

**STATE OF NEW HAMPSHIRE  
DEPARTMENT OF NATURAL AND CULTURAL RESOURCES  
DIVISION OF PARKS AND RECREATION  
PLANNING AND DEVELOPMENT**

172 Pembroke Road  
P.O. Box 1856  
Concord, NH 03302-1856  
Tel. (603) 271-2606 Fax (603) 271-2629

PROJECT MANUAL

Project No.: CAP 2003

Milan Hill State Park

## Park Office New Foundation

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72 Fire Tower Road  
Milan, New Hampshire 03588

December 10, 2019

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**SECTION 00 11 16**

**INVITATION TO BID**

PARK OFFICE NEW FOUNDATION  
CAP 2003  
MILAN, NEW HAMPSHIRE

1. **Sealed Bids:** Proposals for a General Contract for the Construction of the above project will be received by the Owner until 2:00 P.M. prevailing time on Tuesday, February 18, 2020, at which time they will be publicly opened and read aloud. All Bids shall be made out only on the form included in the specifications package and delivered in sealed, labeled envelope marked: Bid Proposal for Milan Park Office New Foundation and deposited in the bid box located at the reception desk of the Department of Natural and Cultural Resources (DNCR) offices at 172 Pembroke Road in Concord, NH. Bidders are invited to attend the Bid opening. Bids received after the above stated time and date will not be accepted.
2. **Technical Questions:** Questions regarding the Bidding Documents shall be referred to: Department of Natural and Cultural Resources, 172 Pembroke Road, Concord New Hampshire, 03301, Telephone (603) 271-2606, attention Scott Coruth, Architect.
3. **Documents:** Bidding Documents may be examined at the Planning and Development Section of DNCR, 172 Pembroke Road, Concord NH and at the following locations:

**Construction Summary of New Hampshire Inc.:** 734 Chestnut Street, Manchester, New Hampshire 03104, (603) 627-8856, [www.constructionsummary.com](http://www.constructionsummary.com)

**Infinite Imaging:** 933 Islington Street, Portsmouth, NH 03801, (800) 581-2712 or (603) 436-3030, [www.planroom.infiniteimaging.com](http://www.planroom.infiniteimaging.com)

**McGraw-Hill Construction:** [www.construction.com](http://www.construction.com)

**Signature Digital Imaging:** 45 Londonderry Turnpike, Hooksett, NH 03106, (603) 624-4025, [www.signaturenh.com](http://www.signaturenh.com)

**Works in Progress:** 20 Farrell Street, Suite 103, South Burlington, VT 05403. (800) 286 3633 or (802) 658-3797

**New Hampshire Department of Administrative Services Bureau of Purchase and Property Website:** <http://admin.state.nh.us/purchasing/vendorresources.asp>

**New Hampshire State Parks Website:** [www.nhstateparks.org](http://www.nhstateparks.org) under the News & Events tab improvement projects sub tab

4. **Qualifications:** All companies, corporations, and trade names bidding must be registered and have a Certificate of Existence from the New Hampshire Secretary of State's Office, Corporate Division (telephone 603-271-3244) in order to do business with the State of New Hampshire

5. Bid Security: A Bid Bond in the amount of five (5%) percent of the total amount of the lump sum bid price shall accompany each Bid Proposal in accordance with the Instructions to Bidders.
6. Bonds: Bidders shall be required to provide the Owner with financial responsibility as security for the completion of the contract in accordance with the plans, specifications and contract documents, in the form of a Performance and Payment Bond in the amount of One Hundred (100%) Percent of the contract award, if the contract award is thirty-five thousand dollars (\$35,000) or more, the cost of which shall be a part of the Base Bid. The form of bond and the surety shall be acceptable to the Commissioner. No contract bond shall be required on contract awards of less than thirty-five thousand dollars (\$35,000).
7. Inspection of Site: Bidders are expected to thoroughly inspect existing building and site conditions prior to submission of Proposals.
8. Awards: In most cases the proposal submitted by the qualified bidder with the lowest base bid price shall be selected. However, the Department of Natural and Cultural Resources (DNCR) reserves the right to reject any or all proposals, or advertise for new proposals as it judges to be in the best interest of the state.
9. Regulations: Bidders' attention is called to the fact that this Project is required to comply with, in addition to all other requirements of the Contract Documents, Equal Employment Opportunity and Affirmative Action Regulations.

**END OF INVITATION TO BID**

**SECTION 00 21 13**

**INSTRUCTIONS TO BIDDERS**

**DEFINITIONS**

1. Definitions set forth in the General Conditions of the Contract for Construction, AIA Document A201, or in other Contract Documents are applicable to the Bidding Documents.
2. Bidding Documents include the Bidding Requirements and the proposed Contract Documents. The Bidding Requirements include the Invitation to Bid, Instructions to Bidders, the Proposal Form and other sample Bidding and Contract forms.
3. Addenda are written or graphic instruments issued prior to the execution of the Contract. They modify or interpret the Bidding Documents by additions, deletions, clarifications, or corrections. Addenda will become part of the Contract Documents when the Construction Contract is executed.
4. A Bid is a complete and properly signed Proposal to do the Work or designated portion thereof for the sums stipulated therein, submitted in accordance with the Bidding Documents.
5. The Base Bid is the sum stated in the Bid for which the Bidder offers to perform the Work described in the Bidding Documents as the base, to which Work may be added or deducted for sums stated in Alternate Bids.
6. An Alternate Bid (or Alternate) is an amount stated in the Bid to be added to or deducted from the amount of the Base Bid if the corresponding change in Work, as described in the Bidding Documents, is accepted.
7. A Unit Price is an amount stated in the Bid as a possible price per unit of measurement for materials, equipment, services or a portion of the Work as described in Bidding Documents. The choice of using Unit Prices, or an alternative method of payment, for additional Work shall be left solely to the Owner's discretion.
8. A Bidder is a person or entity who submits a Bid.
9. A Sub-Bidder is a person or entity who submits a bid to a Bidder for materials, equipment or labor for a portion of the Work.

**BIDDER'S REPRESENTATION**

1. Each Bidder by making his Bid represents that he has examined and understands the Bidding Documents, that the Bidding Documents are adequate to produce the required results, and that his Bid is in accordance therewith.

2. Each Bidder by making his Bid represents that he has visited and thoroughly inspected the existing building and site and familiarized himself with the local conditions under which the Work will be performed. Bidders are encouraged to make any and all inspections and tests as they feel necessary to achieve such familiarization prior to submitting Bids. Such inspections and tests shall be conducted at times mutually acceptable to the Owner and Bidder. Unless waived by the Owner, Bidders shall make repairs following their testing, as necessary to restore tested areas to pre-testing condition. Should a Bidder conclude that time or other factor(s) prohibits him from performing sufficient tests, he shall so notify the Owner, in writing, prior to the receipt of Bids.
3. The submission of a Bid will be construed as conclusive evidence that the Bidder has made all such examinations and inspections necessary for a complete and proper assessment of the Work required, and that the Bidder has included in his Bid a sum sufficient to cover the cost of all items necessary to perform the Work as set forth in the proposed Contract Documents. No allowance will be made to a Bidder because of lack of such examination, inspection or knowledge.
4. Each Bidder by making his Bid represents that he has assessed the conditions of the current construction marketplace, and verified that an adequate, experienced workforce is available to suitably man the Work of this Project, and complete it in a timely fashion.
5. Each Bidder is assumed to have made himself familiar with all Federal, State and Local laws, ordinances and regulations which in any manner affect those engaged in or upon the Work, or in any way affect those engaged or employed in the Work, and no plea of misunderstanding will be considered on account of ignorance thereof. The Contractor shall comply with all taxes, fees and assessments as levied by Federal, State and Local authorities.

## **BIDDING PROCEDURES**

1. All Bids must be prepared on the Proposal forms provided in the Specification and submitted in duplicate copies in accordance with the Notice to Bidders and Instructions to Bidders.
2. A Bid shall be invalid if it has not been deposited at the designated location prior to the time and date in the Invitation to Bid, or prior to any extension thereof issued to the Bidders.
3. Each copy of a Bid shall be signed by the person or persons legally authorized to bind the Bidder to a Contract. A Bid by a corporation shall further give the state of incorporation and have a corporate seal affixed.
4. Unless otherwise provided in any supplement to these Instructions to Bidders, no Bidder shall modify, withdraw or cancel his Bid or any part thereof for Ninety (90) days after the time designated for the receipt of Bids in the Notice to Bidders.
5. Prior to the receipt of Bids, Addenda will be e-mailed, mailed or delivered to each person or firm recorded by the Owner as having received the Bidding Documents and will be available for inspection wherever the Bidding Documents are kept available for that purpose.

## **BID SECURITY**

1. Bid Security shall be made payable to the Owner, in the amount of not less than five percent (5%) of the Bid Sum and shall be attached to the Bid. Security shall be either a certified check or Bid Bond issued by surety licensed to conduct business in the State of New Hampshire. The successful Bidder's security will be retained until he has signed the Agreement or Contract and furnished the required Performance and Payment Bonds and Certificates of Insurance. The Owner reserves the right to retain the Security of the next two lowest Bidders until the low Bidder enters into a Contract, or until Ninety (90) days after Bid opening, whichever occurs first. Bid Security of all other Bidders will be returned as soon as practicable. If any Bidder refuses to enter into an Agreement or Contract, the Owner will retain his Bid Security as liquidated damages, but not as a penalty.

### **EXAMINATION OF BIDDING DOCUMENTS**

1. Each Bidder shall examine the Bidding Documents carefully and, not later than seven (7) days prior to the date of receipt of Bids, shall make written request to the Owner for interpretation or correction of any ambiguity, inconsistency or error therein, which he may discover. Any interpretation or correction will be issued as an Addendum by the Owner. Only a written interpretation or correction by Addendum will be binding. No Bidder shall rely upon any interpretation or correction given by any other method. Bidders are encouraged to direct any questions which may arise to the Owner, in order to provide necessary clarifications prior to the receipt of Bids. Bidders shall promptly notify the Owner of any ambiguity, inconsistency or error which they may discover upon examination of the Bidding Documents, or the existing building, site or local conditions. Should a Bidder fail to notify the Owner of errors, discrepancies or contradictions, he shall be assumed to have bid the more expensive alternative.

### **SUBSTITUTIONS**

1. Each Bidder represents that his Bid is based upon the materials and equipment described in the Bidding Documents. Where the language "or approved equal" is used in the Bidding Documents, it is intended to require that all such materials and equipment shall be submitted as required by these Instructions to Bidders, and approved by the Owner prior to the receipt of Bids.
2. No substitution will be considered unless written request has been submitted to the Owner for approval at least seven (7) days prior to the date for receipt of Bids. Each such request shall include a complete description of the proposed substitute, the name of the material or equipment for which it is to be substituted, drawings, cuts, performance and test data and any other data or information necessary for a complete evaluation. A statement identifying changes in other materials, equipment or other portions of the Work that incorporation of the proposed substitution would require shall also be included.
3. If a Bidder proposes to use a material which, while suitable for the intended use, deviates in any way from the detailed requirements of the Contract Documents, he shall inform the Owner in writing of the nature of such deviations at the time the material is submitted for approval. It shall be the responsibility of the Bidder to notify the Owner, in writing, of the presence of Asbestos or any other hazardous materials in any proposed substitution. Such written notice shall be in the

form of a cover letter attached to the related documents.

4. In requesting approval of deviations or substitutions, a Bidder shall provide, upon request, evidence leading to a reasonable certainty that the proposed substitution or deviation will provide a quality of result at least equal to that otherwise attainable. If, in the opinion of the Owner, the evidence presented by the Bidder does not provide a sufficient basis for such reasonable certainty, the Owner may reject such substitution or deviation without further investigation.
5. In requesting approval of substitutions, a Bidder represents that he will provide the same warranty and/or guarantee for the substitution that he would for that specified.
6. The Contract Documents are intended to produce a building and site improvements of consistent character and quality of design. The Owner shall judge the design and appearance of proposed substitutes on the basis of their suitability in relationship to the overall design of the project, as well as for their intrinsic merits. The Owner will not approve as equal to materials specified proposed substitutions which, in his opinion, would be out of character, obtrusive, or otherwise inconsistent with the character or quality of design of the project.
7. The Contractor shall be solely responsible for coordinating the installation of accepted substitutions, making such changes as may be required for the Work to be complete in all respects. Any additional cost, or any loss or damage arising from the substitution of any material or any method for those originally specified shall be borne by the Contractor, notwithstanding approval or acceptance of such substitution by the Owner, unless such substitution was made at the written request or direction of the Owner.
8. The burden of proof of the merit of a proposed substitution is upon the proposer. Approval of a proposed substitution is valid only upon issuance by the Owner in written form, and the Owner's decision of approval or disapproval of a proposed substitution shall be considered final.

#### **PRECONSTRUCTION CONFERENCE**

1. Either before or soon after the actual award of the Contract (but in any event prior to the start of construction), the Contractor or his representative and his principal subcontractors shall attend a preconstruction conference with representatives of the Owner. The conference will serve to acquaint the participants with the general plan of contract administration and requirements under which the construction operation is to proceed.

#### **END OF INSTRUCTIONS TO BIDDERS**



**SECTION 00 41 00**

**BID PROPOSAL FORM**

**Project No.**                **CAP #2003**

**PROJECT:**                **Park Office New Foundation**  
72 Fire Tower Road  
Milan, NH 03588

**DATE BID OPENING:** **February 18, 2020** at 2:00 pm at DNCR's office at 172 Pembroke Road,  
Concord, NH

**START DATE:**            **May 18, 2020**

**COMPLETION DATE:** **September 4, 2020**

Sealed bid proposals for the above project will be accepted until **2:00 p.m., February 18, 2020**. Bids may be deposited in the bid box at DNCR's offices in Concord or mailed to the attention of Scott Coruth, Architect, Department of Natural and Cultural Resources (DNCR), 172 Pembroke Road, Concord NH 03301. Please note on the outside of the sealed envelope: Bid Proposal for Milan Park Office New Foundation.

**DATE:** \_\_\_\_\_

**PROPOSAL OF:** \_\_\_\_\_

**GRAND TOTAL / LUMP SUM BASE BID (A+B):** \_\_\_\_\_

# PROPOSAL

## Proposal of...

(name)

(address)

To furnish and deliver all materials except as noted and to perform all work in accordance with the Contract of the State of New Hampshire, Department of Natural and Cultural Resources for the construction of...

Project: **CAP #2003** **Park Office New Foundation**  
72 Fire Tower Road  
Milan, NH 03588

Commissioner  
Department of Natural and Cultural Resources  
172 Pembroke Road, P.O. Box 1856  
Concord, N.H. 03302-1856

Commissioner:

In accordance with the advertisement of the Department of Natural and Cultural Resources inviting proposals for the project herein before named and in conformity with the Plans and Specifications on file in the office of the Department of Natural and Cultural Resources, \_\_\_\_\_ (firm name) hereby certifies that \_\_\_\_\_ is/are the only person, or persons, interested in this proposal as principals; that this proposal is made without collusion with any person, firm, or corporation; that an examination has been made of the Plans, of the Standard Specifications, and Special Attentions, Supplemental Specifications, and Special Provisions, all of which are attached hereto, and also of the site of the work; and I, or we, propose to furnish all necessary machinery, equipment, tools, labor, and other means of construction, and to furnish all materials specified in the manner and at the time prescribed; and understand that the quantities of work as shown herein are approximate only and are subject to increase or decrease, and further understand that all quantities of work are to be performed at the quoted prices.

To execute the form of contract and begin work within 15 (fifteen) days after the notice to proceed has been received or otherwise delivered to the contractor and to prosecute said work until its completion.

**It is further proposed:**

To furnish a contract bond in the amount of one hundred percent (100%) of the contract award, if the contract award is thirty-five thousand dollars (\$35,000) or more, as security for the completion of the contract in accordance with the plans and specifications and contract documents. The form of bond shall be that provided for by the Department, and the surety shall be acceptable to the Commissioner. No contract bond shall be required on contract awards of less than thirty-five thousand dollars (\$35,000).

To guarantee all of the work performed under this contract to be done in accordance with the plans and specifications and contract documents.

Enclosed, herewith, find certified check or bid bond in the amount of 5% of the total amount of the Lump Sum Price made payable to the "Treasurer, State of New Hampshire" as a proposal guarantee which is understood, will be forfeited in the event the form of contract is not executed, if awarded to the undersigned. Note: Personal checks will not be accepted as a proposal guarantee.

The undersigned acknowledges receipt of the following addenda, issued during the bidding time, and states that these have been incorporated in the proposal:

Addendum #1 dated \_\_\_\_\_

Addendum #2 dated \_\_\_\_\_

Addendum #3 dated \_\_\_\_\_

Dated \_\_\_\_\_

**ALLOWANCE #1: Unanticipated Modification and/or Additions to Contract Items:**

Include in the Contract, a stipulated sum/price of \$25,000 for use upon the Project Managers instruction. This Allowance will make money available for modifications and/or additions to contract items due to owner-initiated changes, or for unknown, latent or differing existing conditions, or for the removal of hazardous materials that are encountered by construction.

- a. Contractor's costs for products, delivery, installation, labor, insurance, payroll, taxes, equipment rental, overhead and profit will be included in Change Orders authorizing expenditure of funds from this Allowance. The cost of the bond for the amount of Allowance shall be included as part of the lump sum base bid.
- b. Funds will be drawn from an Allowance only by Change Order. Contractor can proceed with Change Order Work against Allowance with direction from the Project Manager. The Contractor shall not proceed with any work that will exceed the amount of Allowance remaining.
- c. Credits can only be added to an Allowance by Alteration Order. The Contractor may not use a credit until an Alteration Order is fully executed.
- d. Notwithstanding the Contractors objection, the Project Manager may at any time reduce the funds remaining in the Allowance by Alteration Order.
- e. At Final Payment of the Contract, funds remaining in the Allowance will be credited to the State.

**SCHEDULE OF VALUES: Milan Park Office New Foundation**

INDICATE DOLLAR AMOUNT OF CONTRACT SUM ALLOCATED TO EACH CATEGORY OF WORK  
AS DESIGNATED BELOW:

General Conditions:	
Bond Cost:	
Historic Removal & Dismantling:	
Building Jacking & Lifting:	
Cast-In-Place Concrete:	
Metal Fabrications:	
Earth Moving:	
Site Utilities:	
<b>Sub Total (A):</b>	
<b>Allowance #1 (B):</b>	\$25,000
<b>Grand Total: lump sum base bid (A + B)</b>	

**NOTE:** The Schedule of Values must be completely filled out in order for bid proposal to be considered responsive.

**SIGNATURE PAGE**

Company Name: \_\_\_\_\_

Address: \_\_\_\_\_

Phone: \_\_\_\_\_

E-mail Address: \_\_\_\_\_

Signature of Authorized Bidder:

\_\_\_\_\_

Print: \_\_\_\_\_

Title: \_\_\_\_\_

Address of Bidder: \_\_\_\_\_  
(If different than company)

Names and Addresses of Members of the Firm/Corporation

Name \_\_\_\_\_ address \_\_\_\_\_

Name \_\_\_\_\_ address \_\_\_\_\_

Name \_\_\_\_\_ address \_\_\_\_\_

**SECTION 00 73 00**

**SUPPLEMENTARY CONDITIONS**

The General Conditions of this Contract are the American Institute of Architect's Document A201, "General Conditions of the Contract for Construction," Fourteenth Edition, 1987, 14 Articles, 24 pages, herein referred to as "AIA General Conditions."

**THE SUPPLEMENTARY CONDITIONS**

The Supplementary Conditions contain modifications, deletions, and/or additions to the AIA General Conditions. Where any part of the AIA General Conditions is modified, deleted or superseded by the Supplementary Conditions, the unaltered provisions shall remain in full effect.

**BIDDING REQUIREMENTS**

Bids shall only be accepted on the official Bid Proposal Forms, attached to these specifications. **Any bids submitted that are not on the official bid proposal forms will not be accepted.**

**CONDITIONS AT SITE OR BUILDING**

Bidders shall visit the site and be responsible for having ascertained pertinent local conditions such as: location, accessibility, general character of the site and the character and extent of existing work to remain, and any other work being performed thereon at the time of the submission of this bid.

**PERFORMANCE AND PAYMENT BOND**

In the event the bid is \$35,000 or more, the contractor shall furnish security by bond or otherwise in an amount equal to 100% of the contract guaranteeing performance and payment. The payment security shall meet the requirements of New Hampshire RSA 447:16.

The performance and payment bond must be returned with the signed contract within 15 days after the contract has been mailed or otherwise delivered to the bidder.

**PROPOSAL GUARANTEE**

The Contractor shall furnish a certified check or bid bond in the amount of 5% of the total amount of the Lump Sum Price made payable to the "Treasurer, State of New Hampshire" as a proposal guarantee. This proposal guarantee will be forfeited in the event that the contract is not executed. Personal checks will not be accepted.

**DETERMINATION OF RIGHT TO DO BUSINESS WITH STATE OF N.H.**

If selected as the low bidder, the bidder must be registered and have a certificate of existence from the Secretary of State, Corporate Division (telephone 603-271-3244) in order to do business with the State of New Hampshire.

**PROPOSAL SELECTION**

In most cases the proposal submitted by the qualified bidder with the lowest base bid price shall be selected. However, the Department of Natural and Cultural Resources (DNCR) reserves the right to

reject any or all proposals, or advertise for new proposals as it judges to be in the best interest of the state.

### **CONTRACTORS QUALIFICATIONS**

The successful bidder shall provide evidence upon request that they have been successfully performing this type, scale, and quality of work for a minimum of five years. Upon request, a comprehensive list of all similar projects worked on in the past two years by the general contractor shall be submitted along with contact information for 3 references of owner's representatives involved with three different projects completed by the contractor.

### **EXECUTION OF CONTRACT**

The Contractor's attention is called to the following:

**EXECUTION AND APPROVAL OF CONTRACT.** The contract shall be signed by the successful Bidder and returned, together with the contract bond, if applicable, within 15 days after the contract has been mailed or otherwise delivered to the Bidder. No contract shall be considered as in effect until it has been fully executed by all the parties thereto and, when the contract amount is more than \$25,000, the award has been concurred in by the Governor and Council.

**FAILURE TO EXECUTE CONTRACT.** Failure to execute the contract within 15 days after the contract has been mailed or otherwise delivered to the successful Bidder shall be just cause for the cancellation of the award and the forfeiture of the proposal guaranty which shall become the property of the Department, not as a penalty, but in liquidation of damages sustained. Award may then be made to the next lowest Bidder, or the work may be re-advertised as the Commissioner of DNCR may decide.

### **STARTING DATE**

The Contractor shall start work after the Notice to Proceed is received. The Notice to Proceed shall be issued immediately upon contract approval by the Governor and Council, and shall establish the actual construction start date. Failure to start work within 15 calendar days after the start date shall be considered a default of the contract. If the actual start date is later than the advertised start date, the completion date shall be extended by an equivalent number of working days.

### **WORKERS COMPENSATION INSURANCE**

Workers compensation insurance is required for all workers on the job site of this project. Per RSA 21-1:81-b At the onset of work on any NH state construction project, the general contractor or designated project construction manager, if any, shall provide to the Department Project Manager a current list of all subcontractors and independent contractors that the general contractor has agreed to use on the job site, with a record of the entity to whom that subcontractor is insured for workers compensation purposes. This list shall be posted on the jobsite and updated as needed to reflect any new subcontractors or independent contractors.

If it is determined that a subcontractor or independent contractor is present on a state construction site without the contractor's name and direct contracting relationship being posted in a visible location at the worksite, the general contractor or designated project manager shall require the subcontractor or independent contractor to provide the information within 36 hours and to post the information in a visible location at the worksite. If the information is not provided within 36 hours of its request, the general contractor shall suspend the contractor until the information is provided and posted.

### **PROTECTION OF EXISTING PROPERTY**

It shall be the responsibility of the contractor to protect existing property from damage. Any damage caused by the contractor in the performance of the work shall be repaired or replaced at his expense to

the satisfaction of the designated DNCR Project Manager.

## **CODES**

All work performed shall meet the provisions, if applicable, of the 2015 IBC, the 2010 ADA standards for Accessible Design, and the 2015 NFPA 101 Life Safety Code.

## **WORKMANSHIP**

All work shall be performed in a neat workmanlike manner by skilled workmen who have been actively engaged in performing the type of work specified under this contract for the last two years.

## **CLEAN-UP**

The site for this project is in a NH State Park and will be open to the public throughout the construction period. It is important to the Department of Natural and Cultural Resources that the site be maintained in a clean and presentable condition for the public. Therefore, all debris from the project shall be cleaned up daily and removed from the site at least on a weekly basis.

