plant has set. Leave burlap wrapping intact around balls. Turn under and bury portions of burlap exposed at top of ball.

2. A saucer shall be provided around each plant as shown on the drawings.

3. Plant pits shall be saturated with water twice within 24 hours of planting.

4. Pruning: Prune new plants only at time of planting and according to standard horticultural practice to preserve the natural character of the plant. Pruning to be done under the supervision of Landscape Architect. Pruning and trimming shall include the following: remove all dead wood, suckers, and broken or badly bruised branches. Use only clean, sharp tools.

5. Mulching: Provide mulch over the surface of all saucers and over the area of shrub beds at 3" minimum.

## 3.04 – PLANT MAINTENANCE AND ACCEPTANCE

A. Maintenance of Trees, Shrubs, and Groundcover: Maintenance shall begin immediately after each plant is planted and shall continue until substantial completion or acceptance with the following requirements.

1. Maintenance of new planting shall consist of pruning, watering, cultivating, weeding, mulching, resetting plants to proper grades or upright position, restoration of the planting saucer, and furnishing and applying such sprays as are necessary to keep the planting free of insects and disease.

2. Planting areas and plants shall be protected at all times against trespassing and damage of all kinds for the duration of the maintenance period. If any plants become damaged or injured, they shall be treated or replaced as directed by the Landscape Architect at no additional cost to the Owner.

3. Upon substantial completion and reinspection of all repairs or renewals necessary, in the judgement of the Landscape Architect shall certify in writing to the Owner as to the acceptance or substantial completion and one year guarantee period shall begin.

4. The Owner will be responsible for the maintenance of the new planting after substantial completion during the one year guarantee period.

B. Acceptance of Trees, Shrubs, and Groundcover: The Landscape Architect shall inspect all work for substantial completion upon written request of the Contractor. The request shall be received at least 10 calendar days before the anticipated date of inspection.

1. Acceptance of plant materials by the Landscape Architect shall be for conformance to specified size, character and quality and shall not relieve the Contractor or responsibility for full conformance to the Contract Documents including correct species.

C. Acceptance in Part: Portions of the work of lawns and planting may be accepted in part upon Landscape Architect's approval. Lawn areas or planting may be accepted exclusive of each other if it is in the best interest of the Owner.

D. Guarantee of Trees, Shrubs, and Groundcover: The contractor shall guarantee trees, shrubs and groundcover for a period of one year from the date of substantial completion to be in good, healthy and flourishing condition.

The Contractor shall make as many periodic inspections as necessary, at no extra cost to the Owner, during the guarantee period to determine the changes, if any, should be made to the Owner's maintenance program. Submit in writing, to the Owner and Landscape Architect, any recommended changes.

E. Final Inspection and Final Acceptance of Trees, Shrubs, and Groundover:

1. At the end of the guarantee period, the Landscape Architect shall inspect all guaranteed work for final acceptance upon request of the Contractor. The request shall be received at least 10 calendar days before the anticipated date for final inspection.

2. Upon final inspection and reinspection of all replacements or repairs necessary in the judgement of the Landscape Architect at that time, the Landscape Architect shall certify in writing to the Owner as to the Final Acceptance of the project.

F. Replacement of Trees, Shrubs, and Groundcover: The Contractor shall replace, without cost of the Owner, and as soon as weather conditions permit, and within a specified planting period, all dead plants and all plants not in a vigorous, thriving condition as determined by the Landscape Architect during drying branches and branch tips, and shall bear foliage of a normal density, size or color. Replacements shall closely match adjacent specimens of the same species.

1. The Contractor shall make all necessary repairs due to plant replacements. Such repairs shall be done at no extra cost to the Owner.

G. Materials and Operations: All replacement shall be plants of the same kind and size specified on the Plant List. They shall be furnished and planted as specified. The cost shall be borne by the Contractor. After substantial Completion and Acceptance replacements resulting from the removal, loss or damage, due to occupancy of the project in any part, vandalism or acts of neglect on the part of others, physical damage by animals, vehicles, etc., and losses due to curtailment of water by local authorities, will be approved and paid for by the Owner.

**END OF SECTION 32 90 00**