Construction Documents
Specifications

Replace Roof and Exterior Stairs – Two Buildings

CSU-Pueblo Project #2018-046M17

2 February 2018

demmon design studios, inc.
999 Vallejo St., Unit #1A
Denver, CO 80204

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STATE OF COLORADO
OFFICE OF THE STATE ARCHITECT
STATE BUILDINGS PROGRAMS

INFORMATION FOR BIDDERS

Institution or Agency: Colorado State University – Pueblo
Project No./Name: Project No.: 2018-046M17 / Replace Roof and Exterior Stairs – Two Buildings

1. **BID FORM:** Bidders are required to use the Bid form attached to the bidding documents. Each bidder is required to bid on all alternates and indicate the time from the date of the Notice to Proceed to Substantial Completion in calendar days, and in addition, the bidder is required to indicate the period of time to finally complete the project from Substantial Completion to Final Acceptance, also in calendar days. Bids indicating times for Substantial Completion and Final Acceptance in excess of the number of days indicated in the Advertisement for Bids for completion of the entire Project may be found non-responsive and may be rejected. The bid shall not be modified or conditioned in any manner. Bids shall be submitted in sealed envelopes bearing the address and information shown below. If a bid is submitted by mail, this aforementioned sealed envelope should be enclosed in an outer envelope and sent to the following addressee:

   INSERT NAME OF AGENCY AND ADDRESS WHERE BID SHOULD BE DELIVERED
   The outside of the sealed inner envelope should bear the following information:

   Project # **2018-046M17**
   Project Name **Replace Roof and Exterior Stairs – Two Buildings**
   Name and Address of Bidder
   Date of Opening
   Time of Opening

2. **INCONSISTENCIES AND OMISSIONS:** Bidders may request clarification of any seeming inconsistencies, or matters seeming to require explanation, in the bidding documents at least three (3) business days prior to the time set for the opening of Bids. Decisions of major importance on such matters will be issued in the form of addendum.

3. **APPLICABLE LAWS AND REGULATIONS:** The bidder's attention is called to the fact that all work under this Contract shall comply with the provisions of all state and local laws, approved state building codes, ordinances and regulations which might in any manner affect the work to be done or those to be employed in or about the work. Attention is also called to the fact that the use of labor for work shall be governed by the provisions of Colorado law which are hereinafter set forth in Articles 27 and 52E of the GENERAL CONDITIONS.

4. **UNAUTHORIZED IMMIGRANTS:** Note that the Special Provisions of the General Conditions of the Contract includes the following language: PUBLIC CONTRACTS FOR SERVICES - CRS 8-17.5-101 and PUBLIC CONTRACTS WITH NATURAL PERSONS - 24-76.5-101. The Contractor certifies that the Contractor shall comply with the provisions of CRS 8-17.5-101 et seq. The Contractor shall not knowingly employ or contract with an illegal alien to perform work under this contract or enter into a contract with a subcontractor that fails to certify to the Contractor that the subcontractor shall not knowingly employ or contract with an illegal alien to perform work under this contract. The Contractor represents, warrants, and agrees that it (i) has verified that it does not employ any illegal aliens, through participation in the Basic Pilot Employment Verification Program administered by the Social Security Administration and Department of Homeland Security, and (ii) otherwise will comply with the requirements of CRS 8-17.5-102(2)(b). The Contractor shall comply with all reasonable requests made in the course of an investigation under CRS 8-17.5-102 by the Colorado Department of Labor and Employment. If the Contractor fails to comply with any requirement of this provision or CRS 8-17.5-101 et seq., the State may terminate this contract for breach and the Contractor shall be liable for actual and consequential damages to the State.