## **DEFAULT AND TERMINATION OF CONTRACT**

If the Contractor...

- a) Fails to begin the work under the contract within the time specified in the contract, or
- b) Fails to perform the work with sufficient workmen and equipment or with sufficient materials to assure the prompt completion of said work, or
- c) Performs the work unsuitably or neglects or refuses to remove materials or to perform anew such work as may be rejected as unacceptable and unsuitable, or
- d) Discontinues the prosecution of work, or
- e) Fails to resume work which has been discontinued, within reasonable time after notice to do so, or
- f) Becomes insolvent or is declared bankrupt, or commits any act of bankruptcy or insolvency, or
- g) Makes an assignment for the benefit of creditors, or
- h) For any other cause whatsoever, fails to carry on the work in an acceptable manner...

The Commissioner of DNCR will give notice in writing to the Contractor of such delay, neglect, or default.

If the Contractor or Surety does not proceed in accordance with the Notice, then the Commissioner will, upon written notification from the Project Manager of the fact of such delay, neglect or default, and the Contractor's failure to comply with such notice, have full power and authority without violating the contract, to take the prosecution of the work out of the hands of the Contractor. The Commissioner may enter into an agreement for the completion of said contract according to the terms and conditions thereof, or use such other methods as in his opinion will be required for the completion of said contract in an acceptable manner.

All extra costs and charges incurred by the Department as a result of such delay, neglect or default, together with the cost of completion of the work under the contract will be deducted from any monies due or which may become due said Contractor. If such expenses exceed the sum which would have been payable under the contract, then the Contractor and the Surety shall be liable and shall pay to the Department, the amount of such excess.



## **FAILURE TO COMPLETE THE WORK ON TIME**

If the Contractor fails to complete all of the work or sections of the Project, within the time specified in the Contract, the sum given in the schedule that follows will be deducted from any money due the Contractor. This deduction will be made, not as a penalty, but as fixed, agreed liquidation damages for inconvenience to the State and for reimbursing the Department the cost of the Administration of the Contract, including engineering and inspection. Should the amount of money otherwise due the Contractor be less than the amount of such liquidated damages, the Contractor and his Surety shall be liable to the State for such deficiency.

Permitting the Contractor to continue and finish the work after the time fixed for its completion, shall in no way obligate the State to waive any of its rights under the Contract.

When the final acceptance has been duly made by the Project Manager, any liquidated damage charges shall end.

The fixed, agreed, liquidated damages shall be assessed in accordance with the following schedule.

<u>ORIGINAL CONTRACT AMOUNT</u>		<u>AMOUNT OF LIQUIDATED DAMAGES PER WORKING DAY</u>
From more than:	to and including:	
\$0.00	\$25,000.00	\$ 300.00
\$25,000.00	\$50,000.00	\$ 400.00
\$50,000.00	\$100,000.00	\$ 500.00
\$100,000.00	\$500,000.00	\$ 600.00

## **SUBSTANTIAL COMPLETION & FINAL INSPECTION**

When the work is substantially complete, the Contractor shall submit to the Project Manager, a list of items of work to be completed or corrected. The failure to include any items on such list does not alter the responsibility of the Contractor to complete all work in accordance with the Contract Documents. On the basis of an inspection by the Project Manager which determines that the work is substantially complete, a Certificate of Substantial Completion shall establish the date of substantial completion and state the responsibilities for any damage to the work and insurance, and fix the time limit within which the Contractor shall complete the items listed herein. Warranties required by the Contract documents shall commence on the date of Substantial Completion unless otherwise provided in the Certificate of Substantial Completion.

If the Contractor fails to proceed to complete the items on the "punch list", then in addition to the corrective measures listed in the Certificate of Substantial Completion, the Commissioner may use the monies still due the Contractor to have such items completed and the Contractor shall lose any claim to the monies used.

Upon written notice that the Work is ready for final inspection and acceptance, the Project manager shall promptly make such inspection, and when he finds the Work acceptable under the Contract documents and the Contract fully performed, a Certificate of Final Payment will be issued.

Final inspection will be made by the Project Manager. Incomplete items necessary to complete the project shall be done prior to final payment.

## **GUARANTEE OF WORK**

1. Except as otherwise specified, all work shall be guaranteed by the Contractor against defects

resulting from the use of inferior materials, equipment or workmanship for **one year** from the date of substantial completion of the work.

2. If, within any guarantee period, repairs or changes are required in connection with guaranteed work, which in the opinion of the Project Manager, is rendered necessary as a result of the use of materials, equipment or workmanship which are inferior, defective, or not in accordance with the terms of the Contract, the Contractor shall, promptly upon receipt of notice from the Commissioner, and at his own expense:
  - a. Place in satisfactory condition in every particular, all of such guaranteed work; correct all defects therein, and...
  - b. Make good all damage to the building or site, or equipment or contents thereof, which in the opinion of the Project Manager, is the result of the use of materials, equipment or workmanship which are inferior, defective, or not in accordance with the terms of the Contract, and...
  - c. Make good any work or material, or the equipment and contents of said building or site disturbed in fulfilling any such guarantee.
3. In any case, wherein fulfilling the requirements of the Contract or of any guarantee, embraced in or required thereby, the Contractor disturbs any work guaranteed under another contract, he shall restore such disturbed work to a condition satisfactory to the Project Manager and guarantee such restored work to the same extent as it was guaranteed under such other contracts.
4. If the Contractor, after notice, fails to proceed promptly to comply with the terms of the guarantee, the Commissioner may have the defects corrected and the Contractor and his Surety shall be liable for all expense incurred.
5. All special guarantees applicable to definite parts of the work that may be stipulated in the specifications or other papers forming a part of the Contract shall be subject to the terms of this paragraph during the first year of the life of such special guarantee.

## **PROSECUTION OF WORK**

Upon starting the work within the 15 days set forth by this contract, the Contractor shall prosecute the work a minimum of 8 hours daily per working day until completion, excluding breakdowns or inclement weather. If the Contractor finds it impossible to start the work as stated above, he may make a written request to the Project Manager for an extension of time. Any such request shall be made prior to expiration of the allowable 15 days, and shall contain reasons which the Contractor believes will justify the granting of his request. In his request, the Contractor shall submit his proposed starting date.

## **CHANGES IN THE WORK**

The Project Manager may at any time, by a written order, and without notice to the Sureties, make changes in the Drawings and Specifications and completion date of this contract and within the general scope thereof.

In making any change, the additional cost or credit for the change shall be determined as follows:

- The order shall stipulate the mutually agreed upon lump sum price which shall be added to or deducted from the contract price. The contractor shall furnish an itemized breakdown of the prices used in computing the value of any change that might be ordered.
- If the price change is an addition to the contract price and the work is performed by the general contractor and not a subcontractor, it shall include the contractor's indirect costs as follows:

Workmen's Compensation and Employee Liability, Unemployment and Social Security Taxes.

- In addition to the above indirect costs, the general contractor shall be allowed a markup not to exceed ten percent (10%). Said ten percent (10%) shall be all inclusive for overhead, supervision, and profit. In addition to this, an allowance shall be made for performance and payment bond additional premiums.
- If the price change is an addition to the contract price and involves the work of the general contractor and subcontractor, the general contractor would be allowed ten percent (10%) on that part of the work performed by him and five percent (5%) on that part of the work performed by the subcontractor. The same percentages shall apply to subcontractors.
- On any change which involves a net credit to the Owner, no allowance for overhead and profit shall be figured.

**INSURANCE REQUIREMENTS**

**No operations under this contract shall commence unless and until certification of insurance attesting to the below listed requirements have been filed with the Commissioner, approved by the Attorney General, and the Contract approved by the Governor and Council and a Notice to Proceed is issued.**

Insurance requirements by paragraphs 1-4 below shall be the responsibility of the Prime Contractor. The Prime Contractor, at his discretion, may make similar requests of any subcontractor.

Following is the summary of minimum insurance requirements:

- 1.) Workmen's Compensation Insurance (In accordance with RSA 281-A.)
  - a. Employers' Liability
    - 1.) \$100,000 each accident
    - 2.) \$500,000 Disease-policy limit
    - 3.) \$100,000 Disease-each employee
- 2.) Commercial General Liability Insurance: Occurrence Form Policy: Include full Contractual Liability (see Indemnification Clause 9), Explosion, Collapse, and Underground coverage's:
  - a. Limits of Liability:
    - 1.) \$1,000,000 Each Occurrence Bodily injury & Property Damage
    - 2.) \$2,000,000 General Aggregate-Include per Project Aggregate Endorsement
    - 3.) \$2,000,000 Products/Completed Operations Aggregate
    - 4.) State shall be named as an additional named insured.
- 3.) If blasting and/or demolition are required by the Contract, the Contractor or subcontractor shall obtain the respective coverage for those activities, and shall furnish to the Commissioner a certificate of Insurance evidencing the required coverage's prior to commencement of any operations involving blasting and/or demolition.
- 4.) Owner's Protective Liability coverage for the benefit of the State of New Hampshire Department of Natural and Cultural Resources.
  - a. Limits of Liability:
    - 1.) \$2,000,000 Each Occurrence
    - 2.) \$3,000,000 Aggregate

- 5.) Commercial Automobile Liability covering all motor vehicles including owned, hired, borrowed, and non-owned vehicles.
  - a. Limits of Liability:
    - 1.) \$1,000,000 Combined Single Limit for Bodily injury & Property Damage

- 6.) Commercial Umbrella Liability
  - a. Limits of Liability:
    - 1.) \$1,000,000 Each Occurrence
    - 2.) \$1,000,000 Aggregate

- 7.) Builder's Risk Insurance (Fire and Extended Coverage):

The Contractor shall insure the work included in the Contract, including extras and change orders, on an "All Risk" basis, on a one hundred percent (100%) completed value basis of the Contract, as modified. Builder's Risk coverage shall include materials located at the Contractor's premises, on-site, in-transit, and at any temporary site. The policy by its own terms or by endorsement shall specifically permit partial or beneficiary occupancy prior to completion or acceptance of the entire work. The policies shall be in the names of the State of New Hampshire Department of Natural and Cultural Resources and the Contractor. The policies shall provide for the inclusion of the names of all other Contractors, Subcontractors, and others employed on the premises as insured's. The policies shall stipulate that the insurance companies shall have no right of subrogation against any Contractors, Subcontractors or other parties employed on the premises.

- 8.) General Insurance Conditions  
Each policy shall contain a clause prohibiting cancellation or modifications of the policy earlier than thirty (30) days or ten (10) in cases of non-payment of premium after written notice thereof has been received by the State.
- 9.) Indemnification:  
The Contractor shall indemnify, defend, and hold harmless the State of New Hampshire, its Agencies, and its agents and employees from and against any and all claims, liabilities, suits or penalties arising out of (or which may be claimed to arise out of) acts of omissions of the Contractor or subcontractors in the performance of work covered by the Contract. This covenant shall survive the termination of the Contract. Notwithstanding the foregoing, nothing herein contained shall be deemed to constitute a waiver of the sovereign immunity of the State, which immunity is hereby reserved by the State.

**END OF SUPPLEMENTARY CONDITIONS**

**SECTION 01 10 00**

**SUMMARY**

**PART 1 – GENERAL**

**1.01 DESCRIPTION**

A. Section includes:

1. Project information.
2. Work covered by Contract Documents.
3. Work sequence.
4. Salvage requirements.
5. Access to site.
6. Coordination with occupants.
7. Work restrictions.
8. Specification and drawing conventions.
9. Miscellaneous provisions.

B. Related Work Specified Elsewhere:

1. SECTION 01 50 00: Temporary Facilities and Controls

**1.02 PROJECT INFORMATION**

A. Project Identification: Park Office New Foundation; CAP 2003

1. Project Location: 72 Fire Tower Road, Milan, New Hampshire 03588

B. Owner: State of New Hampshire, Department of Natural and Cultural Resources

1. Owner's Representative: Scott Coruth, Architect

**1.03 WORK COVERED BY CONTRACT DOCUMENTS**

A. The Work of Project is defined by the Contract Documents and consists of the following:

1. Jacking and lifting an historic wood framed building, removing the existing concrete foundation wall and pouring a new reinforced concrete foundation wall.

B. Type of Contract: Project will be constructed under a stipulated lump sum grand total contract with the State of New Hampshire in accordance with the General Conditions of the Contract for Construction.

C. The Contractor shall, except as otherwise specifically stated in Contract Documents, provide and pay for all materials, labor, tools, equipment, water, heat, fuel, light, power, transportation, superintendence, temporary construction of every nature, and all other services and facilities or

every nature whatsoever necessary to execute, complete, and deliver the work within the specified time.

**1.04 WORK SEQUENCE**

- A. Work shall commence within 15 days after issuance of Notice to Proceed. Failure to comply shall constitute a Default of Contract.

**1.05 SALVAGE REQUIREMENTS**

- A. Unless otherwise indicated, demolition waste becomes the property of Contractor.
- B. Unless otherwise indicated, all equipment that must be removed due to interference with work of this contract remains the property of the Owner, and may be salvaged at Owner's discretion.
- C. Owner wishes to salvage, refurbish, and/or reuse the following materials and store and/or reinstall as itemized below. Drawings also may indicate items to be salvaged and stored on Owner's premises and the location of storage. Coordinate all salvage activities with Owner.
  - 1. Item No.1: Basement Windows
    - a. Handling: Contractor shall refurbish and reinstall as indicated in the Project documents.
  - 2. Item No. 2: Wood Deck
    - a. Handling: Contractor shall refurbish and reinstall as indicated in the Project documents.
- D. Materials and/or items scheduled above for relocation and which are damaged during dismantling or reassembly operations shall be repaired and restored to good operative condition. The Contractor may, at his discretion and upon the approval of the owner, substitute new materials and/or items of like design and quality in lieu of materials and/or items to be relocated.

**1.06 ACCESS TO SITE**

- A. General: Contractor shall have limited use of Project site for construction operations as indicated on Drawings by the Contract limits and as indicated by requirements of this Section.
- B. Use of Site: Limit use of Project site to work in areas indicated. Do not disturb portions of Project site beyond areas in which the Work is indicated.
  - 1. Limits: Confine construction operations to the existing Park Office building.
  - 2. Driveways, Walkways and Entrances: Keep driveways, and entrances serving premises clear and available to Owner, Owner's employees, and emergency vehicles at all times. Do not use these areas for parking or storage of materials.
    - a. Schedule deliveries to minimize use of driveways and entrances by construction operations.
    - b. Schedule deliveries to minimize space and time requirements for storage of materials and equipment on-site.

- C. Condition of Existing Building: Maintain portions of existing building affected by construction operations in a weathertight condition throughout construction period. Repair damage caused by construction operations.

**1.07 COORDINATION WITH OCCUPANTS**

- A. Partial Owner Occupancy: Owner will occupy the site during entire construction period, with the exception of areas under construction. Cooperate with State Park Planning and Operations representative during construction operations to minimize conflicts and facilitate Owner usage. Perform the Work so as not to interfere with Owner's operations. Maintain existing exits unless otherwise indicated.
1. Maintain access to existing walkways, corridors, and other adjacent occupied or used facilities. Do not close or obstruct walkways, corridors, or other occupied or used facilities without written permission from Owner and authorities having jurisdiction.
  2. Provide not less than 72-hours notice to Owner of activities that will affect Owner's operations.

**1.08 WORK RESTRICTIONS**

- A. Work Restrictions, General: Comply with restrictions on construction operations.
1. Comply with limitations on use of public streets and other requirements of authorities having jurisdiction.
- B. On-Site Work Hours: Limit work in the existing building to normal business working hours of 7:00 a.m. to 4:30 p.m., Monday through Friday, unless otherwise indicated.
1. Access for work outside of normal working hours shall be requested in writing to the Contract Administrator, at least one week in advance. The Contract Administrator may accept or reject the request.
  2. No access during the following observed holidays:
    - a. New Years' Day.
    - b. Martin Luther King Jr. Civil Rights Day.
    - c. Washington's Birthday.
    - d. Memorial Day.
    - e. Independence Day.
    - f. Labor Day.
    - g. Veterans' Day.
    - h. Thanksgiving Day.
    - i. Day after Thanksgiving.
    - j. Christmas Day.
- C. Existing Utility Interruptions: Do not interrupt utilities serving facilities occupied by Owner or others unless permitted under the following conditions and then only after providing temporary utility services according to requirements indicated:
1. Notify Owner not less than two days in advance of proposed utility interruptions.
  2. Obtain Owners written permission before proceeding with utility interruptions.

- D. Noise, Vibration, and Odors: Coordinate operations that may result in high levels of noise and vibration, odors, or other disruptions to owner occupancy with owner.
  - 1. Notify Owner not less than two days in advance of proposed disruptive operations.
  - 2. Obtain Owner's written permission before proceeding with disruptive operations.
- E. Controlled Substances: Use of tobacco products and other controlled substances on Project site is not permitted.

#### **1.09 SPECIFICATION AND DRAWING CONVENTIONS**

- A. Specification Content: The Specifications use certain conventions for the style of language and the intended meaning of certain terms, words, and phrases when used in particular situations. These conventions are as follows:
  - 1. Imperative mood and streamlined language are generally used in the Specifications. The words "shall," "shall be," or "shall comply with," depending on the context, are implied where a colon (:) is used within a sentence or phrase.
  - 2. Specification requirements are to be performed by Contractor unless specifically stated otherwise.
- B. Division 01 General Requirements: Requirements of Sections in Division 01 apply to the Work of all Sections in the Specifications.
- C. Drawing Coordination: Requirements for materials and products identified on Drawings are described in detail in the Specifications. One or more of the following are used on drawings to identify materials and products:
  - 1. Terminology: Materials and products are identified by the typical generic terms used in the individual Specifications Sections.
  - 2. Abbreviations: Materials and products are identified by abbreviations published as part of the U.S. National CAD Standard and scheduled on Drawings.

#### **PART 2 – PRODUCTS (Not Used)**

#### **PART 3 – EXECUTION (Not Used)**

**END OF SUMMARY**



**SECTION 01 20 00**

**PRICE AND PAYMENT PROCEDURES**

**PART 1 – GENERAL**

**1.01 DESCRIPTION**

- A. Section Includes:
1. Schedule of Values
  2. Applications for Payment
  3. Allowances

**1.02 SCHEDULE OF VALUES**

- A. Submit printed schedule on AIA Form G703 – Continuation Sheet for G702. Contractor's standard form or electronic media printout will be considered.
- B. Submit Schedule of Values in duplicate within 15 days after the date of issuance of Notice to Proceed. Failure to submit within specified time period will constitute Default of Contract.
- C. Utilize Table of Contents of these Specifications and any addenda. Identify each line item with number and title of specification Section. Identify General Conditions, bonds and insurance.
- D. Include separate line item for the amount of each Allowance and Alternates Specified in this section. For unit cost Allowances, identify quantities taken from Contract Documents multiplied by unit cost to achieve total for each item.
- E. Revise schedule to list approved Change Orders, with each Application for Payment.

**1.03 APPLICATION FOR PAYMENT**

- A. Submit three copies of each application or electronic transmittal along with any supporting materials.
- B. Execute on AIA Form G702 – Application and Certificate for Payment.
- C. Items on the Application for payment shall be consistent with the items listed on the Proposal Form. Utilize Schedule of Values for listing items in Application for Payment.
- D. Submit updated construction schedule with each Application for Payment.
- E. Payment Period: Submit monthly, or as otherwise allowed by the Owner.

**1.04 ALLOWANCES**

- A. Contingency Allowances: Use the allowance only as directed by Section 00 41 00 "Bid Proposal Form".

- B. Contractor's overhead, profit, and related costs for products and equipment ordered by Owner under the contingency allowance are included in the allowance and are not part of the Contract Sum. These costs include delivery, installation, insurance, equipment rental, and similar costs.
- C. Change Orders authorizing use of funds from the contingency allowance will include Contractor's related costs and reasonable overhead and profit margins.
- D. At Project closeout, credit unused amounts remaining in the contingency allowance to Owner by Change Order.

**PART 2 – PRODUCTS (Not Used)**

**PART 3 – EXECUTION (Not Used)**

**END OF PRICE AND PAYMENT PROCEDURES**

**SECTION 01 25 00**

**SUBSTITUTION PROCEDURES**

**PART 1 – GENERAL**

**1.01 DESCRIPTION**

- A. Section includes administrative and procedural requirements for substitutions.
- B. Related Work Specified Elsewhere:
  - 1. SECTION 01 20 00: Price and Payment Procedures
  - 2. SECTION 01 60 00: Product Requirements

**1.02 DEFINITIONS**

- A. Substitutions: Changes in products, materials, equipment, and methods of construction from those required by the Contract Documents and proposed by Contractor.
  - 1. Substitution for Cause: Changes proposed by Contractor that are required due to changed Project conditions, such as unavailability of product, regulatory changes, or unavailability of required warranty terms.
  - 2. Substitution for Convenience: Changes proposed by Contractor that are not required in order to meet other Project requirements but may offer advantage to Contractor.

**1.03 ACTION SUBMITTALS**

- A. Substitution Requests: Submit three copies of each request for consideration. Identify product or fabrication or installation method to be replaced. Include Specification Section number and title and Drawing numbers and titles.
  - 1. Documentation: Show compliance with requirements for substitutions and the following, as applicable:
    - a. Statement indicating why specified product or installation cannot be provided.
    - b. Coordination information, including a list of changes or revisions needed to other parts of the Work and to construction performed by Owner and separate contractors, that will be necessary to accommodate proposed substitution.
    - c. Detailed comparisons of significant qualities of proposed substitution with those of the Work specified. Include annotated copy of applicable Specification Section. Significant qualities may include attributes such as performance, weight, size, durability, visual effect, sustainable design characteristics, warranties, and specific features and requirements indicated. Indicate deviations, if any, from the Work specified.
    - d. Product Data, including drawings and descriptions of products and fabrication and installation procedures.
    - e. Samples, where applicable or requested.
    - f. Certificates and qualification data, where applicable or requested.

- g. List of similar installation for completed projects with project names and addresses and names and addresses of architects and owners.
  - h. Material test reports from qualified testing agency indicating and interpreting test results for compliance with requirements indicated.
  - i. Research reports evidencing compliance with building code in effect for Project, from ICC-ES.
  - j. Detailed comparison of Contractor's construction schedule using proposed substitution with products specified for the Work, including effect on the overall Contract Time, include letter from manufacturer, on manufacturer's letterhead, stating date of receipt of purchase order, lack of availability, or delays in delivery.
  - k. Cost information, including a proposal of change, if any, in the Contract Sum.
  - l. Contractor's certification that proposed substitution complies with requirements in the Contract Documents except as indicated in substitution request, is compatible with related materials, and is appropriate for applications indicated.
  - m. Contractor's waiver of rights to additional payment or time that may subsequently become necessary because of failure or proposed substitution to produce indicated results.
2. Architect's Action: If necessary, Architect will request additional information or documentation for evaluation within seven days of receipt of request for substitution. Architect will notify Contractor of acceptance or rejection of proposed substitution within 15 days of receipt of request, or seven days of receipt of additional information or documentation, whichever is later.
- a. Forms of Acceptance: Change Order, Construction Change Directive, or Architect's Supplemental Instructions for minor changes in the Work.
  - b. Use product specified if Architect does not issue a decision on use of a proposed substitution within time allocated.

#### **1.04 QUALITY ASSURANCE**

- A. Compatibility of Substitutions: Investigate and document compatibility of proposed substitution with related products and materials. Engage a qualified testing agency to perform compatibility tests recommended by manufacturers.

#### **1.05 PROCEDURES**

- A. Coordination: Revise or adjust affected work as necessary to integrate work of the approved substitutions.

### **PART 2 – PRODUCTS**

#### **2.01 SUBSTITUTIONS**

- A. Substitutions for Cause: Submit requests for substitution immediately on discovery of need for change, but not later than 15 days prior to time required for preparation and review of related submittals.

1. Conditions: Architect will consider Contractor's request for substitution when the following conditions are satisfied. If the following conditions are not satisfied, Architect will return requests without action, except to record noncompliance with these requirements:
  - a. Requested substitution is consistent with the Contract Documents and will produce indicated results.
  - b. Requested substitution provides sustainable design characteristics that specified product provided.
  - c. Substitution request is fully documented and properly submitted.
  - d. Requested substitution will not adversely affect Contractor's construction schedule.
  - e. Requested substitution has received necessary approvals of authorities having jurisdiction.
  - f. Requested substitution is compatible with other portions of the Work.
  - g. Requested substitution has been coordinated with other portions of the Work.
  - h. Requested substitution provides specified warranty.
  - i. If requested substitution involves more than one contractor, requested substitution has been coordinated with other portions of the Work, is uniform and consistent, is compatible with other products, and is acceptable to all contractors involved.

B. Substitutions for Convenience: Not allowed.

**PART 3 – EXECUTION (Not Used)**

**END OF SUBSTITUTION PROCEDURES**

**SECTION 01 26 00**

**CONTRACT MODIFICATION PROCEDURES**

**PART 1 – GENERAL**

**1.01 DESCRIPTION**

- A. Section includes administrative and procedural requirements for handling and processing Contract modifications.
- B. Related Work Specified Elsewhere:
  - 1. SECTION 01 20 00: Price and Payment Procedures
  - 2. SECTION 01 25 00: Substitution Procedures
  - 3. SECTION 01 30 00: Administrative Requirements

**1.02 MINOR CHANGES IN THE WORK**

- A. Architect will issue supplemental instructions authorizing minor changes in Work, not involving adjustment to the Contract Sum or the Contract Time.

**1.03 PROPOSAL REQUESTS**

- A. Owner-Initiated Proposal Requests: Architect will issue a detailed description of proposed changes in the Work that may require adjustment to the Contract Sum or the Contract Time. If necessary, the description will include supplemental or revised Drawings and Specification.
  - 1. Work Change Proposal Requests issued by Architect are not instructions either to stop work in progress or to execute the proposed change.
  - 2. Within time specified by Proposal Request or 14 days, when not otherwise specified, after receipt of Proposal Request, submit a quotation estimating cost adjustments to the Contract Sum and the Contract Time necessary to execute the change.
    - a. Include a list of quantities of products required or eliminated and unit costs, with total amount of purchases and credits to be made. If requested, furnish survey data to substantiate quantities.
    - b. Indicate applicable taxes, delivery charges, equipment rental, and amounts of trade discounts.
    - c. Include costs of labor and supervision directly attributable to the change.
    - d. Include and updated Contractor's construction schedule that indicates the effect of the change, including, but not limited to, changes in activity duration, start and finish times, and activity relationship. Use available total float before requesting an extension of the Contract Time.
- B. Contractor-Initiated Proposals: If latent or changed conditions require modifications to the Contract, Contractor may initiate a claim by submitting a request for change to Architect.

1. Include a statement outlining reasons for the change and the effect of the change on the Work. Provide a complete description of the proposed change. Indicate the effect of the proposed change on the Contract Sum and the Contract Time.
2. Include a list of quantities of products required or eliminated and unit costs, with total amount of purchases and credits to be made. If requested, furnish survey data to substantiate quantities.
3. Indicate applicable delivery charges, equipment rental, and amounts of trade discounts.
4. Include costs of labor and supervision directly attributable to the change.
5. Include an updated Contractor's construction schedule that indicated effect of the change, including, but not limited to, changes in activity duration, start and finish times, and activity relationship. Use available float before requesting an extension of the Contract Time.
6. Comply with requirements in Section 01 25 00 "Substitution Procedures" if the proposed change requires substitution of one product or system for product or system specified.

**1.04 CHANGE ORDER PROCEDURES**

- A. On Owner's approval of a Work Change Proposal Request, Architect will issue a Contract Change Order for signatures of Owner and Contractor on Owner's standard form.

**1.05 CONSTRUCTION CHANGE DIRECTIVE**

- A. Construction Change Directive: Architect may issue a Construction Change Directive on Architects standard form. Construction Change Directive instructs Contractor to proceed with a change in Work, for subsequent inclusion in a Change Order.
1. Construction Change Directive contains a complete description of change in the Work. It also designates method to be followed to determine change in Contract Sum or the Contract Time.
- B. Documentation: Maintain detailed records on a time and materials basis of work required by the Construction Change Directive.
1. After completion of change, submit an itemized account and supporting data necessary to substantiate cost and time adjustments to the Contract.

**PART 2 – PRODUCTS (Not Used)**

**PART 3 – EXECUTION (Not Used)**

**END OF CONTRACT MODIFICATION PROCEDURES**

**SECTION 01 30 00**

**ADMINISTRATIVE REQUIREMENTS**

**PART 1 – GENERAL**

**1.01 DESCRIPTION**

- A. Section includes administrative provisions for coordinating construction operations, submittal procedures, delegated design, and Contractor's construction schedule including, but not limited to, the following:
  - 1. Project management and coordination
  - 2. Submittal procedures
  - 3. Delegated design
  - 4. Construction schedule
- B. Related Work Specified Elsewhere:
  - 1. SECTION 01 70 00: Execution and Closeout Requirements

**1.02 PROJECT MANAGEMENT AND COORDINATION**

- A. Subcontract List: Submit a written summary identifying individuals or firms proposed for each portion of the Work.
- B. Key Personnel Names: Within 15 days of starting construction operations, submit a list of key personnel assignments, including superintendent and other personnel in attendance AT Project site. List e-mail addresses and telephone numbers.
- C. Coordinate construction operations included in different Sections of the Specifications to ensure efficient and orderly installation of each part of the Work.
- D. Requests for Information (RFIs): On discovery of the need for additional information or interpretation of the Contract Documents, Contractor shall prepare and submit an RFI. Use forms acceptable to Architect.
- E. Schedule and conduct progress meetings at Project site at biweekly intervals. Notify Owner of meeting dates and times. Require attendance of each subcontractor or other entity concerned with current progress or involved in planning, coordination, or performance of future activities.
  - 1. Contractor will record minutes and distribute to all attendees, including Owner/Architect.

**1.03 SUBMITTAL ADMINISTRATIVE REQUIREMENTS**

- A. Architect's Digital Data Files: Requests for Electronic digital data files of the Contract Drawings will be considered on a case by case basis and documents may be provided by Architect for Contractor's use in preparing submittals. Contractor is to submit request for specific drawing file pertinent to shop drawing preparation.



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1. Architect may furnish Contractor specific digital data drawing files of the Contract Drawings for use in preparing Shop Drawings.
  - a. The decision to provide digital file data is at the sole discretion of the architect. No damages or claims will be accepted for failure to provide requested digital data.
  - b. Architect makes no representations as to the accuracy or completeness of digital data drawing files as they relate to the Contract Drawings.
  - c. Contractor shall execute a liability release and/or data licensing agreement in the form acceptable to the Architect.
- B. Coordinate each submittal with fabrication, purchasing, testing, delivery, other submittals, and related activities that require sequential activity.
  1. No extension of the Contract Time will be authorized because of failure to transmit submittals enough in advance of the Work to permit processing, including resubmittals.
  2. Architect will discard submittals received from sources other than Contractor.
- C. Paper Submittals: Place a permanent label or title block on each submittal for identification. Provide a space approximately on label or beside title block to record Contractor's review and approval markings and action taken by Architect. Include the following information on the label:
  1. Project name.
  2. Date.
  3. Name and address of Contractor.
  4. Name and address of subcontractor or supplier.
  5. Number and title of appropriate Specification Section.
- D. Electronic Submittals: Identify and incorporate information in each electronic submittal file as follows:
  1. Assemble complete submittal package into a single indexed file incorporating submittal requirements of a single Specification Section and transmittal form with links enabling navigation to each item.
  2. Name file with unique identifier, including project identifier, Specification Section number, and revision identifier.
  3. Provide means for insertion to permanently record Contractor's review and approval markings and action taken by Architect.
- E. Identify options requiring selection by Architect.
- F. Identify deviations from the Contract Documents on submittals.
- G. Contractor's Construction Schedule Submittal Procedure:
  1. Submit required submittals in the following format:
    - a. Working electronic copy of schedule file, where indicated.
    - b. PDF electronic file

- c. Three paper copies.
2. Contractor's Construction Schedule: Initial schedule, of size required to display entire schedule for entire construction period.
3. Coordinate Contractor's construction schedule with the schedule of values, submittal schedule, progress reports, payment requests, and other required schedules and reports.

## **PART 2 – PRODUCTS**

### **2.01 SUBMITTAL PROCEDURES**

- A. General Submittal procedure Requirements: Prepare and submit submittals required by individual Specification Sections.
  1. Submit electronic submittals via email as PDF electronic files.
- B. Architect will return annotated file. Annotate and retain one copy of file as an electronic Project record document file.

### **2.02 ACTION SUBMITTALS**

- A. Submit two paper copies or one electronic copy of each submittal unless otherwise indicated. Architect will return one copy.
- B. Product Data: Mark each copy to show applicable products and options. Include the following:
  1. Manufacturer's written recommendations, product specifications, and installation instructions.
  2. Wiring diagrams showing factory-installed wiring.
  3. Printed performance curves and operational diagrams.
  4. Testing by recognized testing agency.
  5. Compliance with specified standards and requirements.
- C. Shop Drawings: Prepare Project-specific information, drawn accurately to scale. Do not base Shop Drawings on reproductions of the Contract Documents or standard printed data. Submit on sheets at least 8-1/2 by 11-inches but not larger than 24 by 36-inches. Include the following:
  1. Dimensions and identification of products.
  2. Fabrication and installation drawings and roughing-in and setting diagrams.
  3. Wiring diagrams showing field-installed wiring.
  4. Notation of coordination requirements.
  5. Notation of dimensions established by field measurement.
- D. Samples: Submit Samples for review of kind, color, pattern, and texture and for comparison of these characteristics between submittal and actual component as delivered and installed. Include name of manufacturer and product name on label.

1. If variation is inherent in material or product, submit at least three sets of paired units that show variations.

## **2.03 INFORMATIONAL SUBMITTALS**

- A. Informational Submittals: Submit two copies of each submittal unless otherwise indicated. Architect will return one copy.
- B. Qualification Data: Include lists of completed projects with project names and addresses, names and addresses of architects and owners, and other information specified.
- C. Product Certificates: Prepare written statements on manufacturer's letterhead certifying that product complies with requirements in the Contract Documents.

## **2.04 DELEGATED DESIGN SERVICES**

- A. Performance and Design Criteria: Where professional design services or certifications by a design professional are specifically required of Contractor by the Contract Documents, provide products and systems complying with specific performance and design criteria indicated.
  1. If criteria indicated are not sufficient to perform services or certification required, submit a written request for additional information to Architect.
- B. Delegated-Design Submittal: In addition to Shop Drawings, Product Data, and other required submittals, submit four copies of a statement, signed and sealed by the responsible design professional, for each product and system specifically assigned to Contractor to be designed or certified by a design professional.
  1. Indicate that products and systems comply with performance and design criteria in the Contract Documents. Include list of codes, loads, and other factors used in performing these services.

## **2.05 CONTRACTOR'S CONSTRUCTION SCHEDULE**

- A. Gantt-Chart Schedule: Submit a comprehensive, fully developed, schedule in the format outlined in the General Conditions.
- B. Preparation: Indicate each significant construction activity separately. Identify first workday of each week with a continuous vertical line.
- C. Cost Correlation: Superimpose a cost correlation timeline, indicating planned and actual costs. On the line, show planned and actual dollar volume of the Work performed as of planned and actual dates used for preparation of payment requests.
- D. Recovery Schedule: When periodic update indicates the Work is 14 or more calendar days behind the current approved schedule, submit a separate recovery schedule indicating means by which Contractor intends to regain compliance with the schedule. Indicate changes to working hours, working days, crew size, and equipment required to achieve compliance, and indicate date by which recovery will be accomplished.

### **PART 3 – EXECUTION**

#### **3.01 SUBMITTAL REVIEW**

- A. Review each submittal and check for coordination with other Work of the Contract and for compliance with the Contract Documents. Note corrections and field dimensions. Mark with approval stamp before submitting to Architect.
- B. Architect will review each action submittal, make marks to indicate corrections or modification required, will signify each submittal with an action stamp, and will signify appropriately to indicate action.
- C. Informational Submittals: Architect will review each submittal and will return a copy. Architect will forward each submittal to appropriate party.
- D. Submittals not required by the Contract Documents may not be reviewed and may be discarded.

#### **3.02 CONTRACTOR'S CONSTRUCTION SCHEDULE**

- A. Updating: At monthly intervals, update schedule to reflect actual construction progress and activities. Issue schedule a minimum of one day before each regularly scheduled progress meeting.
  - 1. As the Work progresses, indicate Actual Completion percentage for each activity.
- B. Distribute copies of approved schedule to Owner/Architect, subcontractors, testing and inspecting agencies, and parties identified by Contractor with a need-to-know schedule responsibility. When revisions are made, distribute updated schedules to the same parties.

### **END OF ADMINISTRATIVE REQUIREMENTS**

**SECTION 01 40 00**

**QUALITY REQUIREMENTS**

**PART 1 – GENERAL**

**1.01 DESCRIPTION**

- A. This Section includes administrative and procedural requirements for quality assurance and quality control.
- B. Testing and inspecting services are required to verify compliance with requirements specified or indicated. These services do not relieve Contractor of responsibility for compliance with the Contract Document requirements.
  - 1. Specific quality-assurance and –control requirements for individual construction activities are specified in the Sections that specify those activities. Requirements in those Sections may also cover production of standard products.
  - 2. Specified tests, inspections, and related activities do not limit Contractor's other quality-assurance and –control procedures that facilitate compliance with the Contract Document requirements.
  - 3. Requirements for Contractor to provide quality-assurance and –control services required by Architect, Owner, or authorities having jurisdiction are not limited by provisions of this Section.

**1.02 CONFLICTING REQUIREMENTS**

- A. Referenced Standards: If compliance with two or more standards is specified and the standards establish different or conflicting requirements for minimum quantities or quality levels, comply with most stringent requirement. Refer conflicting requirements that are different, but apparently equal, to Architect for a decision before proceeding.
- B. Minimum Quantity or Quality Level: The quantity or quality level shown or specified shall be the minimum provided or performed. The actual installation may comply with the minimum quantity or quality specified, or it may exceed the minimum within reasonable limits. To comply with these requirements, indicated numeric values are minimum or maximum, as appropriate, for the context of requirements. Refer uncertainties to Architect for a decision before proceeding.

**1.03 QUALITY ASSURANCE**

- A. General: Qualifications paragraphs in this Article establish the minimum qualification levels required; individual Specification Sections specify additional requirements.
- B. Installer Qualifications: A firm or individual experienced in installing, erecting, or assembling work similar in material, design, and extent to that indicated for this Project, whose work has resulted in construction with a record of successful in-service performance.

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- C. Manufacturer Qualifications: A firm experienced in manufacturing products or systems similar to those indicated for this Project and with a record of successful in-service performance, as well as sufficient production capacity to produce required units.
- D. Fabricator Qualifications: A firm experienced in producing products similar to those indicated for this Project and with a record of successful in-service performance, as well as sufficient production capacity to produce required units.
- E. Professional Engineer Qualifications: A professional engineer who is legally qualified to practice in jurisdiction where Project is located and who is experienced in providing engineering services of the kind indicated. Engineering services are defined as those performed for installation of the system, assembly, or products that are similar to those indicated for this Project in material, design, and extent.
- F. Specialists: Certain sections of the Specification require that specific construction activities shall be performed by entities who are recognized experts in those operations. Specialists shall satisfy qualification requirements indicated and shall be engaged for the activities indicated.
  - 1. Requirement for specialists shall not supersede building codes and regulations governing the Work.
- G. Testing Agency Qualifications: An NRTL, an NVLAP, or an independent agency with the experience and capability to conduct testing and inspecting indicated, as documented according to ASTM E 548; and with additional qualifications specified in individual Sections; and where required by authorities having jurisdiction, that is acceptable to authorities.
  - 1. NRTL: A nationally recognized testing laboratory according to 29 CFR 1910.7.
  - 2. NVLAP: A testing agency accredited according to NIST's National Voluntary Laboratory Accreditation Program.
- H. Factory-Authorized Service Representative Qualifications: An authorized representative of manufacturer who is trained and approved by manufacturer to inspect installation of manufacturer's products that are similar in material, design, and extent to those indicated for this Project.
- I. Mockups: Before installing portions of the Work requiring mockups, build mockups for each for each form of construction and finish required to comply with the following requirements, using materials indicated for the completed Work:
  - 1. Build mockups in location and of size indicated or, if not indicated, as directed by Architect.
  - 2. Notify Architect/Engineer seven days in advance of dates and times when mockups will be constructed.
  - 3. Demonstrate the proposed range of aesthetic effects and workmanship.
  - 4. Obtain Architect's/Engineer's approval of mockups before starting work, fabrication, or construction.
  - 5. Maintain mockups during construction in an undisturbed condition as a standard for judging the completed Work.
  - 6. Demolish and remove mockups when directed, unless otherwise indicated.

#### **1.04 QUALITY CONTROL**

- A. Owner Responsibilities: Where quality-control services are indicated as Owner's responsibility, Owner will engage a qualified testing agency to perform these services.
1. Owner will furnish Contractor with names, addresses, and telephone numbers of testing agencies engaged and a description of types of testing and inspecting they are engaged to perform.
  2. Costs for retesting and re-inspecting construction that replaces or is necessitated by work that failed to comply with the Contract Documents will be charged to Contractor, and the Contract Sum will be adjusted by Change Order.
- B. Contractor Responsibilities: Tests and inspections not explicitly assigned to Owner are Contractor's responsibility. Unless otherwise indicated, provide quality-control services specified and those required by authorities having jurisdiction. Perform quality-control services required of Contractor by authorities having jurisdiction, whether specified or not.
- C. Manufacturer's Field Services: Where indicated, engage a manufacturer's representative to observe and inspect the Work. Manufacturer's representative's services include examination of substrates and conditions, verification of materials, inspection of completed portions of the Work, and submittal of written reports.
- D. Retesting/Reinspecting: Regardless of whether original tests or inspections were Contractor's responsibility, provide quality-control services, including retesting and reinspecting, for construction that replaced Work that failed to comply with the Contract Documents.
- E. Associated Services: Cooperate with agencies performing required tests, inspections, and similar quality-control services, and provide reasonable auxiliary services as requested. Notify agency sufficiently in advance of operations to permit assignment of personnel. Provide the following:
1. Access to the Work.
  2. Incidental labor and facilities necessary to facilitate tests and inspection.
  3. Adequate quantities of representative sample of materials that require testing and inspecting. Assist agency in obtaining samples.
  4. Facilities for storage and of test samples.
  5. Delivery of samples to testing agencies.
- F. Coordination: Coordinate sequence of activities to accommodate required quality-assurance and -control services with a minimum of delay and to avoid necessity of removing and replacing construction to accommodate testing and inspecting.

#### **1.05 SPECIAL TESTS AND INSPECTIONS**

- A. Special Tests and Inspections: Contractor will engage a qualified testing agency to conduct special tests and inspections required by authorities having jurisdiction as the responsibility of the Owner, and as follows:

1. Verifying that manufacturer maintains detailed fabrication and quality-control procedures and reviews the completeness and adequacy of those procedures to perform the Work.
2. Notify Architect and Contractor promptly of irregularities and deficiencies observed in the Work during performance of its services.
3. Submitting a certified written report of each test, inspection, and similar quality-control service to Architect with copy to Contractor and to authorities having jurisdiction.
4. Submitting a final report of special tests and inspections at Substantial Completion, which includes a list of unresolved deficiencies.
5. Interpreting tests and inspections and stating in each report whether tested and inspected work complies with or deviates from the Contract Documents.
6. Retesting and reinspecting corrected work.

**PART 2 – PRODUCTS (Not Used)**

**PART 3 – EXECUTION**

**3.03 REPAIR AND PROTECTION**

- A. General: On completion of testing, inspecting, sample taking, and similar services, repair damaged construction and restore substrates and finishes.
  1. Provide materials and comply with installation requirements specified in other Specification Sections or matching existing substrates and finishes. Restore patched areas and extend restoration into adjoining areas with durable seams that are as invisible as possible. Comply with Contract Document requirements for cutting and patching in Section 01 70 00 "Execution and Closeout Requirements."
- B. Protect construction exposed by or for quality-control service activities.
- C. Repair and protection are Contractor's responsibility, regardless of the assignment of responsibility for quality-control services.

**END OF QUALITY REQUIREMENTS**



**SECTION 01 50 00**

**TEMPORARY FACILITIES AND CONTROLS**

**PART 1 – GENERAL**

**1.01 DESCRIPTION**

- A. Section includes requirements for temporary utilities, support facilities, and security and protection facilities.
  - 1. The Work shall include, but shall not necessarily be limited to:
    - a. Use charges
    - b. Temporary utilities
    - c. Construction facilities
    - d. Temporary controls
- B. Related Work Specified Elsewhere:
  - 1. SECTION 01 26 00: Contract Modification Procedures
  - 2. SECTION 01 70 00: Execution and Closeout Requirements

**1.02 USE CHARGES**

- A. General: Installation and removal of and use charges for temporary facilities shall be included in the Contract Sum. Allow other entities to use temporary services and facilities without cost, including, but not limited to, Owner's construction forces, Architect, Engineers, occupants of Project, testing agencies, and authorities having jurisdiction.

**1.03 INFORMATIONAL SUBMITTALS**

- A. Site Plan: Show temporary facilities, utility hookups, staging areas, and parking areas for construction personnel.

**1.04 QUALITY ASSURANCE**

- A. Electric Service: Comply with NECA, NEMA, and UL standards and regulations for temporary electric service. Install service to comply with NFPA 70.
- B. Tests and Inspections: Arrange for authorities having jurisdiction to test and inspect each temporary utility before use. Obtain required certifications and permits.

**1.05 PROJECT CONDITIONS**

- A. The Contractor shall be permitted to utilize the existing Owner utilities at the site. These utilities include electric power and water. The Contractor shall provide temporary sanitary facilities for the workmen, temporary cell phones and temporary fire safety devices such as fire extinguishers.

## **PART 2 – PRODUCTS**

### **2.01 TEMPORARY FACILITIES**

- A. Field Offices: Prefabricated or mobile units with serviceable finishes, temperature controls, and foundations adequate for normal loading.
- B. Storage and Fabrication Sheds: Provide sheds sized, furnished, and equipped to accommodate materials and equipment for construction operations.

### **2.02 EQUIPMENT**

- A. Fire Extinguishers: Portable, UL rated; with class and extinguishing agent as required by locations and classes of fire exposures.

## **PART 3 – EXECUTION**

### **3.01 INSTALLATION, GENERAL**

- A. Locate facilities where they will serve Project adequately and result in minimum interference with performance of the Work. Relocate and modify facilities as required by progress of the Work.
- B. Provide each facility ready for use when needed to avoid delay. Do not remove until facilities are no longer needed or are replaced by authorized use of completed permanent facilities.

### **3.02 TEMPORARY UTILITY INSTALLATION**

- A. General: Install temporary service or connect to existing service.
  - 1. Arrange with utility company, Owner, and existing users for time when service can be interrupted, if necessary, to make connections for temporary services.
- B. Water Service: Connect to Owner's existing water service facilities. Clean and maintain water service facilities in a condition acceptable to Owner. At Substantial Completion, restore these facilities to condition existing before initial use.
- C. Sanitary Facilities: Provide temporary toilets, wash facilities, and drinking water for use of construction personnel. Comply with authorities having jurisdiction for type, number, location, operation, and maintenance of fixtures and facilities. Permanent sanitary facilities installed under this Contract shall not be used during construction.
- D. Heating and Cooling: Provide temporary heating and cooling required by construction activities for curing or drying of completed installation or for protecting installed construction from adverse effects of low temperatures or high humidity. Select equipment that will not have a harmful effect on completed installation or elements being installed.
- E. Isolation of Work Areas in Occupied Facilities: Prevent dust, fumes, and odors from entering occupied areas.

1. Prior to commencing work, isolate HVAC system in area where work is to be performed according to coordination drawings.
  2. Maintain dust partitions during Work. Use vacuum collection attachments on dust-producing equipment. Isolate limited work within occupied areas using portable dust-containment devices.
  3. Perform daily construction cleanup and final cleanup using approved, HEPA-filter-equipped vacuum equipment.
- F. Ventilation and Humidity Control: Provide temporary ventilation required by construction activities for curing or drying of completed installations or for protecting installed construction from adverse effects of high humidity. Select equipment that will not have a harmful effect on completed installation or elements being installed. Coordinate ventilation requirements to produce ambient condition required and minimize energy consumption.
- G. Electric Power Service: Connect to Owner's existing electric power service. Maintain equipment in a condition acceptable to Owner.
- H. Lighting: Provide temporary lighting with local switching that provides adequate illumination for construction operations, observations, inspections, and traffic conditions.

### **3.03 SUPPORT FACILITIES INSTALLATION**

- A. General: Comply with the following:
1. Provide construction for temporary offices, shops, and sheds located within construction area or within 30-feet of building lines that is noncombustible according to ASTM E 136. Comply with NFPA 241.
  2. Maintain support facilities until Architect schedules Substantial Completion inspection. Remove before Substantial Completion. Personnel remaining after Substantial Completion will be permitted to use permanent facilities, under conditions acceptable to Owner.
- B. Parking: Use designated areas of Owner's existing parking areas for construction personnel.

### **3.04 SECURITY AND PROTECTION FACILITIES INSTALLATION**

- A. Protection of Existing Facilities: Protect existing vegetation, equipment, structures, utilities and other improvements at Project site and on adjacent properties, except those indicated to be removed or altered. Repair damage to existing facilities.
- B. Environmental Protection: Provide protection, operate temporary facilities, and conduct construction as required to comply with environmental regulations and that minimize possible air, waterway, and subsoil contamination or pollution or other undesirable effects.
- C. Site Enclosure Fence: Before construction operations begin, furnish and install site enclosure fence in manner that will prevent people and animals from easily entering site except by entrance gate.

- D. Barricades, Warning Signs, and Lights: Comply with authorities having jurisdiction for erecting structurally adequate barricades, including warning signs and lighting.
- E. Temporary Egress: Maintain temporary egress from existing occupied facilities as indicated and as required by authorities having jurisdiction.

**3.05 OPERATION, TERMINATION, AND REMOVAL**

- A. Supervision: Enforce strict discipline in use of temporary facilities. To minimize waste and abuse, limit availability of temporary facilities to essential and intended uses.
- B. Termination and Removal: Remove each temporary facility when need for its service has ended, when it has been replaced by authorized use of a permanent facility, or no later than Substantial Completion. Complete or, if necessary, restore permanent construction that may have been delayed because of interference with temporary facility. Repair damaged Work, clean exposed surfaces, and replace construction that cannot be satisfactorily repaired.

**END OF TEMPORARY FACILITIES AND CONTROLS**

**SECTION 01 60 00**

**PRODUCT REQUIREMENTS**

**PART 1 – GENERAL**

**1.01 DESCRIPTION**

- A. Section includes administrative and procedural requirements for selection of products for use in Project.
  - 1. The Work shall include, but shall not necessarily be limited to:
    - a. Product delivery, storage, and handling
    - b. Manufacturers' standard warranties
    - c. Special warranties
    - d. Comparable products
- B. Related Work Specified Elsewhere:
  - 1. SECTION 01 20 00: Price and Payment Procedures
  - 2. SECTION 01 25 00: Substitution Procedures

**1.02 DEFINITIONS**

- A. Products: Items obtained for incorporating into the Work, whether purchased for Project or taken from previously purchased stock. The term "product" includes the terms "material," "equipment," "system," and terms of similar intent.
  - 1. Named products: Items identified by manufacturer's product name, including make or model number or other designation shown or listed in manufacturer's published product literature, that is current as of date of the Contract Documents.
  - 2. New Products: Items that have not previously been incorporated into another project or facility. Products salvaged or recycled from other projects are not considered new products.
  - 3. Comparable Products: Product that is demonstrated and approved through submittal process to have the indicated qualities related to type, function, dimension, in-service performance, physical properties, appearance, and other characteristics that equal or exceed those of specified product.
- B. Basis-of-Design Product Specification: A specification in which a specific manufacturer's product is named and accompanied by the words "basis-of-design product," including make or model number or other designation, to establish the significant qualities related to type, function, dimension, in-service performance, physical properties, appearance, and other characteristics for purposes of evaluating comparable products of additional manufacturers named in the specification.

**1.03 ACTION SUBMITTALS**

- A. Comparable Product Requests: Submit request for consideration of each comparable product. Identify product or fabrication or installation method to be replaced. Include Specification Section number and title and drawing numbers and titles. Note that no substitutions for convenience are allowed per Section 01 25 00.
1. Include data to indicate compliance with the requirements specified in “Comparable Products” Article.
  2. Architect’s Action: If necessary, Architect will request additional information or documentation for evaluation within one week of receipt of comparable product request. Architect will notify Contractor of approval or rejection of proposed comparable product request within 15 days of receipt of request, or seven days of receipt of additional information or documentation, whichever is later.
    - a. Form of Approval: As specified in Section 01 30 00 “Administrative Requirements.”
    - b. Use product specified if Architect does not issue a decision on use of a comparable product request within time allocated.
- B. Basis-of-Design Product Specification Submittal: Comply with requirements in Section 01 30 00 “Administrative Requirements.”

#### **1.04 QUALITY ASSURANCE**

- A. Compatibility of Options: If contractor is given option of selecting between two or more products for use on Project, select product compatible with products previously selected, even if previously selected products were also options.

#### **1.05 DELIVERY, STORAGE AND HANDLING**

- A. Deliver, store, and handle products using means and methods that will prevent damage, deterioration, and loss, including theft and vandalism. Comply with manufacturer’s written instructions.
- B. Delivery and Handling:
1. Schedule delivery to minimize long-term storage at Project site and to prevent overcrowding of construction spaces.
  2. Coordinate delivery with installation time to ensure minimum holding time for items that are flammable, hazardous, easily damaged, or sensitive to deterioration, theft, and other losses.
  3. Deliver products to Project site in an undamaged condition in manufacturer’s original sealed container or other packaging system, complete with labels and instructions for handling, storing, unpacking, protecting, and installing.
  4. Inspect products on delivery to determine compliance with the Contract Documents and to determine that products are undamaged and properly protected.
- C. Storage:
1. Store products to allow for inspection and measurement of quantity or counting of units.

2. Store materials in a manner that will not endanger Project structure.
3. Store products that are subject to damage by elements, under cover in a weathertight enclosure above ground, with ventilation adequate to prevent condensation.
4. Protect foam plastic from exposure to sunlight, except to extent necessary for period of installation and concealment.
5. Comply with product manufacturer's written instructions for temperature, humidity, ventilation, and weather-protection requirements for storage.
6. Protect stored products from damage and liquids from freezing.
7. Provide a secure location and enclosure at Project site for storage of materials and equipment by owner's construction forces. Coordinate location with owner.

#### **1.06 PRODUCT WARRANTIES**

- A. Warranties specified in other Sections shall be in addition to, and run concurrent with, other warranties required by the Contract Documents. Manufacturer's disclaimers and limitations on product warranties do not relieve Contractor of obligations under requirements of the Contract Documents.
1. Manufacturer's Warranty: Written warranty furnished by individual manufacturer for a particular product and specifically endorsed by manufacturer to owner.
  2. Special Warranty: Written warranty required by Contract Documents to provide specific rights for Owner.
- B. Special Warranties: Prepare a written document that contains appropriate terms and identification, ready for execution.
- a. Manufacturer's Standard Form: Modified to include Project-specific information and properly executed.
  - b. Specified Form: When specified forms are included with the Specifications, prepare a written document using indicated form properly executed.
  - c. See other Sections for specific content requirements and particular requirements for submitting special warranties.
- C. Submittal Time: Comply with requirements in Section 01 70 00 "Execution and Closeout Requirements."

### **PART 2 – PRODUCTS**

#### **2.01 PRODUCT SELECTION PROCEDURES**

- A. General Product Requirements: Provide products that comply with the Contract Documents, are undamaged and, unless otherwise indicated, are new at time of installation.
1. Provide products complete with accessories, trim, finish, fasteners, and other items needed for a complete installation and indicated use and effect.
  2. Standard Products: If available, and unless custom products or nonstandard options are specified, provide standard products of types that have been produced and used successfully in similar situations on other projects.

3. Owner reserves the right to limit selection to products with warranties not in conflict with requirements of the Contract Documents.
4. Where products are accompanied by the term “as selected”, Architect will make selection.
5. Descriptive, performance, and reference standard requirements in the Specifications establish salient characteristics of products.

**B. Product Selection Procedures:**

1. Product: Where Specifications name a single manufacturer and product, provide the named product complies with requirements. Comparable products or substitutions for Contractor’s convenience will not be considered.
2. Manufacturer/Source: Where Specifications name a single manufacturer or source, provide a product by the named manufacturer or source that complies with requirements. Comparable products or substitutions for Contractor’s convenience will not be considered.
3. Products:
  - a. Restricted List: Where Specifications include a list of names of both manufacturers and products, provide one of the products listed that complies with requirements.
4. Manufacturers:
  - a. Restricted List: Where Specifications include a list of manufacturers’ names, provide a product by one of the manufacturers listed that complies with requirements.
5. Basis-of-Design Product: Where Specifications name a product, or refer to a product indicated on Drawings, and include a list of manufacturers and/or products, provide the specified or indicated product or a comparable product by one of the other named manufacturers. Drawings and Specifications indicate sizes, profiles, dimensions, and other characteristics that are based on the product names. Comply with requirements in “Comparable Products” Article for consideration of an unnamed product by one of the other named manufacturers.

- C. Visual Selection Specification: Where Specifications include the phrase “as selected by Architect from manufacturer’s full range” or similar phrase, select a product that complies with requirements. Architect will select color, gloss, pattern, density, or texture from manufacturer’s product line that includes both standard and premium items.

**2.02 COMPARABLE PRODUCTS**

- A. Conditions for Consideration: Architect will consider Contractor’s request for comparable products when the following conditions are satisfied. Note that substitutions for convenience are not allowed per Section 01 25 00. If the following conditions are not satisfied, Architect may return requests without action, except to record noncompliance with these requirements:



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1. Evidence that the proposed product does not require revisions to the Contract Documents, that it is consistent with the Contract Documents and will produce the indicated results, and that it is compatible with other portions of the Work.
2. Detailed comparison of significant qualities of proposed product with those named in the Specifications. Significant qualities include attributes such as performance, weight, size, durability, visual effect, and specific features and requirements indicated.
3. Evidence that proposed product provides specified warranty.
4. List of similar installations for completed projects with project names and addresses and names and addresses of architects and owners, if requested.
5. Samples, if requested.

**PART 3 – EXECUTION (Not Used)**

**END OF PRODUCT REQUIREMENTS**

**SECTION 01 70 00**

**EXECUTION AND CLOSEOUT REQUIREMENTS**

**PART 1 – GENERAL**

**1.01 DESCRIPTION**

- A. Section includes general administrative and procedural requirements governing execution and closeout of the Work including, but not limited to, the following:
  - 1. Execution
  - 2. Cutting and patching
  - 3. Cleaning
  - 4. Closeout procedures
- B. Related Work Specified Elsewhere:
  - 1. SECTION 01 10 00: Summary
  - 2. SECTION 01 30 00: Administrative Requirements

**1.02 EXECUTION REQUIREMENTS**

- A. Certificates: Submit certificate signed by land surveyor certifying that location and elevation of improvements comply with requirements.
- B. Cutting and Patching:
  - 1. Structural Elements: When cutting and patching structural elements, notify Architect of locations and details of cutting and await directions from Architect before proceeding. Shore, brace, and support structural elements during cutting and patching.
  - 2. Operational Elements: Do not cut and patch operating elements and related components in a manner that results in reducing their capacity to perform as intended or that result in increased maintenance or decreased operational life or safety.
  - 3. Visual Elements: Do not cut and patch construction in a manner that results in visual evidence or cutting and patching. Do not cut and patch exposed construction in a manner that would, in Architect's opinion, reduce the buildings aesthetic qualities.
- C. Manufacturer's Installation Instructions: Obtain and maintain on-site manufacturer's written recommendations and instructions for installation of products and equipment.

**1.03 CLOSEOUT SUBMITTALS**

- A. Contractor's List of Incomplete Items: Initial submittal at Substantial Completion.
- B. Certified List of Incomplete Items: Final submittal at Final Completion.
- C. Operation and Maintenance Data: Submit two copies of manual.

- D. PDF Electronic File: Assemble manual into a composite electronically indexed file. Submit on digital media.
- E. Record Drawings: Submit two set of marked-up record prints.
- F. Record Product Data: Submit two paper copy and annotated PDF electronic files and directories of each submittal.

**1.04 SUBSTANTIAL COMPLETION PROCEDURES**

- A. Prepare a list of items to be completed and corrected (punch list), the value of items on the list, and reasons why the Work is not complete.
- B. Submittals Prior to Substantial Completion: Before requesting Substantial Completion inspection, complete the following:
  - 1. Obtain and submit releases from authorities having jurisdiction permitting Owner unrestricted use of the Work and access to services and utilities. Include occupancy permits, operating certificates, and similar releases.
  - 2. Submit closeout submittals specified in other Sections, including project record documents, operation and maintenance manuals, property surveys, similar final record information, warranties, workmanship bonds, maintenance service agreements, final certifications, and similar documents.
  - 3. Submit maintenance material submittals specified in other Sections, including tools, spare parts, extra materials, and similar items, and deliver to location designated by Architect.
  - 4. Submit test/adjust/balance records.
  - 5. Submit Changeover information related to owner's occupancy, use, operation, and maintenance.
- C. Procedures Prior to Substantial Completion: Before requesting Substantial Completion inspection, complete the following:
  - 1. Advise owner of pending insurance changeover requirements.
  - 2. Make final changeover or permanent locks and deliver keys to Owner.
  - 3. Complete startup and testing of systems and equipment.
  - 4. Perform preventative maintenance or equipment prior to Substantial Completion.
  - 5. Advise owner of changeover in heat and other utilities.
  - 6. Participate with owner in conducting inspection and walkthrough with local emergency responders.
  - 7. Remove temporary facilities and controls.
  - 8. Complete final cleaning requirements, including touchup painting.
  - 9. Touch up and otherwise repair and restore marred exposed finishes to eliminate visual defects.
- D. Inspection: Submit a written request for inspection for Substantial Completion. On receipt of request, Architect will proceed with inspection or advise Contractor of unfulfilled requirements. Architect will prepare the Certificate of Substantial Completion after inspection or will advise Contractor of items that must be completed or corrected before certificate will be issued.

## **1.05 FINAL COMPLETION PROCEDURES**

- A. Submittals Prior to Final Completion: Before requesting inspection for determining final completion, complete the following:
  - 3. Submit a final Application for Payment.
  - 4. Submit certified copy of Architect's Substantial Completion inspection list of items to be completed or corrected (punch list). Certified copy of the list shall state that each item has been completed or otherwise resolved.
  - 5. Certificate of Insurance: Submit evidence of final, continuing insurance coverage complying with insurance requirements.
- B. Submit a written request for final inspection and acceptance. On receipt of request, Architect will either proceed with inspection or notify Contractor of unfulfilled requirements. Architect will prepare final Certificate for Payment after inspection or will advise Contractor of items that must be completed or corrected before certificate will be issued.
  - 1. Reinspection: Request reinspection when the Work identified in previous inspections as incomplete is completed or corrected.

## **PART 2 – PRODUCTS**

### **2.01 MATERIALS**

- A. In-Place materials: Use materials for patching identical to in-place materials. For exposed surfaces, use materials that visually match in-place adjacent surfaces to the fullest extent possible.
- B. Cleaning Agents: Use cleaning materials and agents recommended by manufacturer or fabricator of the surface to be cleaned. Do not use cleaning agents that are potentially hazardous to health or property or that might damage finished surfaces.

### **2.02 OPERATION AND MAINTENANCE DOCUMENTATION**

- A. Directory: Prepare a single, comprehensive directory of emergency, operation, and maintenance data and materials, listing items and their location to facilitate ready access to desired information.
- B. Organization: Unless otherwise indicated, organize manuals into separate sections for each system and subsystem, and separate sections for each piece of equipment not part of a system.
- C. Organize data into three-ring binders with identification on front and spine of each binder, and envelopes for folded drawings. Include the following:
  - 1. Manufacturer's operation and maintenance documentation.
  - 2. Maintenance and service schedules.
  - 3. Maintenance service contracts. Include name and telephone number of service agent.
  - 4. Emergency instructions.

5. Spare parts list and local source of maintenance materials.
6. Wiring diagrams.
7. Copies of warranties. Include procedures to follow and required notifications for warranty claims.

## **2.03 RECORD DRAWINGS**

- A. Record Prints: Maintain a set of prints of the Contract Drawings and Shop Drawings, incorporating new and revised drawings as modification are issued. Mark to show actual installation where installation varies from that shown originally. Accurately record information in an acceptable drawing technique.
  1. Record drawings are to be updated at a minimum weekly.
  2. Review markings with Architect and Owner at Project Meetings.
  3. Identify and date each record Drawing; include the designation "PROJECT RECORD DRAWING" in a prominent location.
- B. Record Digital Data Files: Immediately before inspection for Certificate of Substantial Completion, review marked-up record prints with Architect.

## **PART 3 – EXECUTION**

### **3.01 EXAMINATION AND PREPARATION**

- A. Existing Conditions: The existence and location of underground and other utilities and construction indicated as existing are not guaranteed. Before beginning sitework, investigate and verify the existence and location of underground utilities, mechanical and electrical systems, and other construction affecting the Work.
  1. Comply with the "Underground Utility Damage Prevention System" per NH RSA 374 by notification to DIG-SFAE SYSTEM, Inc., of intent to excavate within 100 feet of an underground utility. Contact DIG-SAFE at least seventy-two (72) hours in advance of starting any excavation.
- B. Before proceeding with each component of the Work, examine substrates, areas, and conditions, with Installer or Applicator present where indicated, for compliance with requirements for installation tolerances and other conditions affecting performance.
  1. Verify compatibility with and suitability of substrates.
  2. Examine roughing-in for mechanical and electrical systems.
  3. Examine walls, floors, and roofs for suitable conditions.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.
- D. Take field measurements as required to fit the Work properly. Where portions of the Work are indicated to fit to other construction, verify dimensions of other construction by field measurements before fabrication.
- E. Verify space requirements and dimensions of items shown diagrammatically on Drawings.

### **3.02    CONSTRUCTION LAYOUT AND FIELD ENGINEERING**

- A.     Before proceeding to lay out the Work, verify layout information shown on Drawings, in relation to the property survey and existing benchmarks.
- B.     Engage a land surveyor to lay out Work using accepted surveying practices.
- C.     Engage a land surveyor to prepare a final property survey showing significant features (real property) for project and finish floor elevations.
  - 1.        At Substantial Completion, have the final property survey recorded by or with authorities having jurisdiction as the official “property survey.”

### **3.03    INSTALLATION**

- A.     Locate the Work and components of the Work accurately, in correct alignment and elevation, as indicated.
  - 1.        Make vertical work plumb and horizontal work level.
  - 2.        Conceal pipes, ducts, and wiring in finished areas unless otherwise indicated.
  - 3.        Maintain minimum headroom clearance of 96-inches in occupied spaces and 90-inches in unoccupied spaces, unless otherwise noted.
- B.     Comply with manufacturer’s written instructions and recommendations.
- C.     Conduct construction operations so no part of the Work is subjected to damaging operations or loading in excess of that expected during normal conditions of occupancy.
- D.     Templates: Obtain and distribute to the parties involved templates for work specified to be factory prepared and field installed.
- E.     Attachment: Provide blocking and attachment plates and anchors and fasteners of adequate size and number to securely anchor each component in place. Where size and type of attachments are not indicated, verify size and type required for load conditions.
- F.     Joints: Make joints uniform in width. Where joint locations in exposed work are not indicated, arrange joints for the best visual effect. Fit exposed connections together to form hairline joints.
- G.     Use products, cleaners, and installation materials that are not considered hazardous.

### **3.04    CUTTING AND PATCHING**

- A.     Provide temporary support of work to be cut.
- B.     Protection: Protect in-place construction during cutting and patching to prevent damage. Provide protection from adverse weather conditions for portions of Project that might be exposed during cutting and patching operations.

- C. Where existing services/systems are required to be removed, relocated, or abandoned, bypass such services/systems before cutting to minimize interruption to occupied areas.
- D. Cutting: Cut in-place construction using methods least likely to damage elements retained or adjoining construction.
  - 1. Cut holes and slots neatly to minimum size required, and with minimum disturbance of adjacent surfaces. Temporarily cover openings when not in use.
- E. Patch with durable seams that are as invisible as possible. Provide materials and comply with installation requirements specified in other Sections.
  - 1. Restore exposed finishes of patched areas and extend finish restoration into adjoining construction in a manner that will minimize evidence of patching and refinishing.
  - 2. Where walls or partitions that are removed extend one finished area into another, patch and repair floor and wall surfaces in the new space. Provide an even surface of uniform finish, color, texture, and appearance.
  - 3. Where patching occurs in a painted surface, prepare substrate and apply primer and intermediate paint coats appropriate for substrate over the patch, and apply final paint coat over entire unbroken surface containing patch. Provide additional coats until patch blends with adjacent surfaces.

### **3.05 CLEANING**

- A. Clean Project site and work areas daily, including common areas. Dispose of materials lawfully.
  - 1. Remove liquid spills promptly.
  - 2. Where dust would impair proper execution of the Work, broom-clean or vacuum the entire work area, as appropriate.
  - 3. Remove debris from concealed spaces before enclosing space.
- B. Complete the following cleaning operations before requesting inspection for certification of Substantial Completion:
  - 1. Clean Project site, yard, and grounds, in areas disturbed by construction activities. Sweep paved areas; remove stains, spills, and foreign deposits. Rake grounds that are neither planted nor paved to a smooth, even-textured surface.
  - 2. Remove labels that are not permanent.
  - 3. Clean transparent materials, including mirrors. Remove excess glazing compounds.
  - 4. Clean exposed finishes to a dust-free condition, free of stains, films, and foreign substances. Sweep concrete floors broom clean.
  - 5. Vacuum carpeted surfaces and wax resilient flooring.
  - 6. Wipe surfaces of mechanical and electrical equipment. Remove excess lubrication and foreign substances. Clean plumbing fixtures. Clean light fixtures, lamps, globes, and reflectors.
  - 7. Replace disposable air filters and clean permanent air filters. Clean exposed surfaces of diffusers, registers, and grills.

### **3.06 OPERATION AND MAINTENANCE MANUAL PREPARATION**

- A. Operation and Maintenance Manuals: Assemble a complete set of operation and maintenance data indicating operation and maintenance of each system, subsystem, and piece of equipment not part of a system.
- B. Manufacturer's Data: Where manuals contain manufacturers' standard printed data, include only sheets pertinent to product or component installed. Mark each sheet to identify each product or component incorporated into the Work. If data include more than one item in a tabular format, identify each item using appropriate references from the Contract Documents. Identify data applicable to the Work and delete references to information not applicable.
  - 1. Prepare supplementary text if manufacturers' standard printed data are unavailable and where the information is necessary for proper operation and maintenance of equipment or systems.
- C. Drawings: Prepare drawings supplementing manufacturers' printed data to illustrate the relationship of component parts of equipment and systems and to illustrate control sequence and flow diagrams.

**3.07 DEMONSTRATION AND TRAINING**

- A. Engage qualified instructors to instruct Owner's personnel to adjust, operate, and maintain systems, subsystems, and equipment not part of a system. Include detailed review of the following:
  - 1. Include instructions for basis of system design and operational requirements, review of documentation, emergency procedures, operations, adjustments, troubleshooting, maintenance, and repairs.

**END OF EXECUTION AND CLOSEOUT REQUIREMENTS**



## **SECTION 02 42 96**

### **HISTORIC REMOVAL & DISMANTLING**

#### **PART 1 – GENERAL**

##### **1.01 DESCRIPTION**

- A. Section includes historic treatment procedures in the form of special types of selective demolition work for designated historic spaces, area, rooms, and surfaces and the following specific work:
1. Removal and dismantling of indicated portions of building or structure and debris hauling.
  2. Removal and dismantling of indicated site elements and debris hauling.
  3. Salvage of existing items to be reused or recycled.
  4. Jacking and lifting of historic buildings and structures.

##### **1.02 DEFINITIONS**

- A. Dismantle: To disassemble or detach a historic item from a surface, or a nonhistoric item from a historic surface, using gentle methods and equipment to prevent damage to historic items and surfaces; disposing of items unless indicated to be salvaged or reinstalled.
- B. Existing to Remain: Existing items that are not to be removed or dismantled, except to the degree indicated for performing required Work.
- C. Remove: To take down or detach a nonhistoric item located within a historic space, area, or room, using methods and equipment to prevent damage to historic items and surfaces; disposing of items unless indicated to be salvaged or reinstalled.
- D. Retain: To keep existing items that are not to be removed or dismantled.
- E. Salvage: To protect removed or dismantled items and deliver them to owner ready for reuse.

##### **1.03 PRECONSTRUCTION MEETINGS**

- A. Preconstruction Conference: Conduct conference at Project Site.
1. Review minutes of Preliminary Historic Treatment Conference that pertain to removal and dismantling procedures and protection of historic areas and surfaces.
  2. Review list of items indicated to be salvaged.
  3. Verify qualifications of personnel assigned to perform removal and dismantling.
  4. Inspect and discuss condition of each construction type to be removed or dismantled.
  5. Review requirements of other work that depends on condition of substrates exposed by removal and dismantling work.
  6. Review methods and procedures related to removal and dismantling work, including, but not limited to, the following:
    - a. Jacking and lifting methods and procedures.

- b. Historic removal and dismantling specialist's personnel, equipment, and facilities needed to make progress and avoid delays.
- c. Materials, material application, sequencing, tolerances, and required clearances.
- d. Fire prevention.
- e. Coordination with building occupants.

#### **1.04 INFORMATIONAL SUBMITTALS**

- A. Qualification Data: For historic removal and dismantling specialist, and Jacking and Lifting specialists.
- B. Preconstruction Documentation: Show preexisting conditions of adjoining construction and site improvements, including finish surfaces, that might be misconstrued as damage caused by Contractors removal and dismantling operations.
- C. Removal and Dismantling Historic Treatment Program: Submit 30 days before work begins.
- D. List of Items Indicated to be salvaged: Prepare a list of items indicated on Drawings to be salvaged for Owner's use or for reinstallation. Submit 15 days before preconstruction conference.
- E. Inventory of Salvaged Items: After removal or dismantling work is complete, submit a list of items that have been salvaged.
  - 1. Include item description, item condition, number of items if more than one of a type, and tag number.
  - 2. As work proceeds, include on the inventory items that were indicated to be salvaged and items of historic importance discovered during the work. Document reasons, if any, why an item indicated to be salvaged was not salvaged.

#### **1.05 QUALITY ASSURANCE**

- A. Jacking and Lifting Qualifications: A qualified jacking and lifting specialist with experience in lifting historic structures with a minimum of five years' experience jacking and lifting structures similar to Work specified herein.
- B. Historic Removal and Dismantling Specialist Qualifications: A qualified historic treatment specialist. General selective demolition experience is insufficient experience for historic removal and dismantling work.
- C. Removal and Dismantling Historic Treatment Program: Prepare a written, detailed description of materials, methods, equipment, and sequence of operations to be used for each phase of removal and dismantling work, including protection of surrounding substrate materials and Project site.
  - 1. Dust and Noise Control: Include locations of proposed temporary dust- and noise-control partitions and means of egress from occupied areas coordinated with continuing on-site operations and other known work in progress.
  - 2. Debris Hauling: Include plans clearly marked to show debris hauling routes, turning radii, and locations and details of temporary protective barriers.

- D. Regulatory Requirements: Comply with notification regulations of authorities having jurisdiction before beginning removal and dismantling work. Comply with hauling and disposal regulations of authorities having jurisdiction.

#### **1.06 FIELD CONDITIONS**

- A. Conditions existing at time of inspection for bidding purposes will be maintained by Owner as far as practical.
- B. Notify Architect of discrepancies between existing conditions and Drawings before proceeding with removal and dismantling work.
- C. Hazardous Materials: It is not expected that hazardous materials will be encountered in the Work.
  - 1. If materials suspected of containing hazardous materials are encountered, do not disturb; immediately notify Architect and Owner. Owner will remove hazardous materials under a separate contract.
    - a. In the case of asbestos, stop work in the area of potential hazard, shut off fans and other air handlers ventilating the area, and rope off area until the questionable material is identified. Reassign workers to continue work in unaffected areas. Resume work in the area of concern after safe working conditions are verified.
- D. Storage or sale of removed or dismantled items on-site is not permitted unless otherwise indicated.

### **PART 2 – PRODUCTS – Not Used**

### **PART 3 – EXECUTION**

#### **3.01 HISTORIC REMOVAL AND DISMANTLING EQUIPMENT**

- A. Removal Equipment: Use only hand-held tools, except as follows or unless otherwise approved by Architect on a case-by-case basis:
  - 1. Light jackhammers are allowed subject to Architect's approval.
  - 2. Large air hammers are not permitted.
- B. Dismantling Equipment: Use manual, hand-held tools, except as follows or otherwise approved by Architect on a case-by-case basis:
  - 1. Hand-held power tools and cutting torches are permitted only as submitted in the historic treatment program. They must be adjustable so as to penetrate or cut only the thickness of material being removed.
  - 2. Pry bars more than 18 inches long and hammers weighing more than 2 lbs are not permitted for dismantling work.

#### **3.02 EXAMINATION**

- A. Preparation for Removal and Dismantling: Examine construction to be removed or dismantled to determine best methods to safely and effectively perform removal and dismantling work. Examine adjacent work to determine what protective measures are necessary. Make explorations, probes, and inquiries as necessary to determine condition of construction to be removed or dismantled and location of utilities and services to remain that may be hidden by construction that is to be removed or dismantled.
  - 1. Verify that affected utilities are disconnected and capped.
  - 2. Inventory and record the condition of items to be removed and dismantled for reinstallation or salvage. Enter this information of the submittal of salvaged items.
  - 3. Before removal or dismantling of existing building elements that will be reproduced or duplicated in final Work, make permanent record of measurements, materials, and construction details required to make exact reproduction.
  - 4. Engineering Survey: Engage a professional engineer to survey condition of building to determine whether removing any element might result in structural deficiency or unplanned collapse of any portion of structure or adjacent structures as a result of removal and dismantling work.
- B. Survey of Existing Conditions: Record existing conditions by use of preconstruction photographs.
- C. Perform surveys as the Work progresses to detect hazards resulting from historic removal and dismantling procedures.

### **3.03 JACKING AND LIFTING**

- A. General: Have jacking and lifting work performed by a qualified jacking and lifting specialist. Ensure that jacking and lifting specialist's field supervisors are present when jacking and lifting work begins and during its progress.
- B. Perform jacking and lifting work according to the historic treatment program.
  - 1. Perform jacking and lifting using a unified jacking machine or other approved method.
  - 2. Provide supports and reinforcement for existing construction to maintain structural stability of the building.
  - 3. Provide shoring, blocking and bracing to support existing construction while new excavation and foundation work is performed.

### **3.04 HISTORIC REMOVAL AND DISMANTLING**

- A. General: Have removal and dismantling work performed by a qualified historic removal and dismantling specialist. Ensure that historic removal and dismantling specialist's field supervisors are present when removal and dismantling work begins and during its progress.
- B. Perform work according to the historic treatment program.
  - 1. Perform removal and dismantling to the limits indicated.
  - 2. Provide supports or reinforcement for existing construction that becomes temporarily weakened by removal and dismantling work, until the Project Work is completed unless otherwise indicated.

3. Perform cutting by hand or with small power tools wherever possible. Cut holes and slots neatly to size required, with minimum disturbance of adjacent work.
  4. Do not operate air compressors inside building unless approved by Architect in each case.
  5. Do not drill or cut columns, beams, joists, girders, structural slabs, or other structural supporting elements, without having Contractor's professional engineer's written approval for each location before such work is begun.
  6. Dispose of removed and dismantled items off-site unless indicated to be salvaged or reinstalled.
- C. Water-Mist Sprinkling: Use water-mist sprinkling and other wet methods to control dust only with adequate, approved procedures and equipment according to the historic treatment program to ensure that such water does not create a hazard or adversely affect other building areas or materials.
- D. Unacceptable Equipment: Keep equipment that is not permitted for historic removal or dismantling work away from the vicinity where such work is being performed.
- E. Removing and Dismantling Items on or Near Historic Surfaces:
1. Use only dismantling equipment and procedures within 12 inches of historic surface. Do not use pry bars. Protect historic surface from contact with or damage by tools.
  2. Unfasten items in the opposite order from which they were installed.
  3. Support each item as it becomes loosened to prevent stress and damage to the historic surface.
  4. Dismantle anchorages.
- F. Anchorages:
1. Remove anchorages associated with removed items.
  2. Dismantle anchorages associated with dismantled items.
  3. In nonhistoric surfaces, patch holes created by anchorage removal or dismantling according to the requirements for new work.
  4. In historic surfaces, patch or repair holes created by anchorage removal or dismantling according to Section that is specific to the historic surface being patched.

## **END OF HISTORIC REMOVAL & DISMANTLING**

**SECTION 03 30 00**

**CAST-IN-PLACE CONCRETE**

**PART 1 – GENERAL**

**1.01 DESCRIPTION**

- A. Provide all labor, materials, equipment, services, etc. required to furnish and install all Cast-In-Place concrete as indicated on the Drawings, Specified herein, or otherwise required for a complete and proper job.
  - 1. The Work shall include, but shall not necessarily be limited to:
    - a. Cast-In-Place Concrete
    - b. Formwork
    - c. Reinforcement
    - d. Materials, mixture design, placement and finishes
- B. Related Work Specified Elsewhere:
  - 1. SECTION 07 10 00: Dampproofing and Waterproofing

**1.02 REFERENCES (LATEST EDITIONS)**

- A. ASTM listed standards by the American Society for Testing and Materials.
- B. ACI listed standards by the American Concrete Institute.
- C. CRSI listed standards by the Concrete Reinforcing Steel Institute.

**1.03 ACTION SUBMITTALS**

- A. Product Data: For each type of product indicated.
- B. Design Mixtures: For each concrete mixture. Submit alternate design mixtures when characteristics of materials, Project conditions, weather, test results, or other circumstances warrant adjustments.
  - 1. Indicate amounts of mixing water to be withheld for later addition at Project site.
- C. Steel Reinforcement Shop Drawings: Placing drawings that detail fabrication, bending, and placement. Include bar sizes, lengths, material, grade, bar schedules, stirrup spacing, bent bar diagrams, bar arrangement, splices and laps, mechanical connections, tie spacing, hoop spacing, and supports for concrete reinforcement.
- D. Construction Joint Layout: Indicate proposed construction joints required to construct the structure.
  - 1. Location of joints is subject to approval of the Architect.

**1.04 INFORMATIONAL SUBMITTALS**

- A. Qualification Data: For Installer and testing agency.
- B. Affidavit: Submit, upon request by Architect, manufacturer's, suppliers and installer's affidavit stating that material or product provided complies with Contract Documents.
- C. Material Test Reports: For the following, from a qualified testing agency:
  - 1. Aggregates: Include service record data indicating absence of deleterious expansion of concrete due to alkali aggregate reactivity.
- D. Field quality-control reports.

**1.05 QUALITY ASSURANCE**

- A. Installer Qualifications: A qualified installer who employs on the Project personnel qualified as ACI-certified Flatwork Technician and Finisher and a supervisor who is an ACI-certified Concrete Flatwork Technician.
- B. Manufacturers Qualifications: A firm experienced in manufacturing ready-mixed concrete products and that complies with ASTM C 94/C 94M requirements for production facilities and equipment.
  - 1. Manufacturer certified according to NRMCA's "Certification of Ready Mixed Concrete production Facilities."
- C. Testing Agency Qualifications: An independent agency qualified in accordance with ASTM C1077 and ASTM E329 for testing indicated.
  - 1. Personnel conducting field tests shall be qualified as ACI Concrete Field Testing Technician, Grade 1, in accordance with ACI CP-1, or an equivalent certification program.
  - 2. Personnel performing laboratory tests shall be ACI-certified Concrete Strength Testing Technician and Concrete Laboratory Testing Technician, Grade I. Testing agency laboratory supervisor shall be an ACI-certified Concrete Laboratory Testing Technician, Grade II.
- D. Welding Qualifications: Qualify procedures and personnel according to AWS D1.4/D1.4 M, "Structural Welding Code – Reinforcing Steel."

**1.06 DELIVERY, STORAGE AND HANDLING**

- A. Steel Reinforcement: Deliver, store, and handle steel reinforcement to prevent bending and damage.
- B. Waterstops: Store waterstops under cover to protect from moisture, sunlight, dirt, oil, and other contaminants.

## **1.07 PROJECT CONDITIONS**

- A. Cold-Weather Placement: Comply with ACI 306.1 and as follows. Protect concrete work from physical damage or reduced strength that could be caused by frost, freezing actions, or low temperatures.
1. When average high and low temperature is expected to fall below 40 deg F for three successive days, maintain delivered concrete mixture temperature within the temperature range required by ACI 301.
  2. Do not use frozen materials or materials containing ice or snow. Do not place concrete on frozen subgrade or on subgrade containing frozen materials.
  3. Do not use calcium chloride, salt, or other materials containing antifreeze agents or chemical accelerators unless otherwise specified and approved in mixture designs.
- B. Hot-Weather Placement: Comply with ACI 301 and as follows:
1. Maintain concrete temperature below 90 deg F at time of placement. Chilled mixing water or chopped ice may be used to control temperature, provided water equivalent of ice is calculated to total amount of mixing water. Using liquid nitrogen to cool concrete is Contractor's option.
  2. Fog-spray forms, steel reinforcement, and subgrade just before placing concrete. Keep subgrade uniformly moist without standing water, soft spots, or dry areas.

## **PART 2 – PRODUCTS**

### **2.01 FORM-FACING MATERIALS**

- A. Provide form-facing panels as defined by ACI and as required to achieve the specified Surface Finish and Surface Tolerance Class.
- B. Chamfer Strips: Wood, metal, PVC, or rubber strips, 3/4 by 3/4 inch, minimum.
- C. Form-Release Agent: Commercially formulated form-release agent that will not bond with, stain, or adversely affect concrete surfaces and will not impair subsequent treatments of concrete surfaces.
- D. Form Ties: Factory-fabricated, removable or snap-off metal or glass-fiber-reinforced plastic or metal form ties designed to resist lateral pressure of fresh concrete on forms and to prevent spalling of concrete on removal.
1. Furnish units that will leave no corrodible metal closer than 1-inch to the plane of exposed concrete surfaces.
  2. Furnish ties that, when removed, will leave holes no larger than 1-inch in diameter in concrete surfaces.
  3. Furnish ties with integral water-barrier plates to wall indicated to receive dampproofing or waterproofing.

### **2.02 STEEL REINFORCEMENT**



- A. Reinforcing Bars: ASTM A 615/A 615M, Grade 60, deformed.
- B. Plain-Steel Wire: ASTM A 82/A 82M, as drawn.
- C. Plain-Steel Welded-Wire Reinforcement: ASTM A1064/A1064M, plain, fabricated from as-drawn steel wire into flat sheets.

### **2.03 REINFORCEMENT ACCESSORIES**

- A. Joint Dowel Bars: ASTM A 615/A 615M, Grade 60, plain-steel bars, cut true to length with ends square and free of burrs.
- B. Bar Supports: Bolsters, chairs, spacers, and other devices for spacing, supporting, and fastening reinforcing bars and welded wire reinforcement in place. Manufacture bar supports from steel wire, plastic, or precast concrete according to CRSI's "Manual of Standard Practice," of greater compressive strength than concrete and as follows:
  - 1. For concrete surfaces exposed to view where legs of wire bar supports contact forms, use CRSI Class 1 plastic-protected steel wire or CRSI Class 2 stainless-steel bar supports.

### **2.04 CONCRETE MATERIALS**

- A. Source Limitations: Obtain each type or class of cementitious material of the same brand from same manufacturer's plant, obtain aggregate from single source, and obtain admixtures from single source from single manufacturer.
- B. Cementitious Material:
  - 1. Portland Cement: ASTM C 150, Type I or Type II, gray.
  - 2. Fly Ash: ASTM C618, Class F or C.
  - 3. Slag Cement: ASTM C989/C989M, Grade 100 or 120.
- C. Normal-Weight Aggregates: ASTM C33/C33M, Class 3M coarse aggregate or better, graded. Provide aggregates from a single source.
  - 1. Maximum Coarse-Aggregate Size: 3/4-inch nominal.
  - 2. Fine Aggregate: Free of materials with deleterious reactivity to alkali in cement.
- D. Chemical Admixtures: Provide admixtures certified by manufacturer to be compatible with other admixtures and that will not contribute water-soluble chloride ions exceeding those permitted in hardened concrete. Do not use calcium chloride or admixtures containing calcium chloride.
  - 1. Air-Entraining Admixture: ASTM C260/C260M
  - 2. Water-Reducing Admixture: ASTM C494/C494M, Type A.
  - 3. Mid-Range Water-Reducing Admixture: ASTM C49/C494M, Type A.
  - 4. Retarding Admixture: ASTM C494/C494M, Type B.
  - 5. Accelerating Admixture: ASTM C494/C494M, Type C.

6. Water-Reducing and Retarding Admixture: ASTM C494/C494M, Type D.
7. Hydration-Control Admixture: ASTM C494/C494M, Type D.
8. Water-Reducing and Accelerating Admixture: ASTM C494/C494M, Type E.
9. High-Range, Water-Reducing Admixture: ASTM C494/C494M, Type F.
10. High-Range, Water-Reducing and Retarding Admixture: ASTM C494/C494M, Type G.
11. Plasticizing and Retarding Admixture: ASTM C1017/C1017M, Type II.

E. Water: ASTM C 94/C 94M.

## **2.05 WATERSTOPS**

- A. Flexible PVC Waterstops: CE CRD-C 572, for embedding in concrete to prevent passage of fluids through joints. Factory fabricate corners, intersections, and directional changes. Configuration as indicated on drawings.

## **2.06 VAPOR RETARDERS**

- A. Sheet Vapor Retarder: ASTM E 1745, Class A, except with maximum perm rating of 0.01 as tested after mandatory conditioning (ASTM E 154 sections 8,11,12,13). Include manufacturer's recommended adhesive or pressure-sensitive tape.

1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:
  - a. W.R. Meadows, Inc.; Perminator 15 mil.
  - b. Stego Industries, LLC; Stego Wrap 15 mil Class A.

## **2.07 LIQUID FLOOR TREATMENTS**

- A. Penetrating Liquid Floor Treatment: Clear, chemically reactive, waterborne solution of inorganic silicate or silicate materials and proprietary components; odorless; that penetrates, hardens, and densifies concrete surfaces.

1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:
  - a. MasterKure HB 200WB by BASF Corporation.
  - b. Curecrete Distribution Inc.; Ashford Formula.
  - c. Euclid Chemical Company (The), and RPM company; Euco Diamond Hard.
  - d. L&M Construction Chemicals, Inc.; Seal Hard.
  - e. W.R. Meadows, Inc.; LIQUI-HARD.

## **2.08 CURING MATERIALS**

- A. Evaporation Retarder: Waterborne, monomolecular film forming, manufactured for application to fresh concrete.
- B. Moisture-Retaining Cover: AASHTO M-182, Class 2, burlap cloth made from jute or kenaf, weighing approximately 10 oz./sq. yd. when dry.

- C. Water: Potable.

## **2.09 RELATED MATERIALS**

- A. Expansion and Isolation Joint-Filler Strips: ASTM D1752, cork or self-expanding cork.
- B. Semirigid Joint Filler: Two-component, semirigid, 100 percent solids, aromatic polyurea with a Shore A durometer hardness range of 90 to 95 in accordance with ASTM D2240.
- C. Bonding Agent: ASTM C1059/C1059M, Type II, non-redispersible, acrylic emulsion or styrene butadiene.
- D. Epoxy Bonding Adhesive: ASTM C881, two-component epoxy resin, capable of humid curing and bonding to damp surfaces, of class suitable for application temperature and of grade to suit requirements, and as follows:
1. Types IV and V, load bearing, for bonding hardened or freshly mixed concrete to hardened concrete.

## **2.10 CONCRETE MIXTURES, GENERAL**

- A. Prepare design mixtures for each type and strength of concrete, proportioned on the basis of laboratory trial mixture or field test data, or both, according to ACI 301.
1. Use a qualified independent testing agency for preparing and reporting proposed mixture designs based on laboratory trial mixtures.
- B. Cementitious Materials: Limit percentage, by mass, of cementitious materials other than Portland cement in concrete as follows:
1. Fly Ash: 15 percent.
  2. Slag Cement: 25 percent.
- C. Limit water-soluble, chloride-ion content in hardened concrete to 0.06 percent by mass of cement.
- D. Admixtures: Use admixtures according to manufacturer's written instructions.
1. Use water-reducing, high-range water-reducing or plasticizing admixture in concrete, as required, for placement and workability.
  2. Use water-reducing and –retarding admixture when required by high temperatures, low humidity, or other adverse placement conditions.
  3. Use accelerating or water-reducing and accelerating admixture when required by low temperatures, or other adverse winter placement conditions.
  4. Use water-reducing admixture in pumped concrete, concrete to be watertight, and concrete with a water-cementitious materials ratio below 0.50.

## **2.11 CONCRETE MIXTURES FOR BUILDING ELEMENTS**

- A. Footings and Foundation Walls: Normal-weight concrete.
  - 1. Minimum Compressive Strength: 3000 psi at 28 days.
  - 2. Maximum Water-Cementitious Materials Ratio: 0.45.
  - 3. Slump Limit: 4 inches, or, 8 inches for concrete with verified slump of 2 to 4 inches before adding high-range water-reducing admixture or plasticizing admixture, plus or minus 1 inch.
  - 4. Air Content: 6 percent, plus or minus 1.5 percent at point of delivery for 3/4-inch nominal maximum aggregate size.
- B. Slabs-on-Ground (Troweled Finish): Normal-weight concrete mixture.
  - 1. Minimum Compressive Strength: 4000 psi at 28 days.
  - 2. Maximum Water-Cementitious Materials Ratio: 0.45.
  - 3. Minimum Cementitious Materials Content: 540 lb/cu. yard.
  - 4. Slump Limit: 4 inches, or, 8 inches for concrete with verified slump of 2 to 4 inches before adding high-range water-reducing admixture or plasticizing admixture, plus or minus 1 inch.
  - 5. Air Content: Do not allow air content of trowel-finished floors to exceed 3 percent.
  - 6. Prohibit the use of fly ash and slag cement.

## **2.12 FABRICATING REINFORCEMENT**

- A. Fabricate steel reinforcement according to CRSI's "Manual of Standard Practice."

## **2.13 CONCRETE MIXING**

- A. Ready-Mixed Concrete: Measure, batch, and deliver concrete according to ASTM C 94/C 94M, and furnish batch ticket information.
  - 1. When air temperature is between 85 and 90 deg F, reduce mixing and delivery time from 1-1/2 hours to 75-minutes; when air temperature is above 90 deg F, reduce mixing and delivery time to 60-minutes.

## **PART 3 – EXECUTION**

### **3.01 FORMWORK**

- A. Design, erect, shore, brace, and maintain formwork, according to ACI 301, to support vertical, lateral, static, and dynamic loads, and construction loads that might be applied, until structure can support such loads.
- B. Construct formwork so concrete members and structures are of size, shape, alignment, elevation, and position indicated, within tolerance limits of ACI 117.
- C. Limit concrete surface irregularities, designated by ACI 347 as abrupt or gradual, as follows:
  - 1. Class A, 1/8 inch for all surfaces exposed to view.
  - 2. Class C, 1/2 inch for other concrete surfaces.

- D. Construct forms tight enough to prevent loss of concrete mortar.
- E. Fabricate forms for easy removal without hammering or prying against concrete surfaces. Provide crush or wrecking plates where stripping may damage cast concrete surfaces. Provide top forms for inclined surfaces steeper than 1.5 horizontal to 1 vertical.
  - 1. Install keyways, reglets, recesses, and the like, for easy removal.
  - 2. Do not use rust-stained steel form-facing material.
- F. Set edge forms, bulkheads, and intermediate screed strips for slabs to achieve required elevations and slopes in finished concrete surfaces. Provide and secure units to support screed strips; use strike-off templates or compacting-type screeds.
- G. Provide temporary openings for cleanouts and inspection ports where interior area of formwork is inaccessible. Close openings with panels tightly fitted to forms and securely braced to prevent loss of concrete mortar. Locate temporary openings in forms at inconspicuous locations.
- H. Chamfer exterior concrete corners and edges of permanently exposed concrete.
- I. Form openings, chases, offsets, sinkages, keyways, reglets, blocking, screeds, and bulkheads required in the Work. Determine sizes and locations from trades providing such items.
- J. Clean forms and adjacent surfaces to receive concrete. Remove chips, wood, sawdust, dirt, and other debris just before placing concrete.
- K. Retighten forms and bracing before placing concrete, as required, to prevent mortar leaks and maintain proper alignment.
- L. Coat contact surfaces of forms with form-release agent, according to manufacturer's written instructions, before placing reinforcement.

### **3.02 EMBEDDED ITEMS**

- A. Place and secure anchorage devices and other embedded items required for adjoining work that is attached to or supported by cast-in-place concrete. Use setting drawings, templates, diagrams, instructions, and directions furnished with items to be embedded.
  - 1. Install anchor rods, accurately located, to elevations required and complying with tolerances in Section 7.5 of AISC's "Code of Standard Practice for Steel Buildings and Bridges."
  - 2. Install reglets to receive waterproofing and to receive through-wall flashings in outer face of concrete frame at exterior walls, where flashing is shown at lintels, shelf angles, and other conditions.

### **3.03 REMOVING AND REUSING FORMS**

- A. General: Formwork for sides of beams, walls, columns, and similar parts of the Work that does not support the weight of concrete may be removed after cumulatively curing at not less than 50

deg F for 24 hours after placing concrete. Concrete has to be hard enough to not be damaged by form-removal operations and curing and protection operations need to be maintained.

1. Leave formwork for slabs and other structural elements that supports weight of concrete in place until concrete has achieved at least 70-percent of its 28-day design compressive strength.
  2. Remove forms only if shores have been arranged to permit removal of forms without loosening or disturbing shores.
- B. Clean and repair surfaces of forms to be reused in the Work. Split, frayed, delaminated, or otherwise damaged form-facing material will not be acceptable for exposed surfaces. Apply new form-release agent.
- C. When forms are reused, clean surfaces, remove fins and laitance, and tighten to close joints. Align and secure joints to avoid offsets. Do not use patched forms for exposed concrete surfaces unless approved by Architect.

### **3.04 SHORES AND RESHORES**

- A. Comply with ACI 318 and ACI 301 for design, installation, and removal of shoring and reshoring.
1. Do not remove shoring or reshoring until measurement of slab tolerances is complete.
- B. Plan sequence of removal of shores and reshore to avoid damage to concrete. Locate and provide adequate reshoring to support construction without excessive stress or deflection.

### **3.05 VAPOR RETARDERS**

- A. Sheet Vapor Retarders: Place, protect, and repair sheet vapor retarder according to ASTM E 1643 and manufacturer's written instructions.
1. Lap joints 6-inches and seal with manufacturer's recommended tape.

### **3.06 STEEL REINFORCEMENT**

- A. General: Comply with CRSI's "Manual of Standard Practice" for placing reinforcement.
1. Do not cut or puncture vapor retarder. Repair damage and reseal vapor retarder before placing concrete.
- B. Clean reinforcement of loose rust and mill scale, earth, ice, and other foreign materials that would reduce bond to concrete.
- C. Accurately position, support, and secure reinforcement against displacement. Locate and support reinforcement with bar supports to maintain minimum concrete cover. Do not tack weld crossing reinforcement bars.
- D. Set wire ties with ends directed into concrete, not toward exposed concrete surfaces.

- E. Install welded-wire reinforcement in longest practicable lengths on bar supports spaced to minimize sagging. Lap edges and ends of adjoining sheets at least one mesh spacing. Offset laps of adjoining sheet widths to prevent continuous laps in either direction. Lace overlaps with wire.

### **3.07 JOINTS**

- A. General: Construct joints true to line with faces perpendicular to surface plane of concrete.
- B. Construction Joints: Install so strength and appearance of concrete are not impaired, at locations indicated or as approved by Architect.
  - 1. Place joints perpendicular to main reinforcement. Continue reinforcement across construction joints unless otherwise indicated. Do not continue reinforcement through sides of strip placements of floors and slabs.
  - 2. Form keyed joints as indicated. Embed keys at least 1-1/2 inches into concrete.
  - 3. Locate joints for beams, slabs, joists, and girders in the middle third of spans. Offset joints in girders a minimum distance of twice the beam width from a beam-girder intersection.
  - 4. Locate horizontal joints in walls and columns at underside of floors, slabs, beams, and girders and at the top of footings or floor slabs.
  - 5. Space vertical joints in walls a maximum of 80 feet on center. Locate joints beside piers integral with walls, near corners, and in concealed locations where possible.
  - 6. Use a bonding agent at locations where fresh concrete is placed against hardened or partially hardened concrete surfaces.
  - 7. Use epoxy-bonding adhesive at locations where fresh concrete is placed against hardened or partially hardened concrete surfaces.
- C. Construction Joints in Slabs-On-Grade: Form weakened-plane contraction joints, sectioning concrete into areas indicated. Construct contraction joints for a depth equal to at least one-fourth of concrete thickness as follows:
  - 1. Sawed Joints: Form contraction joints with an early-entry power saw using a dry-cut blade. Use a vacuum attached to the saw to remove saw cut residue. Cut 1/8-inch wide joints to a depth of one fourth of the concrete thickness into concrete when cutting action will not tear, abrade, or otherwise damage surface and before concrete develops random contraction cracks.
- D. Isolation Joints in Slabs-On-Grade: After removing formwork, install joint-filler strips at slab junctions with vertical surfaces, such as column pedestals, foundation walls, grade beams, and other locations, as indicated.
  - 1. Terminate full-width joint-filler strips not less than 1/2-inch or more than 1-inch below finished concrete surface where joint sealants, specified in Section 07 92 00 "Joint Sealants," are indicated.
  - 2. Install joint-filler strips in lengths as long as practicable. Where more than one length is required, lace or clip sections together.

- E. Doweled Joints: Install dowel bars and support assemblies at joints where indicated. Lubricate or asphalt coat one-half of dowel length to prevent concrete bonding to one side of joint.

### **3.08 WATERSTOPS**

- A. Flexible Waterstops: Install in construction joints and at other joints indicated to form a continuous diaphragm. Install in longest lengths practicable. Support and protect exposed waterstops during progress of the Work. Field fabricate joints in waterstops according to manufacturer's written instructions.

### **3.09 CONCRETE PLACEMENT**

- A. Before placing concrete, verify that installation of formwork, reinforcement, and embedded items is complete and that required inspections have been performed.
- B. Do not add water to concrete during delivery, at Project site, or during placement unless approved by Architect.
- C. Before test sampling and placing concrete, water may be added at Project side, subject to limitations of ACI 301.
  - 1. Do not add water to concrete after adding high-range water-reducing admixtures to mixture.
- D. Deposit concrete continuously in one layer or in horizontal layers of such thickness that no new concrete will be placed on concrete that has hardened enough to cause seams or planes of weakness. If a section cannot be placed continuously, provide construction joints as indicated. Deposit concrete to avoid segregation.
  - 1. Deposit concrete in horizontal layers of depth not to exceed formwork design pressures and in a manner to avoid inclined construction joints.
  - 2. Consolidate placed concrete with mechanical vibrating equipment according to ACI 301.
  - 3. Do not use vibrators to transport concrete inside forms. Insert and withdraw vibrators vertically at uniformly spaced locations to rapidly penetrate placed layer and at least 6-inches into proceeding layer. Do not insert vibrators into lower layers of concrete that have begun to lose plasticity. At each insertion, limit duration of vibration to time necessary to consolidate concrete and complete embedment or reinforcement and other embedded items without causing mixture constituents to segregate.
- E. Deposit and consolidate concrete for floors and slabs in a continuous operation, within limits of construction joints, until placement of a panel or section is complete.
  - 1. Consolidate concrete during placement operations so concrete is thoroughly worked around reinforcement and other embedded items and into corners.
  - 2. Maintain reinforcement in position on chairs during concrete placement.
  - 3. Screed slab surfaces with a straightedge and strike off to correct elevations.
  - 4. Slope surfaces uniformly to drains where required.



5. Begin initial floating using bull floats or darbies to form a uniform and open-textured surface plane, before excess bleedwater appears on surface. Do not further disturb slab surfaces before starting finishing operations.

### **3.10 FINISHING FORMED SURFACES**

A. As-Cast Finishes: Provide As-Cast finishes per ACI 301 and amended below:

1. Surface Finish-1.0 (SF-1.0)
  - a. Patch voids larger than 1-1/2 inch wide or 1/2 inch deep
  - b. Remove projects larger than 1 inch
  - c. Tie holes need not be patched
  - d. Surface tolerance Class D (1-inch within 5 Ft.)
  - e. Mockup not required
2. Surface Finish-2.0 (SF-2.0)
  - a. Patch voids larger than 3/4 inch wide or 1/2 inch deep
  - b. Remove projections larger than 1/4 inch
  - c. Patch tie holes
  - d. Surface tolerance Class B (1/4-inch within 5 Ft.)
  - e. Provide mockup

B. Rubbed Finish: Apply the following to as-cast concrete where indicated:

1. Smooth-Rubbed Finish: Not later than one day after form removal, moisten concrete surfaces and rub with carborundum brick or other abrasive until producing a uniform color and texture. Do not apply cement grout other than that created by the rubbing process.
2. Grout-Cleaned Finish: Wet concrete surfaces and apply grout of a consistency of wet paint to coat surfaces and fill small holes. Mix 1 part portland cement to 1-1/2 parts fine sand with a 1:1 mixture of bonding admixture and water. Add white portland cement in amounts determined by trial patches, so color of dry grout matches adjacent surfaces. Scrub grout into voids and remove excess grout. When grout whitens, rub surface with clean burlap and keep surface damp by fog spray for at least 36 hours.

C. Finish Schedule: Except as otherwise indicated on the Drawings, provide the finishes below:

1. Surfaces entirely concealed from view (Inside face of frost walls, etc.): SF-1.0 with As-Cast Finish
2. Surfaces exposed to view (Exposed portion of frost walls): SF-2.0 with As-Cast Finish
3. Exterior surfaces fully exposed to view (Stairs, fully exposed foundation walls): SF-1.0 with Smooth-Rubbed Finish
4. Interior surfaces fully exposed to view (Inside basement walls): SF-2.0 with Grout-Cleaned Finish

D. Related Unformed Surfaces: At tops of walls, horizontal offsets, and similar unformed surfaces adjacent to formed surfaces, strike off smooth and finish with a texture matching adjacent formed surfaces. Continue final surface treatment of formed surfaces uniformly across adjacent unformed surfaces unless otherwise indicated.

### **3.11 FINISHING FLOORS AND SLABS**

- A. General: Comply with ACI 302.1R recommendations for screeding, restraighening, and finishing operations for concrete surfaces. Do not wet concrete surfaces.
- B. Float Finish: Consolidate surface with power-driven floats or by hand floating if area is small or inaccessible to power driven floats. Restraighten, cut down high spots, and fill low spots. Repeat float passes and restraighening until surface is left with a uniform, smooth, granular texture.
- C. Trowel Finish: After applying float finish, apply first troweling and consolidate concrete by hand or power-driven trowel. Continue troweling passes and restraighten until surface is free of trowel marks and uniform in texture and appearance. Grind smooth any surface defects that would telegraph through applied coatings of floor coverings.
  - 1. Specified overall values of flatness, F(F) 35; and of levelness, F(L) 25; with minimum local values of flatness, F(F) 24; and of levelness, F(L) 17; for slabs-on-ground
  - 2. Finish and measure surface so gap at any point between concrete surface and an unlevelled, freestanding, 10-foot long straightedge resting on two high spots and placed anywhere on the surface does not exceed 1/4-inch.
- D. Finish Schedule: Except where indicated otherwise on the Drawings, provide the finishes below:
  - 1. Floated Finish for:
    - a. Treads and platforms of exterior steps and stairs.
  - 2. Troweled Finish for:
    - a. Interior slabs that are exposed to view.

### **3.12 MISCELLANEOUS CONCRETE ITEMS**

- A. Filling In: Fill in holes and openings left in concrete structures after work of other trades is in place unless otherwise indicated. Mix, place, and cure concrete, as specified, to blend with in-place construction. Provide other miscellaneous concrete filling indicated or required to complete the Work.
- B. Curbs: Provide monolithic finish to interior curbs by stripping forms while concrete is still green and by steel-troweling surfaces to a hard, dense finish with corners, intersections, and terminations slightly rounded.

### **3.13 CONCRETE PROTECTING AND CURING**

- A. General: Protect freshly placed concrete from premature drying and excessive cold or hot temperatures. Comply with ACI 306.1 for cold-weather protection and ACI 305 for hot-weather protection during curing.
- B. Evaporation Retarder: Apply evaporation retarder to unformed concrete surfaces if hot, dry, or windy conditions cause moisture loss approaching 0.1 lb/sq. ft. x h before and during finishing operations. Apply in accordance with manufacturer's written instructions after placing, screeding, and bull floating or darbying concrete, but before float finishing.
- C. Formed Surfaces: Cure formed concrete surfaces, including underside of beams, supported slabs, and other similar surfaces. If forms remain during curing period, moist cure after loosening

forms. If removing forms before end of curing period, continue curing for the remainder of the curing period.

- D. Unformed Surfaces: Begin curing immediately after finishing concrete. Cure unformed surfaces, including floors and slabs, concrete floor toppings, and other surfaces.
- E. Cure concrete according to ACI 308.1, by one or a combination of the following methods:
  - 1. Moisture Curing: Keep surfaces continuously moist for not less than seven days with the following materials:
    - a. Water.
    - b. Continuous water-fog spray.
    - c. Absorptive cover, water saturated, and kept continuously wet. Cover concrete surfaces and edges with 12-inch lap over adjacent absorptive covers.
  - 2. Curing Schedule: Curing compounds shall not be permitted.
    - a. Vertical Concrete: Moisture Cure
    - b. Concrete surfaces to receive liquid floor treatment: Moisture Cure

### **3.14 LIQUID FLOOR TREATMENTS**

- A. Penetrating Liquid Floor Treatment: Prepare, apply, and finish penetrating liquid floor treatment according to manufacturer's written instructions.
  - 1. Remove sealers, oil, dirt, laitance, and other contaminants and complete surface repairs.
  - 2. Apply liquid until surface is saturated, scrubbing into surface until a gel forms; rewet; and repeat brooming or scrubbing. Rinse with water; remove excess material until surface is dry. Apply a second coat in a similar manner if surface is rough or porous.

### **3.15 JOINT FILLING**

- A. Prepare, clean, and install joint filler according to manufacturer's written instructions.
  - 1. Defer joint filling until concrete has aged at least one month. Do not fill joints until construction traffic has permanently ceased.
- B. Remove dirt, debris, saw cuttings, curing compounds, and sealers from joints; leave contact faces of joint clean and dry.
- C. Install semirigid joint filler full depth in saw-cut joints and at least 2-inches deep in formed joints. Overfill joint and trim joint filler flush with top of joint after hardening.

### **3.16 CONCRETE SURFACE REPAIRS**

- A. Defective Concrete: Concrete not conforming to required lines, details, dimensions, tolerances, finishing or other specified requirements. Repair and patch or replacement of defective concrete will be determined by the Architect. Remove and replace concrete that cannot be repaired and patched to Architect's approval.

- B. Do not patch, fill, touch-up, repair, or replace exposed concrete except upon express direction of Architect for each individual area.
- C. Patching Mortar: Mix dry-pack patching mortar, consisting of one part Portland cement to two and one-half parts fine aggregate passing a No. 16 sieve, using only enough water for handling and placing.
- D. Repairing Formed Surfaces: Surface defects include color and texture irregularities, cracks, spalls, air bubbles, honeycombs, rock pockets, fins and other projections on the surface, and stains and other discolorations that cannot be removed by cleaning.
  - 1. Repair defects on exposed formed surfaces as required to meet the specified as-cast Surface Finish.
  - 2. Repair defects on concealed formed surfaces that affect concrete's durability and structural performance as determined by Architect.
- E. Repairing Unformed Surfaces: Test unformed surfaces, such as floors and slabs, for finish and verify surface tolerances specified for each surface. Correct low and high areas. Test surfaces sloped to drain for trueness of slope and smoothness; use a sloped template.
  - 1. Repair finished surfaces containing defects. Surface defects include spalls, popouts, honeycombs, rock pockets, crazing and cracks in excess of 0.01-inch wide or that penetrate to reinforcement or completely through unreinforced sections regardless of width, and other objectionable conditions.
  - 2. After concrete has cured at least 14 days, correct high areas by grinding.
  - 3. Correct localized low areas during or immediately after completing surface finishing operations by cutting out low areas and replacing with patching mortar. Finish repaired areas to blend into adjacent concrete.
  - 4. Correct other low areas scheduled to remain exposed with a repair topping. Cut out low areas to ensure a minimum repair topping depth of 1/4-inch to match adjacent floor elevations. Prepare, mix, and apply repair topping and primer according to manufacturer's written instructions to produce a smooth, uniform, plane, and level surface.
  - 5. Repair defective areas, except random cracks and single holes 1-inch or less in diameter, by cutting out and replacing with fresh concrete. Remove defective areas with clean, square cuts and expose steel reinforcement with at least 3/4-inch clearance all around. Dampen concrete surfaces in contact with patching concrete and apply bonding agent. Mix patching concrete of same materials and mixture as original concrete except without coarse aggregate. Place, compact, and finish to blend with adjacent finished concrete. Cure in same manner as adjacent concrete.
  - 6. Repair random cracks and single holes 1-inch or less in diameter with patching mortar. Groove top of cracks and cut out holes to sound concrete and clean off dust, dirt, and loose particles. Dampen cleaned concrete surfaces and apply bonding agent. Place patching mortar before bonding agent has dried. Compact patching mortar and finish to match adjacent concrete. Keep patched area continuously moist for at least 72 hours.
- F. Perform structural repairs of concrete, subject to Architect's approval, using epoxy adhesive and patching mortar.

- G. Repair materials and installation not specified above may be used, subject to Architect's approval.

**3.17 FIELD QUALITY CONTROL**

- A. Testing and Inspecting: Contractor will engage a qualified testing and inspecting agency to perform field tests and inspections and prepare test reports.
- B. Inspections:
1. Steel reinforcement placement.
  2. Headed bolts and studs.
  3. Verification of use of required design mixture.
  4. Concrete placement, including conveying and depositing.
  5. Curing procedures and maintenance of curing temperature.
  6. Verification of concrete strength before removal of shores and forms from beams and slabs.
- C. Concrete Tests: Testing of composite samples of fresh concrete obtained according to ASTM C 172 shall be performed according to the following requirements:
1. Testing Frequency: Obtain one composite sample for each day's pour of each concrete mixture exceeding 5 cu. yd., but less than 50 cu. yd., plus one set for each additional 50 cu. yd. or fraction thereof. All samples shall be taken at the point of placement.
  2. Slump: ASTM C143/C143M; one test at point of placement for each composite sample, but not less than one test for each day's pour of each concrete mixture. Perform additional tests when concrete consistency appears to change.
  3. Air Content: ASTM C231, pressure method, for normal-weight concrete; one test for each composite sample, but not less than one test for each day's pour of each concrete mixture.
  4. Concrete Temperature: ASTM C1064/C1064M; one test hourly when air temperature is 40 deg F and below and when 80 deg F and above, and one test for each composite sample.
  5. Compression Test Specimens: ASTM C31/C31M.
    - a. Cast and laboratory cure four 6- by 12-inch or five 4- by 8-inch cylinder specimens for each composite sample.
  6. Compressive-Strength Tests: ASTM C39/C39M.
    - a. A compressive-strength test shall be the average compressive strength from a set of two 6- by 12-inch or three 4- by 8-inch specimens obtained from same composite sample and tested at age indicated.
    - b. Test cylinders at 7 days and at 28 days.
  7. When strength of field-cured cylinders is less than 85 percent of companion laboratory-cured cylinders, Contractor shall evaluate operations and provide corrective procedures for protecting and curing in-place concrete.
  8. Strength of each concrete mixture will be satisfactory, if every average of any three consecutive compressive-strength tests equals or exceeds specified compressive strength ( $f_c'$ ) and no compressive-strength test value falls below  $f_c'$  by more than 500 psi when  $f_c'$  is below 5000 psi or by more than  $0.10f_c'$  when  $f_c'$  is more than 5000 psi.

9. Test results shall be reported in writing to Architect, concrete manufacturer, and Contractor within 48 hours of testing. Reports of compressive-strength tests shall contain Project identification name and number, date of concrete placement, name of concrete testing and inspecting agency, location of concrete batch in Work, design compressive strength at 28 days, concrete mixture proportions and materials, compressive breaking strength, and type of break for both 7 and 28-day tests.
  10. Nondestructive Testing: Rebound hammer, ultrasonic, or other nondestructive device may be permitted by Architect but will not be used as sole basis for approval or rejection of concrete.
  11. Additional Tests: Testing and inspecting agency shall make additional tests of concrete when results indicate that slump, air entrainment, compressive strengths, or other requirements have not been met, as directed by Architect. Testing and inspecting agency may conduct tests to determine adequacy of concrete by cored cylinders complying with ASTM C42/C42M or by other methods as directed by Architect.
  12. Additional testing and inspecting, at Contractor's expense, will be performed to determine compliance of replaced or additional work with specified requirements.
  13. Correct deficiencies in the Work that test reports and inspections indicate do not comply with the Contract Documents.
- D. Measure floor and slab flatness and levelness according to ASTM E1155 within 24 hours of finishing.
- E. Prepare test and inspection reports.

3.18 **PROTECTION**

- A. Protect liquid floor treatment from damage and wear during remainder of construction period. Use protective methods and materials, including temporary covering, recommended in writing by liquid floor treatments Installer.

**END OF CAST-IN-PLACE CONCRETE**

**SECTION 05 50 00**

**METAL FABRICATIONS**

**PART 1 – GENERAL**

**1.01 DESCRIPTION**

- A. Provide all labor, materials, equipment, services, etc. required to furnish and install all Metal Fabrications as indicated on the Drawings, Specified herein, or otherwise required for a complete and proper job.
  - 1. The Work shall include, but shall not necessarily be limited to:
    - a. Steel pipe guardrails and handrails

**1.02 SUBMITTALS**

- A. Product Data: Submit product data for products used in metal fabrications, including load and deflection tables, anchor details, paint products, grout, fasteners and standard installation details for each product submitted.
- B. Shop Drawings: Submit shop drawings for each metal fabrication indicated; include plans, elevations; sections showing construction, installation and fastenings; method of joining materials.

**1.03 QUALITY ASSURANCE**

- A. Codes and Standards: Comply with provisions of the following, except as otherwise indicated. Where conflicts occur, comply with the more stringent requirements.
  - 1. ANSI 14.3
  - 2. AWS D1.1 and D1.3
  - 3. NFPA 101
- B. Fabricators Qualifications: A company experienced in successfully producing metal fabrications similar to that shown on the Drawings, with sufficient production capacity to produce required units without causing delay in the Work.
- C. Qualify welding processes and welding operators in accordance with AWS D1.1 and D1.3. Certify that each welder has satisfactorily passes AWS qualification tests for welding processes involved and, if pertinent, has undergone recertification.
- D. All materials used shall be free of lead and asbestos fibers.

**1.04 DELIVERY, STORAGE AND HANDLING**

- A. Store metal fabrications above grade on platforms, skids, or other required supports and protect from corrosion or damage.
- B. Piece mark each fabricated piece as noted on shop drawings.

**1.05 PROJECT CONDITIONS**

- A. Contractor shall verify actual locations of walls and any other adjoining construction by field measurements and communicate via approved shop drawings to fabricator prior to start of order fabrication.

**PART 2 – PRODUCTS**

**2.01 FERROUS METALS**

- A. Metal Surfaces, General: Form metal fabrications exposed to view upon completion of the work, provide materials selected for their surface flatness, smoothness, and freedom from surface blemishes. Do not use materials whose exposed surfaces exhibit pitting, seam marks, roller marks, rolled trade names, roughness, and, for steel sheet, variations in flatness exceeding those permitted by referenced standards for stretcher-leveled sheet.
- B. Steel Pipe: ASTM A53, Type S, Grade B, standard weight (schedule 40), black finish, unless otherwise indicated
- C. Brackets, Flanges and Anchors: Cast or formed metal of the same type material and finish as supported rails, unless otherwise indicated.
- D. Concrete Inserts: Threaded or wedge type; galvanized ferrous castings, either malleable iron, ASTM A47, or cast steel, ASTM A27. Provide bolts, washers, and shims as required, hot-dip galvanized per ASTM A153
- E. Welding Rods and Bare Electrodes: Select in accordance with AWS specifications for the metal alloy to be welded.

**2.02 GROUT**

- A. Non-shrink Nonmetallic Grout: Premixed, factory-packaged, non-staining, non-corrosive, non-gaseous grout complying with ASTM C1107. Provide grout specifically recommended by manufacturer for interior and exterior applications of type specified in this Section. Subject to compliance with requirements, products that may be incorporated in the work include, but are not limited to the following:
1. Euco N-S Grout – Euclid Chemical Co.
  2. Kemset – Chem-Masters Corp.
  3. Crystex – L & M Construction Chemicals, Inc.
  4. SonogROUT – Sonneborn Building Products Div., Rexnord Chemical Products, Inc.

**2.03 FASTENERS**

- A. General: Provide zinc-coated fasteners for exterior use or where built into exterior walls. Select fasteners for the type, grade, and class required. Suspect/counterfeit bolts will not be accepted and will be replaced at Contractors expense.



**2.04    PAINT**

- A.     Shop Primer for Ferrous Metal: Red oxide, lead- and cadmium-free, corrosion- inhibiting primer complying with performance requirements of FS TT-P-664
- B.     Galvanizing Repair Paint: High zinc dust content paint for galvanizing welds in galvanized steel, with dry film containing not less than 94% zinc dust by weight, and complying with SSPC-Paint-20
- C.     Bituminous Paint: Cold-applied asphaltic mastic complying with SSPC-Paint-12 except containing no asbestos fibers.
- D.     Zinc Chromate Primer: FS TT-P-645

**2.05    FABRICATION – GENERAL**

- A.     Form metal fabrications from materials of size, thickness, and shapes indicated but not less than that needed to comply with performance requirements indicated. Work to dimensions indicated or accepted on shop drawings, using proven details of fabrication and support. Use type of materials indicated or specified for various components of each metal fabrication.
- B.     Form exposed work true to line and level with accurate angles and surfaces and straight sharp edges.
- C.     Allow for thermal movement resulting from the following change (range) in ambient temperature in the design, fabrication, and installation of installed metal assemblies to prevent buckling, opening up of joints, and overstressing or welds and fasteners. Base design calculations on actual surface temperature of metals due to both solar heat gain and nighttime sky heat loss
  - 1.       Temperature change (Range): 120 degrees F, ambient; 180 degrees F, material surfaces
- D.     Shear and punch metals cleanly and accurately. Remove burrs.
- E.     Ease exposed edges to a radius of approximately 1/32-inch, unless otherwise indicated. Form bent-metal corners to smallest radius possible without causing grain separation or otherwise impairing work.
- F.     Remove sharp or rough areas on exposed traffic surfaces.
- G.     Weld corners and seams continuously to comply with AWS recommendations and the following:
  - 1.       Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.
  - 2.       Obtain fusion without undercut or overlap
  - 3.       Remove welding flux immediately
  - 4.       At exposed connections, finish exposed welds and surfaces smooth and blended so that no roughness shows after finishing and contour of welded surface matched those adjacent.

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- H. Form exposed connections with hairline joints, flush and smooth, using concealed fasteners wherever possible. Use exposed fasteners of type indicated or, if not indicated, Phillips flat-head (countersunk) screws or bolts. Locate joints where least conspicuous.
- I. Provide for anchorage of type indicated; coordinate with supporting structure. Fabricate and space anchoring devices to provide adequate support for intended use.
- J. Shop Assembly: Preassemble items in shop to the greatest extent possible to minimize field splicing and assembly. Disassemble units only as necessary for shipping and handling limitations. Use connections that maintain structural value of joined pieces. Clearly mark units for reassembly and coordinated installation.
- K. Cut, reinforce, drill and tap miscellaneous metal work as indicated to receive finish hardware, screws, and similar items.
- L. Fabricate joints that will be exposed to weather in a manner to exclude water, or provide weep holes where water may accumulate.

**2.06 STEEL PIPE GUARDRAILS AND HANDRAILS**

- A. Delegated Design: Design railings, including comprehensive engineering analysis by a qualified professional engineer, using performance requirements and design criteria indicated.
- B. General: In engineering railings to withstand structural loads indicated, determine allowable design working stresses of railing materials based on the following:
  - 1. Steel: 72 percent of minimum yield strength.
- C. Structural Performance: Railings shall withstand the effects of gravity loads and the following loads and stresses within limits and under conditions indicated:
  - 1. Handrails and Top Rails of Guards:
    - a. Uniform load of 50 lbf/ft. applied in any direction
    - b. Concentrated load of 200 lbf applied in any direction
    - c. Uniform and concentrated loads need not be assumed to act concurrently
  - 2. Infill of Guards:
    - a. Concentrated load of 50 lbf applied horizontally on an area of 1 sq. ft.
    - b. Infill load and other loads need not be assumed to act concurrently
- D. General: Fabricate pipe guardrails and handrails to comply with requirements indicated for dimensions, details, finish, and member sizes, including thickness of pipe, post spacing's, and anchorage.
- E. Interconnect guardrails and handrail members by butt-welding or welding with internal connectors, at fabricator's option, unless otherwise indicated. At tee and cross intersections, cope ends of intersecting members to fit contour of pipe to which end is joined, weld all around and grind smooth.
- F. Form changes in direction of railing members as follows:

1. By use of welded prefabricated steel elbow fittings.
  2. By bending, of radius indicated.
  3. By mitering at elbow bends.
- G. Form simple and compound curves by bending pipe in jigs to produce uniform curvature for each repetitive configuration required; maintain cylindrical cross-section of pipe throughout entire bend without buckling, twisting, cracking, or otherwise deforming exposed surfaces of pipe.
- H. Provide wall returns at ends of wall-mounted handrails, unless otherwise indicated.
- I. Close exposed ends of pipe by welding 3/16-inch thick steel plate in place or by use of prefabricated fittings, except where clearance of end of pipe and adjoining wall surface is 1/4-inch or less.
- J. Toe Boards: Where indicated, provide toe boards at railings around openings and at the edge of open-sided floors and platforms. Fabricate to dimensions and details indicated, or if not indicated, use 4-inches high by 1/4-inch steel bar welded to each railing post.
- K. Brackets, Flanges, Fittings, and Anchors: Provide wall brackets, end enclosures, flanges, miscellaneous fittings, and anchors for interconnections of pipe and attachment of guardrails and handrails to other work. Furnish inserts and other anchorage devices for connecting guardrails and handrails to concrete or masonry work.
1. For railing posts set in concrete, fabricate sleeves from steel pipe not less than 6-inches long and with an inside diameter not less than 1/2-inch greater than the outside diameter of post, with steel plate closure welded to bottom of sleeve.
  2. For removable railing posts, fabricate slip-fit sockets from steel pipe whose diameter is sized for a close fit with posts and to limit deflection of post without lateral load, measured at top, to not more than 1/12 of post height. Provide socket covers designed and fabricated to resist accidental dislodgement.
- L. Fillers: Provide steel sheet or plate fillers of thickness and size indicated or required to support structural loads of handrails where needed to transfer wall bracket loads through wall finishes to structural supports. Size fillers to suit wall finish thicknesses. Size fills to produce adequate bearing to prevent bracket rotation and overstressing of substrate.

## **2.07 FINISHES**

- A. General: Comply with NAAMM AMP 500 "Metal Finishes Manual" for recommendations relative to application and designation of finishes.
- B. Finish metal fabrications after assembly.

## **2.08 STEEL AND IRON FINISHES**

- A. General: Shop-paint uncoated surfaces of metal fabrications, except those to be embedded in concrete or masonry or to receive sprayed-on fireproofing, surfaces and edges to be welded, and

galvanized surfaces, unless otherwise indicated. Comply with requirements of SSPC-PA 1 for shop painting.

- B. Galvanizing: For those items indicated for galvanizing, apply zinc-coating by the hot-dip process in compliance with the following requirements:
  - 1. ASTM A123 for galvanizing both fabricated and non-fabricated iron and steel products made of uncoated rolled, pressed, and forced shapes, plates, bars, and strip 0.0299-inches thick and heavier.
  - 2. ASTM A153 for galvanizing iron and steel hardware.
- C. Surface Preparation for Shop Priming: Prepare uncoated ferrous metal surfaces to comply with minimum requirements indicated below:
  - 1. Remove oil, grease and similar contaminants in accordance with SP-1, "Solvent Cleaning".
  - 2. Remove loose rust, scale, spatter, slag and other deleterious materials in accordance with SSPC.
- D. Painting: Immediately after surface preparation, apply structural steel primer paint in accordance with manufacturer's instructions and at a rate to provide dry film thickness of not less than 3.0 mils. Use painting methods that result in full coverage of joints, corners, edges, and exposed surfaces. Apply 2 coats of paint to surfaces that are inaccessible after assembly or erection.

**2.09 FACTORY APPLIED ARCHITECTURAL FINISH OVER GALVANIZED STEEL**

- A. The following miscellaneous metal fabrications shall receive factory applied architectural finish over hot-dip galvanizing:
  - 1. All exterior rails
  - 2. All exterior bollards
- B. Basis-of-Design: Colorgalv by Duncan Galvanizing.
- C. Primer coat shall be factory-applied polyamide epoxy primer. Apply primer within 12 hours after galvanizing at the same galvanizer's plant in a controlled environment meeting applicable environmental regulations and as recommended by the primer coating manufacturer.
- D. Finish coat shall be factory-applied color-pigmented architectural finish. Apply finish coating at the galvanizer's plant, in a controlled environment meeting applicable environmental regulations and as recommended by the finish coating manufacturer.
- E. Coatings shall be certified OTC/VOC compliant and conform to applicable regulations and EPA standards.
- F. Apply the galvanizing, primer, and coating within the same facility and provide single-source responsibility for galvanizing, priming and finish coating.

- G. Clean galvanized surface to create an acceptable profile for coatings. Galvanizer shall certify that performance will be met without blast cleaning and coating will be applied within 12 hours of galvanizing at the galvanizer's plant. If blasted, galvanizer shall certify that rugosity standards are met.
- H. Primer shall meet or exceed the following performance criteria:
1. Abrasion Resistance: ASTM D 4060 (CS17 Wheel, 1,000 grams load) 1 kg load, 200 mg loss.
  2. Adhesion: ASTM D 4541, 1050 psi.
  3. Corrosion Weathering: ASTM D 5894, 13 cycles, 4,368 hours, 10 per ASTM D 714 for blistering; 7 per ASTM D 610 for rusting.
  4. Direct Impact Resistance: ASTM D 2794, 160 in. lbs.
  5. Flexibility: ASTM D 522, 180 degrees bend, 1 inch mandrel, Passes.
  6. Pencil Hardness: ASTM D 3363, 3H.
  7. Moisture Condensation Resistance: ASTM D 4585, 100 degrees F, 2000 hours, Passes no cracking or delamination.
  8. Dry Heat Resistance: ASTM D 2485, 250 degrees F.
  9. Accelerated Weathering: QUV- ASTM D 4587 QUV A 5000 Hours: Passes.
  10. Salt Fog Resistance: ASTM B 117, 5,600 hours No cracking or blisters.
- I. Topcoat shall meet or exceed the following performance criteria:
1. Abrasion Resistance: ASTM D 4060, CS17 Wheel, 1,000 cycles 1 kg load, 87.1 mg loss.
  2. Adhesion: ASTM D 4541, 1050 psi.
  3. Direct Impact Resistance: ASTM D 2794, greater than 28 in. pounds.
  4. Dry Heat Resistance: ASTM D 2485, 200 degrees F (93 C).
  5. Salt Fog Resistance: ASTM B 117 9,000 hours, Rating 10 per ASTM D 714 for blistering, Rating 9 per ASTM D 610 for rusting.
  6. Flexibility: ASTM D522, 180 degrees bend, 1/8 inch mandrel, Passes.
  7. Pencil Hardness: ASTM D 3363, F.
  8. Moisture Condensation Resistance: ASTM D 4585, 100 degrees F, 1000 hours, No blistering or delamination.
  9. Xenon Arc Test: ASTM D 4798, Pass 200 hours.
  10. Corrosion Weathering: ASTM D 5894, 21 Cycles, 7056 Hours: Rating 10 per ASTM D714 for blistering. Rating 9 Per ASTM D 610 for Rusting.
  11. Thermal Shock: ASTM D 2246, 15 cycles, Excellent.
- J. Topcoat shall exhibit a rugosity (smoothness) 4 rug or less (16-20 microns of variation) when measured by a profilometer over a 1 inch straight line on the surface of elements that are less than 24 pounds per running foot. Profilometer shall be capable of operating in 1 micron increments.
- K. Warranty: Provide galvanizer's standard warranty that materials will be free from 10 percent or more visible rust for 20 years.

### **PART 3 – EXECUTION**

#### **3.01 EXAMINATION**

- A. Installer shall examine the areas and conditions under which metal fabrication items are to be installed. Notify the Owner in writing of conditions detrimental to the proper and timely completion of the work. Do not proceed with the work until unsatisfactory conditions have been corrected in a manner acceptable to the Installer and Owner.

### **3.02 PREPARATION**

- A. Coordinate and furnish anchorages, setting drawings, diagrams, templates, instructions, and directions for installation of anchorages, including concrete inserts, sleeves, anchor bolts, and miscellaneous items having integral anchors that are to be embedded in concrete or masonry construction. Coordinate delivery of such items to Project site.
- B. Set sleeves in concrete with tops flush with finish surface elevations; protect sleeves from water and concrete entry.

### **3.03 INSTALLATION, GENERAL**

- A. Fastening to In-Place Construction: Provide anchorage devices and fasteners where necessary for securing miscellaneous metal fabrications to in-place construction; include threaded fasteners for concrete and masonry inserts, toggle bolts, and through-bolts, lag bolts, wood screws and other connectors as required.
- B. Cutting, Fitting and Placement: Perform cutting, drilling, and fitting required for installation of miscellaneous metal fabrications. Set metal fabrications accurately in location, alignment, and elevation; with edges and surfaces level, plumb, true, and free of rack; and measured from established lines and levels.
- C. Provide temporary bracing or anchors in formwork for items that are to be built into concrete masonry or similar construction.
- D. Fit exposed connections accurately together to form hairline joints. Weld connections that are not to be left as exposed joints, but cannot be shop-welded because of shipping size limitations. Do not weld, cut, or abrade the surfaces of exterior units which have been hot-dip galvanized after fabrication, and are intended for bolted or screwed field connections.
- E. Field Welding: Comply with AWS Code for procedures of manual shielded metal- arch welding, appearance and quality of welds made, methods used in correcting welding work, and the following:
  - 1. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.
  - 2. Obtain fusion without undercut or overlap.
  - 3. Remove welding flux immediately.
  - 4. At exposed connections, finish exposed welds and surfaces smooth and blended so that no roughness shows after finishing and contour of welded surfaces matches those adjacent.
- F. Grout: Follow manufacturer's recommendations for substrate preparation and application.

- G. Corrosion Protection: Coat concealed surfaces of aluminum that will come into contact with grout, concrete, masonry, wood, or dissimilar metals with a heavy coat of bituminous paint or zinc chromate primer.

### **3.04 INSTALLATION OF STEEL PIPE GUARDRAILS AND HANDRAILS**

- A. Adjust railings prior to anchoring to ensure matching alignment at abutting joints. Space posts at spacing indicated, or if not indicated, as required by design loadings. Plumb posts in each direction. Secure posts and railing ends to building construction as follows:
1. Anchor posts in concrete by means of pipe sleeves preset and anchored in concrete. After posts have been inserted into sleeves, fill annular space between post and sleeve solid with non-shrink, non-metallic grout, mixed and placed to comply with anchoring material manufacturer's directions.
  2. Anchor posts and rail ends to steel with welded connections, unless otherwise indicated.
  3. Anchor posts and rail ends into concrete and masonry with steel round flanges welded to post and rail ends, and anchored into wall construction with expansion shields and bolts.
  4. Install removable railing sections where indicated in slip-fit metal sockets cast into concrete. Accurately locate sockets to match post spacing.
- B. Secure handrails to wall with wall brackets and end fittings. Provide bracket with not less than 1-1/2 inch clearance from inside face of handrail and finished wall surface. Locate brackets at spacing not less than 5-feet on center, unless otherwise indicated. Secure wall brackets and wall return fittings to building construction as follows:
1. Use type of bracket with flange tapped for concealed anchorage to threaded hanger bolt.
  2. For concrete and solid masonry anchorage, use drilled-in expansion shield and either concealed hanger bolt or exposed lag bolt, as applicable.
  3. For hollow masonry anchorage, fasten brackets directly on masonry wall using toggle bolts.
  4. For steel framed gypsum board assemblies, fasten brackets to wood blocking using lag bolts or to metal blocking using self-tapping screws, of size and type required to support structural loads.
- C. Expansion Joints: Provide expansion joints at locations indicated, or if not indicated, at intervals not to exceed 40-feet. Provide slip joint with internal sleeve extending 2-inches beyond joint on either side; fasten internal sleeve securely to one side; locate joint within 6-inches of posts.

### **3.05 ADJUSTING AND CLEANING**

- A. Touch-Up Painting of Steel Items: Immediately after erection, clean field welds, bolted connections, abraded areas of shop paint, and paint exposed areas with same material as used for shop painting to comply with SSPC-PA 1 requirements for touch-up of field painted surfaces. Apply by brush or spray to provide a minimum dry film thickness of 3.0 mils.
- B. For galvanized surfaces clean welds, bolted connections and abraded areas and apply galvanizing repair paint to comply with ASTM A780.

**END OF METAL FABRICATIONS**



**SECTION 07 10 00**

**DAMPPROOFING AND WATERPROOFING**

**PART 1 – GENERAL**

**1.01 DESCRIPTION**

- A. Provide all labor, materials, equipment, services, etc. required to furnish and install all Dampproofing and Waterproofing as indicated on the Drawings, Specified herein, or otherwise required for a complete and proper job.
  - 1. The Work shall include, but shall not necessarily be limited to:
    - a. Fluid applied waterproofing
    - b. Drainage panels and Insulation drainage panels
- B. Related Work Specified Elsewhere:
  - 1. SECTION 03 30 00: Cast-In-Place Concrete

**1.02 SUBMITTALS**

- A. Product Data: For each type of dampproofing and waterproofing product specified, including;
  - 1. Technical data indicating compliance with requirements
  - 2. Substrate preparation instructions and recommendations
- B. Certificates: Submit certificate that applicator complies with requirements of this Section and is approved by manufacturer.

**1.03 QUALITY ASSURANCE**

- A. Manufacturer Qualifications: A qualified manufacturer with minimum five years' experience in manufacture of dampproofing and waterproofing as one of its principal products.
- B. Installer Qualifications: A manufacturer approved firm with minimum three years' experience in installation of specified products in successful use on similar projects, employing workers trained by manufacturer, including a full-time on-site supervisor with a minimum three years' experience installing similar work, and able to communicate verbally with Contractor and employees.
- C. Compatibility: It shall be the responsibility of the Contractor to verify the compatibility of all materials specified herein, and to provide all surface preparation, cleaning, priming, etc., required for a lasting, proper installation.

**1.04 DELIVERY, STORAGE AND HANDLING**

- A. All materials and related accessories shall be delivered and stored in strict compliance with the manufacturer's instructions.

- B. Deliver materials in manufacturer's original, unopened, undamaged containers with identification labels intact.
- C. Store materials protected from exposure to harmful environmental conditions and at temperature and humidity conditions recommended by the manufacturer.

#### **1.05 PROJECT CONDITIONS**

- A. Maintain environmental conditions (temperature, humidity and ventilation) within the limits recommended by manufacturer for optimum results. Do not install products under environmental conditions outside manufacturer's absolute limits.
- B. Provide concrete wall surfaces that are broom clean, dry, sound and free of voids, bug holes, rock pockets, honeycombs, protrusions, excessive roughness, foreign matter, frost, ice and other contaminants which may inhibit application or performance of the waterproofing system.

#### **1.06 WARRANTY**

- A. Deliver to the Owner signed copies of the following written warranties against defective materials and workmanship for a period of ten years following the date of Substantial Completion. Warrant that installed waterproofing system shall be free of defects including adhesive failure, cohesive failure, and waterproofing failure.
  - 1. Manufacturer's ten year standard warranty covering materials;
  - 2. Applicators two year standard warranty covering workmanship.

### **PART 2 – PRODUCTS**

#### **2.01 PERFORMANCE REQUIREMENTS**

- A. Waterproofing: System shall be capable of performing as a continuous watertight installation and as a moisture drainage plane transitioned to adjacent flashings and discharging water to the building exterior. Waterproofing shall accommodate normal substrate movement and seal expansion and control joints, construction material transitions, opening transitions, penetrations, and perimeter conditions without resultant moisture deterioration.
- B. Compatibility: Provide waterproofing system materials that are compatible with one another and with adjacent materials under conditions of service and application required, as demonstrated by waterproofing manufacturer based on testing and field experience.

#### **2.02 WATERPROOFING**

- A. Basis of Design: Provide waterproofing products manufactured by Tremco, Inc., Commercial Sealants and Waterproofing Division, Beachwood OH; or comparable products by Marflex Waterproofing & Building Products, Karnak Corporation; or approved equal.
- B. Source Limitation: Obtain products from a single source from a single manufacturer.

- C. Fluid-Applied Waterproofing Membrane (Spray-on Application): Environmentally responsible, single component, polymer-modified asphalt material for application to damp and green concrete.
1. Basis of Design Product: TREMproof 260
  2. Thickness: 60 mils
  3. VOC Content: Less than 72 g/L
  4. Elongation, ASTM D412: 800%
  5. Low Temperature Flexibility and Crack Bridging, ASTM C 836: Pass
  6. Peel Adhesion, ASTM D903: Pass
  7. Water Resistance, ASTM C836; AATC-127: Pass
  8. Water Vapor Permeance:
    - a. ASTM C836; ASTM E96 Dry Cup: 0.09 US Perms
    - b. ASTM C836; ASTM E96 Wet Cup: 1.70 US Perms

## **2.03 ACCESSORY MATERIALS**

- A. General: Accessory materials as described in manufacturer's written installation instructions, recommended to produce complete waterproofing system meeting performance requirements, and compatible with dampproofing and waterproofing material and adjacent materials
- B. Substrate Patching Material: Waterproofing manufacturer's standard trowel-grade filler material.
- C. Primer: Liquid primer meeting VOC limitations and recommended for substrate by waterproofing manufacturer.
- D. Elastomeric Detail Sheet: Blended thermoset elastomeric sheet reinforced with polyester woven scrim
- E. Metal Termination Bars: Waterproofing manufacturer's standard aluminum or stainless steel termination bar, with stainless steel fasteners.
- F. Termination Mastic: Waterproofing manufacturer's standard cold fluid-applied elastomeric liquid; trowel grade, with recommended glass-fiber-mesh tape.
- G. Joint Sealant: ASTM C 719, high performance, medium-modulus, low-VOC, UV-stable, non-sag polyurethane sealant approved by waterproofing manufacturer for adhesion and compatibility with waterproofing and accessories.
- H. Joint Backing: Closed-cell polyethylene rod as recommended by manufacturer.

## **2.04 DRAINAGE PANELS**

- A. Nonwoven-Geotextile-Faced, Molded-Sheet Drainage Panel: Manufactured composite subsurface drainage panels consisting of a nonwoven, needle-punched, polypropylene fabric laminated to one side of a studded, non-biodegradable, polystyrene drainage core, with polymeric film attached to back of drainage core.
1. Basis of Design: Tremco, TREMDrain 1000 PF
  2. Flow capacity, per unit width, ASTM D4716: 18 gpm/ft
  3. Flow Rate, ASTM D 4491: 165 gpm/ft<sup>2</sup>

4. Apparent Opening Size: No. 70 sieve
5. Puncture Strength, ASTM D 4833: 65 lb
6. Core Compressive Strength, ASTM D 1621: 15,000 lb/ft<sup>2</sup>
7. Thickness: 0.437 inch

### **PART 3 – EXECUTION**

#### **3.01 EXAMINATION**

- A. Surface Condition: Before applying materials, examine substrate and conditions to ensure substrates are fully cured, clean, dry, and free from high spots, depressions, loose and foreign particles and other deterrents to adhesion, and conditions comply with manufacturer's written recommendations.
  1. Verify concrete surfaces are visibly dry, have cured for time period recommended by manufacturer, and are free from release agents, curing agents, laitance, and other contaminants. Test for capillary moisture by plastic sheet method according to ASTM D 4263. Test for adhesion per manufacturer's recommended method. Notify Owner of unsatisfactory conditions.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

#### **3.02 INTERFACE WITH OTHER WORK**

- A. Sequencing of Work: Coordinate sequencing of dampproofing and waterproofing Work with work of other Sections that form portions of building envelope moisture control to ensure that flashings and transition materials can be properly installed and inspected.
- B. Subsequent Work: Coordinate dampproofing and waterproofing Work with work of other Sections installed subsequent to the Work of this Section to ensure complete inspection of installed waterproofing and sealing of waterproofing penetrations necessitated by subsequent work.

#### **3.03 PREPARATION**

- A. Clean, prepare, and treat substrates in accordance with manufacturers written instructions.
  1. Mask adjacent finished surfaces
  2. Remove contaminants and film-forming coatings from substrates
  3. Remove projections and excess materials and fill voids with substrate patching material.
  4. Prepare and treat joints and cracks in substrate per ASTM D 4258 and manufacturer's written instructions.
- B. Detail Preparation: Prepare non-moving shrinkage cracks, large cracks, construction joints, expansion joints, projections and protrusions, penetrations and changes in plane in accordance with manufacturer's written instructions and details, using accessory materials specified. The following are two acceptable options for detail preparation:

1. Adhere strips of elastomeric detail sheet to moving expansion joints on both sides in conjunction with a metal termination bar embedded in a layer of cold fluid-applied waterproofing and overlay with coat of cold fluid-applied waterproofing.
  2. Apply single-component urethane within moving expansion joints and overlay with a coat of cold fluid-applied waterproofing.
- C. Transitions to Adjacent Materials: Apply approved primer to transition cold fluid-applied waterproofing membrane to adjacent components of the building envelope.
- D. On poured concrete walls, tie holes and other voids, honeycomb, rock pockets, etc. shall be patched with a non-shrinking grout. On CMU insure all joints are struck flush.

### **3.04 FLUID-APPLIED WATERPROOFING INSTALLATION**

- A. General: Install waterproofing system in accordance with manufacturer's recommendations and instructions as applied to the Work except where more stringent requirements are indicated.
1. Membrane shall have a minimum 90 mil wet film thickness producing a 60 mil dry film sprayed at 18 square feet per gallon.
  2. Grid surfaces to assure proper coverage rates and verify membrane wet mil film thickness with gauges as work progresses.
- B. Verify proper condition of substrate using method recommended by membrane system manufacturer; perform adhesion checks prior to general application of membrane system using field adhesion test method recommended by manufacturer.
- C. Mask of adjoining surfaces not to receive membrane system.
- D. Overlap existing work by 4-inches with new work.
- E. Spray apply the waterproofing membrane uniformly and allow it to cure in accord with manufacturer's instructions.
- F. Install the protection course over the cured membrane in accordance with manufacturer's instructions.

### **3.05 PROTECTION INSTALLATION**

- A. Drainage Panel: Place and secure drainage panels using methods that do not penetrate waterproofing. Face geotextile away from deck substrate. Lap edges or abut ends of geotextile.

### **3.06 CLEANING AND PROTECTING**

- A. Clean spills, stains, and overspray resulting application utilizing cleaning agents recommended by manufacturers of affected construction. Remove masking material.
- B. Protect waterproofing from damage from subsequent work. Protect waterproofing materials from exposure to UV light for period in excess of that acceptable to waterproofing manufacturer; replace overexposed materials and retest.

**3.07    DAMPPROOFING AND WATERPROOFING SCHEDULE**

A.      Waterproofing:

1.      The earth-covered face of exterior building walls(building perimeter) with earth on one side and habitable space on the other
2.      Miscellaneous as indicated on the Drawings.

**END OF DAMPPROOFING AND WATERPROOFING**

**SECTION 31 20 00**

**EARTH MOVING**

**PART 1 – GENERAL**

**1.01 DESCRIPTION**

- A. Provide all labor, materials, equipment, services, etc. required to furnish and install all Earth Moving as indicated on the Drawings, Specified herein, or otherwise required for a complete and proper job.
1. The Work shall include, but shall not necessarily be limited to:
- a. Preparing subgrades for slabs-on-grade, walks, pavements, turf and grasses and plants.
  - b. Excavating and backfilling for buildings and structures.
  - c. Subsurface drainage backfill for walls and trenches.
  - d. Excavating and backfilling trenches for utilities and pits for buried utility structures.
- B. Related Work Specified Elsewhere:
1. SECTION 03 30 00: Cast-In-Place Concrete

**1.02 DEFINITIONS**

- A. Backfill: Soil material or controlled low-strength material used to fill an excavation.
1. Initial Backfill: Backfill placed beside and over pipe in a trench, including haunches to support sides of pipe.
2. Final Backfill: Backfill placed over initial backfill to fill a trench.
- B. Bedding Course: Aggregate layer placed over the excavated subgrade in a trench before laying pipe.
- C. Borrow Soil: Satisfactory soil imported from off-site for use as fill or backfill.
- D. Drainage Course: Aggregate layer supporting the slab-on-grade that also minimizes upward capillary flow of pore water.
- E. Excavation: removal of material encountered above subgrade elevations and to lines and dimensions indicated.
1. Authorized Additional Excavation: Excavation below subgrade elevations or beyond indicated lines and dimensions as directed by Architect. Authorized additional excavation and replacement material will be paid for according to Contract provisions for changes in Work.

2. Unauthorized Excavation: Excavation below subgrade elevations or beyond indicated lines and dimensions without direction by Architect. Unauthorized excavation, as well as remedial work directed by Architect, shall be without additional compensation.
- F. Fill: Soil materials used to raise existing grades.
- G. Rock: Rock material in beds, ledges, unstratified masses, conglomerate deposits, and boulders or rock material that exceed 1 cu. Yd. for footing, trench and pit excavation that cannot be removed by rock excavating equipment equivalent to the following in size and performance ratings, without systematic drilling, ram hammering, ripping, or blasting, when permitted:
1. Excavation of Footings, Trenches, and pits: Late-model, track-mounted hydraulic excavator; equipped with a 42-inch wide, maximum, short-tip-radius rock bucket; rated at not less than 138-hp flywheel power with bucket-curling force of not less than 28,700 lbf and stick-crowd force of not less than 18,400 lbf with extra-long reach boom; measured according to SAE J-1179.
- H. Structures: Buildings, footings, foundations, retaining walls, slabs, tanks, curbs, mechanical and electrical appurtenances, or other man-made stationary features constructed above or below the ground surface.
- I. Subgrade: Uppermost surface of an excavation or the top surface of a fill or backfill immediately below subbase, drainage fill, drainage course, or topsoil materials.
- J. Utilities: On-site underground pipes, conduits, ducts, and cables, as well as underground services within buildings.

### **1.03 ACTION SUBMITTALS**

- A. Product Data: For each type of the following manufactured products required:
1. Geotextiles.
  2. Warning tapes.
- B. Samples for Verification: For the following products, in sizes indicated below:
1. Geotextile: 12 by 12-inches.
  2. Warning Tape: 12-inches long; of each color.

### **1.04 INFORMATIONAL SUBMITTALS**

- A. Qualification Data: For qualified testing agency.
- B. Material Test Reports: For each on-site and borrow soil material proposed for fill and backfill as follows:
1. Classification according to ASTM D 2487.
  2. Laboratory compaction curve according to ASTM D 1557.



- C.      Preexcavation Photographs or Videotape: Show existing conditions of adjoining construction and site improvements, including finish surfaces that might be misconstrued as damage caused by earth moving operations. Submit before earth moving begins.

**1.05      QUALITY ASSURANCE**

- A.      Geotechnical Testing Agency Qualifications: Qualified according to ASTM E 329 and ASTM D 3740 for testing indicated.
- B.      Preexcavation Conference: Conduct conference at Project site.

**1.06      PROJECT CONDITIONS**

- A.      Traffic: Minimize interference with adjoining roads, streets, walks, and other adjacent occupied or used facilities during earth moving operations.
  - 1.          Do not close or obstruct streets, walks, or other adjacent occupied or used facilities without permission from Owner and authorities having jurisdiction.
  - 2.          Provide alternate routes around closed or obstructed traffic ways if required by Owner or authorities having jurisdiction.
- B.      Utility Locator Service: Notify "Dig Safe System" for area where Project is located before beginning earth moving operations.
- C.      Do not commence earth moving operations until plant-protection measures specified, are in place.
- D.      The following practices are prohibited within protection zones:
  - 1.          Storage of construction materials, debris, or excavated material.
  - 2.          Parking vehicles or equipment.
  - 3.          Foot traffic.
  - 4.          Erection of sheds or structures.
  - 5.          Impoundment of water.
  - 6.          Excavation or other digging unless otherwise indicated.
  - 7.          Attachment of signs to or wrapping materials around trees or plants unless otherwise indicated.
- E.      Do not direct vehicle or equipment exhaust towards protection zones.
- F.      Prohibit heat sources, flames, ignition sources, and smoking within or near protection zones.

**PART 2 – PRODUCTS**

**2.01      SOIL MATERIALS**

- A.      General: Provide borrow soil materials when sufficient satisfactory soil materials are not available from excavations.

- B. Satisfactory Soils: Soil Classification Groups A-1, A-2-4, A-2-5, and A-3 according to AASHTO M 145, or a combination of these groups; free of rock or gravel larger than 3-inches in any dimension, debris, waste, frozen materials, vegetation, and other deleterious matter.
- C. Unsatisfactory Soils: Soil Classification Groups A-2-6, A-2-7, A-4, A-5, A-6, and A-7 according to AASHTO M 145, or a combination of these groups.
  - 1. Unsatisfactory soils also include satisfactory soils not maintained within 2 percent of optimum moisture content at time of compaction.
- D. Subbase Material: NHDOT Item 304.2.
- E. Base Course: NHDOT Item 304.3.
- F. Engineered Fill: Naturally or artificially graded mixture of natural or crushed gravel, crushed stone, and natural or crushed sand; ASTM D 2940; with at least 90 percent passing a 1-1/2 inch sieve and not more than 12 percent passing a No. 200 sieve.
- G. Bedding Course: Naturally or artificially graded mixture of natural or crushed gravel, crushed stone, and natural or crushed sand; ASTM D 2940; except with 100 percent passing a 1-inch sieve and not more than 8 percent passing a No. 200 sieve.
- H. Drainage Course: Narrowly graded mixture of crushed stone, or crushed and uncrushed gravel; ASTM D 448; coarse-aggregate grading Size 57; with 100 percent passing a 1-1/2 inch sieve and 0 to 5 percent passing a No. 8 sieve.
- I. Filter Material: Narrowly graded mixture of natural or crushed gravel, or crushed stone and natural sand; ASTM D 448; coarse-aggregate grading Size 67; with 100 percent passing a 1-inch sieve and 0 to 5 percent passing a No. 4 sieve.
- J. Sand: ASTM C 33; fine aggregate.
- K. Impervious Fill: Clayey gravel and sand mixture capable of compacting to a dense state.

## **2.02 GEOTEXTILES**

- A. Subsurface Drainage Textile: Nonwoven needle-punched geotextile, manufactured for subsurface drainage applications, made from polyolefins or polyesters; with elongation greater than 50 percent; complying with AASHTO M 288 and the following, measured per test methods referenced:
  - 1. Survivability: Class 2; AASHTO M 288.
  - 2. Grab Tensile Strength: 157 lbf; ASTM D 4632.
  - 3. Sewn Seam Strength: 142 lbf; ASTM D 4632.
  - 4. Tear Strength: 56 lbf; ASTM D 4533.
  - 5. Puncture Strength: 56 lbf; ASTM D 4833.
  - 6. Apparent Opening Size: No. 40.
  - 7. Permittivity: 0.5 per second, minimum; ASTM D 4491.
  - 8. UV Stability: 50 percent after 500 hours' exposure; ASTM D 4355.

## **2.03    ACCESSORIES**

- A.     Detectable Warning Tape: Acid and Alkali-resistant, polyethylene film warning tape manufactured for marking and identifying underground utilities, a minimum of 6-inches wide and 4 mils thick, continuously inscribed with a description of the utility, with metallic core encased in a protective jacket for corrosion protection, detectable by metal detector when tape is buried up to 30-inches deep; colored as follows:
1.        Red: Electric.
  2.        Yellow: Gas, oil, steam, and dangerous materials.
  3.        Orange: Telephone and other communications.
  4.        Blue: Water systems.
  5.        Green: Sewer systems.

## **PART 3 – EXECUTION**

### **3.01    PREPARATION**

- A.     Protect structures, utilities, sidewalks, pavements, and other facilities from damage caused by settlement, lateral movement, undermining, washout, and other hazards created by earth moving operations.
- B.     Protect and maintain erosion and sedimentation controls during earth moving operations.
- C.     Protect subgrades and foundation soils from freezing temperatures and frost. Remove temporary protection before placing subsequent materials.

### **3.02    DEWATERING**

- A.     Prevent surface water and ground water from entering excavations, from ponding on prepared subgrades, and from flooding Project site and surrounding area.
- B.     Protect subgrades from softening, undermining, washout, and damage by rain or water accumulation.
1.        Reroute surface water runoff away from excavated areas. Do not allow water to accumulate in excavations. Do not use excavated trenches as temporary drainage ditches.

### **3.03    EXCAVATION, GENERAL**

- A.     Unclassified Excavations: Excavate to subgrade elevations regardless of the character of surface and subsurface conditions encountered. Unclassified excavated materials may include rock, soil materials, and obstructions. No changes in the Contract Sum or the Contract Time will be authorized for rock excavation or removal of obstructions.
1.        If excavated materials intended for fill and backfill include unsatisfactory soil materials and rock, replace with satisfactory soil materials.

2. Remove rock to lines and grades indicated to permit installation of permanent construction without exceeding the following dimensions:
  - a. 24-inches outside of concrete forms other than at footings.
  - b. 12-inches outside of concrete forms at footings.
  - c. 6-inches outside of minimum required dimensions of concrete cast against grade.
  - d. 6-inches beneath bottom of concrete slabs-on-grade.
  - e. 6-inches beneath pipe in trenches, and the greater of 24-inches wider than pipe or 42-inches.

### **3.04 EXCAVATION FOR UTILITY TRENCHES**

- A. Excavate trenches to indicated gradients, lines, depths, and elevations.
  1. Beyond building perimeter, excavate trenches to allow installation of top of pipe below frost line.
- B. Excavate trenches to uniform widths to provide the following clearance on each side of pipe or conduit. Excavate trench walls vertically from trench bottom to 12-inches higher than top of pipe or conduit unless otherwise indicated.
  1. Clearance: As indicated.
- C. Trench Bottoms: Excavate and shape trench bottoms to provide uniform bearing and support of pipes and conduit. Shape subgrade to provide continuous support for bells, joints, and barrels of pipes and for joints, fittings, and bodies of conduits. Remove projecting stones and sharp objects along trench subgrade.
  1. For pipes and conduit less than 6-inches in nominal diameter, hand-excavate trench bottoms and support pipe and conduit on an undisturbed subgrade.
  2. For pipes and conduit 6-inches or larger in nominal diameter, shape bottom of trench to support bottom 90 degrees of pipe or conduit circumference. Fill depressions with tamped sand backfill.
  3. For flat-bottomed, multiple-duct conduit units, hand-excavate trench bottoms and support conduit on an undisturbed subgrade.
  4. Excavate trenches 6-inches deeper than elevation required in rock or other unyielding bearing material to allow for bedding course.
- D. Trenches in Tree and plant-Protection Zones:
  1. Hand-excavate to indicated lines, cross sections, elevations, and subgrades. Use narrow-tine spading forks to comb soil and expose roots. Do not break, tear, or chop exposed roots. Do not use mechanical equipment that rips, tears, or pulls roots.
  2. Do not cut main lateral roots or taproots; cut only smaller roots that interfere with installation of utilities.

### **3.05 SUBGRADE INSPECTION**

- A. Notify Architect when excavations have reached required subgrade.

- B. If Architect determines that unsatisfactory soil is present, continue excavation and replace with compacted backfill or fill material as directed.
- C. Proof-roll subgrade below the building slabs and pavements with a pneumatic-tired and loaded 10-wheel, tandem axle dump truck weighing not less than 15 tons to identify soft pockets and areas of excess yielding. Do not proof-roll wet or saturated subgrades.
  - 1. Completely proof-roll subgrade in one direction, repeating proof-rolling in direction perpendicular to first direction. Limit vehicle speed to 30 mph.
  - 2. Excavate soft spots, unsatisfactory soils, and areas of excessive pumping or rutting, as determined by Architect, and replace with compacted backfill or fill as directed.
- D. Authorized additional excavation and replacement material that will be paid for according to Contract provisions for changes in the Work.
- E. Reconstruct subgrades damaged by freezing temperatures, frost, rain, accumulated water, or construction activities, as directed by Architect, without additional compensation.

### **3.06 UNAUTHORIZED EXCAVATION**

- A. Fill unauthorized excavation under foundations or wall footings by extending bottom elevation of concrete foundation or footing to excavation bottom, without altering top elevation. Lean concrete fill, with 28-day compressive strength of 2500 psi, may be used when approved by Architect.
  - 1. Fill unauthorized excavations under other construction, pipe, or conduit as directed by Architect.

### **3.07 STORAGE OF SOIL MATERIALS**

- A. Stockpile borrow soil materials and excavated satisfactory soil materials without intermixing. Place, grade, and shape stockpiles to drain surface water. Cover to prevent windblown dust.
  - 1. Stockpile soil materials away from edge of excavations. Do not store within drip line of remaining trees.

### **3.08 BACKFILL**

- A. Place and compact backfill in excavations promptly, but not before completing the following:
  - 1. Construction below finish grade including, where applicable, subdrainage, dampproofing, waterproofing, and perimeter insulation.
  - 2. Surveying locations of underground utilities for record Documents.
  - 3. Testing and inspecting of underground utilities.
  - 4. Removing concrete formwork.
  - 5. Removing trash and debris.
  - 6. Removing temporary shoring and bracing, and sheeting.
  - 7. Installing permanent or temporary horizontal bracing on horizontally supported walls.
- B. Place backfill on subgrades free of mud, frost, snow, or ice.

### **3.09 UTILITY TRENCH BACKFILL**

- A. Place and compact bedding course on trench bottoms and where indicated. Shape bedding course to provide continuous support for bells, joints, and barrels of pipes and for joints, fittings, and bodies of conduits.
- B. Trenches under Footings: Backfill trenches excavated under footings and within 18-inches of bottom of footings with satisfactory soil; fill with concrete to elevation of bottom of footings. Concrete is specified in Section 03 30 00 "Cast-In-Place Concrete."
- C. Backfill voids with satisfactory soils while removing shoring and bracing.
- D. Place and compact initial backfill of satisfactory soil, free of particles larger than 1-inch in any dimension, to a height of 12-inches over the pipe or conduit.
  - 1. Carefully compact initial backfill under pipe haunches and compact evenly up on both sides and along the full length of piping or conduit to avoid damage or displacement of piping or conduit. Coordinate backfilling with utilities testing.
- E. Place and compact final backfill of satisfactory soil to final subgrade elevation.
- F. Install warning tape directly above utilities, 12-inches below finished grade, except 6-inches below subgrade under pavements and slabs.

### **3.10 SOIL FILL**

- A. Plow, scarify, bench, or break up sloped surfaces steeper than 1 vertical to 4 horizontal so fill material will bond with existing material.
- B. Place and compact fill material in layers to required elevations as follows:
  - 1. Under grass and planted areas, use satisfactory soil material.
  - 2. Under walks and pavements, use satisfactory soil material.
  - 3. Under steps and ramps, use engineered fill.
  - 4. Under building slabs, use engineered fill.
  - 5. Under footings and foundations, use engineered fill.
- C. Place soil fill on subgrades free of mud, frost, snow, or ice.

### **3.11 SOIL MOISTURE CONTROL**

- A. Uniformly moisten or aerate subgrade and each subsequent fill or backfill soil layer before compaction to within 2 percent of optimum moisture content.
  - 1. Do not place backfill or fill soil material on surfaces that are muddy, frozen, or contain frost or ice.

2. Remove and replace, or scarify and air dry, otherwise satisfactory soil material that exceeds optimum moisture content by 2 percent and is too wet to compact to specified dry unit weight.

### **3.12 COMPACTION OF SOIL BACKFILLS AND FILLS**

- A. Place backfill and fill soil materials in layers not more than 8-inches in loose depth for material compacted by heavy compaction equipment, and not more than 4-inches in loose depth for material compacted by hand-operated tampers.
- B. Place backfill and fill soil materials evenly on all sides of structures to required elevations, and uniformly along the full length of each structure.
- C. Compact soil materials to not less than the following percentages of maximum dry unit weight according to AASHTO T 191, AASHTO T 310:
  1. Under structures, building slabs, steps, and pavements, scarify and recompact top 12-inches of existing subgrade and each layer of backfill or fill soil material at 95 percent.
  2. Under walkways, scarify and recompact top 6-inches below subgrade and compact each layer of backfill or fill soil material at 92 percent.
  3. Under turf or unpaved areas, scarify and recompact top 6-inches below subgrade and compact each layer of backfill or fill soil material at 85 percent.
  4. For utility trenches, compact each layer of initial and final backfill soil material at 85 percent.

### **3.13 GRADING**

- A. General: Uniformly grade areas to a smooth surface, free of irregular surface changes. Comply with compaction requirements and grade to cross sections, lines, and elevations indicated.
  1. Provide a smooth transition between adjacent existing grades and new grades.
  2. Cut out soft spots, fill low spots, and trim high spots to comply with required surface tolerances.
- B. Site Rough Grading: Slope grades to direct water away from buildings and to prevent ponding. Finish subgrades to required elevations within the following tolerances:
  1. Turf or Unpaved Areas: Plus or minus 1-inch.
  2. Walks: Plus or minus 1-inch.
  3. Pavements: Plus or minus 1/2-inch.

- C. Grading inside Building Lines: Finish subgrade to a tolerance of 1/2-inch when tested with a 10-foot straightedge.

### **3.14 SUBSURFACE DRAINAGE**

- A. Subsurface Drain: Place subsurface drainage geotextile around perimeter of subdrainage trench. Place a 6-inch course of filter material on subsurface drainage geotextile to support subdrainage pipe. Encase subdrainage pipe in a minimum 12-inches of filter material, placed in compacted

layers 6-inches thick, and wrap in subsurface drainage geotextile, overlapping sides and ends at least 6-inches.

1. Compact each filter material layer to 85 percent of maximum dry unit weight according to AASHTO T 191, AASHTO T 310 with a minimum of two passes of a plate-type vibratory compactor.
- B. Drainage Backfill: Place and compact filler material over subsurface drain, in width indicated, to within 12-inches of final subgrade, in compacted layers 6-inches thick. Overlay drainage backfill with one layer of subsurface drainage geotextile, overlapping sides and ends at least 6-inches.
1. Compact each filter material layer to 85 percent of maximum dry unit weight according to ASTM D 698.
  2. Place and compact impervious fill over drainage backfill in 6-inch thick compacted layers to final subgrade.

### **3.15 FIELD QUALITY CONTROL**

- A. Special Inspections: Contractor will engage a qualified special inspector to perform the following special inspections:
1. Determine prior to placement of fill that site has been prepared in compliance with requirements.
  2. Determine that fill material and maximum lift thickness comply with requirements.
  3. Determine, at the required frequency, that in-place density of compacted fill complies with requirements.
- B. Testing Agency: Contractor will engage a qualified geotechnical engineering testing agency to perform tests and inspections.
- C. Allow testing agency to inspect and test subgrades and each fill or backfill layer. Proceed with subsequent earth moving only after test results for previously completed work comply with requirements.
- D. Footing Subgrade: At footing subgrades, at least one test of each soil stratum will be performed to verify design bearing capacities. Subsequent verification and approval of other footing subgrades may be based on a visual comparison of subgrade with tested subgrade when approved by Architect.
- E. Testing agency will test compaction of soils in place according to AASHTO T 191, AASHTO T 310, as applicable. Tests will be performed at the following locations and frequencies:
1. Paved and Building Slab Areas: At subgrade and at each compacted fill and backfill layer, at least one test for every 2000 sq. ft. or less of paved area or building slab, but in no case fewer than three tests.
  2. Foundation Wall Backfill: At each compacted backfill layer, at least one test for every 100 feet or less of wall length, but no fewer than two tests.
  3. Trench Backfill: At each compacted initial and final backfill layer, at least one test for every 150 feet or less of trench length, but no fewer than two tests.



- F. When testing agency reports that subgrades, fills, or backfills have not achieved degree of compaction specified, scarify and moisten or aerate, or remove and replace soil materials to depth required; recompact and retest until specified compaction is obtained.

**3.16 PROTECTION**

- A. Protecting Graded Areas: Protect newly graded areas from traffic, freezing, and erosion. Keep free of trash and debris.
- B. Repair and reestablish grades to specified tolerances where completed or partially completed surfaces become eroded, rutted, settled, or where they lose compaction due to subsequent construction operations or weather conditions.
  - 1. Scarify or remove and replace soil material to depth as directed by Architect; reshape and recompact.
- C. Where settling occurs before project correction period elapses, remove finished surfacing, backfill with additional soil material, compact, and reconstruct surfacing.
  - 1. Restore appearance, quality, and condition of finished surfacing to match adjacent work, and eliminate evidence of restoration to greatest extent possible.

**3.17 DISPOSAL OF SURPLUS AND WASTE MATERIALS**

- A. Remove surplus satisfactory soil and waste materials, including unsatisfactory soil, trash, and debris, and legally dispose of them off Owner's property.
- B. Transport surplus satisfactory soil to designated storage areas on Owner's property. Stockpile or spread soil as directed by Architect.
  - 1. Remove waste materials, including unsatisfactory soil, trash, and debris, and legally dispose of them off Owner's property.

**END OF EARTH MOVING**