   A Contractor that operates as a sole proprietor hereby swears or affirms under penalty of perjury that the Contractor (i) is a citizen of the United States or otherwise lawfully present in the United States pursuant to federal law, (ii) shall comply with the provisions of CRS 24-76.5-101 et seq, and (iii) shall produce one of the forms of identification required by CRS 24-76.5-103 prior to the effective date of this Contract. Except where

exempted by federal law and except as provided in CRS 24-76.5-103(3), a Contractor that receives federal or state funds under this contract must confirm that any individual natural person eighteen years of age or older is lawfully present in the United States pursuant to CRS 24-76.5-103(4) if such individual applies for public benefits provided under this contract.

5. **TAXES:** The bidder's attention is called to the fact that the Bid submitted shall exclude all applicable federal excise or manufacturers' taxes and all state sales and use taxes as hereinafter set forth in Article 9C of the GENERAL CONDITIONS.

6. **OR EQUAL:** The words "OR EQUAL" are applicable to all specifications and drawings relating to materials or equipment specified. Any material or equipment that will fully perform the duties specified, will be considered "equal", provided the bid submits proof that such material or equipment is of equivalent substance and function and is approved, in writing. Requests for the approval of "or equal" shall be made in writing at least five (5) business days prior to bid opening. During the bidding period, all approvals shall be issued by the Architect/Engineer in the form of addenda at least two (2) business days prior to the bid opening date.

7. **ADDENDA**: Owner/architect initiated addenda shall not be issued later than two (2) business days prior to bid opening date. All addenda shall become part of the Contract Documents and receipt must be acknowledged on the Bid form.

8. **METHOD OF AWARD - LOWEST RESPONSIBLE BIDDER:** If the bidding documents for this project require alternate prices, additive and/or deductible alternates shall be listed on the alternates bid form provided by the Principal Representative. Bidders should note the Method of Award is applicable to this Bid as stated below.

   A. **DEDUCTIBLE ALTERNATES:** The lowest responsible Bid, taking into account the Colorado resident bidder preference provision of Colorado law, will be determined by and the contract will be awarded on the base bid combined with deductible alternates, deducted in numerical order in which they are listed in the alternates bid form provided by the Principal Representative. The subtraction of alternates shall result in a sum total within available funds. If this bid exceeds such amount, the right is reserved to reject all bids. An equal number of alternates shall be subtracted from the base bid of each bidder within funds available for purposes of determining the lowest responsible bidder.

   B. **ADDITIVE ALTERNATES:** The lowest responsible Bid, taking into account the Colorado resident bidder preference provision of Colorado law, will be determined by and the contract will be awarded on the base bid plus all additive alternates added in the numerical order in which they are listed in the alternates bid form provided by the Principal Representative. The addition of alternates shall result in a sum total within available funds. If this bid exceeds such amount, the right is reserved to reject all bids. An equal number of alternates shall be added to the base bid of each bidder within funds available for purposes of determining the lowest responsible bidder.

   C. **DEDUCTIBLE AND ADDITIVE ALTERNATES:** Additive alternates will not be used if deductible alternates are used and deductible alternates will not be used if additive alternates are used.

9. **NOTICE OF CONTRACTOR'S SETTLEMENT** – Agencies/institutions must indicate in the initial Solicitation (Advertisement for Bids, Documented Quotes, or Requests for Proposals) whether settlement will be advertised in newspapers or electronic media.

The Advertisement for Bids can be located at the web site: www.colorado.gov/dpa/dfp/sbrep/constructdesign.htm
(Click on the link below the second paragraph Colorado Construction and Design Notices)

STATE OF COLORADO
OFFICE OF THE STATE ARCHITECT
STATE BUILDINGS PROGRAMS

BID

Institution/Agency: Colorado State University - Pueblo
Project No./Name: Project No.: 2018-046M17 / Replace Roof and Exterior Stairs – Two Buildings

Bidder Acknowledges Receipt of Addenda Numbers: _____

Base Bid $ _____
(Refer to Bid Alternate Form SC-6.13.1 Attached, If Applicable)

Bidder's Time of Completion

a. Time Period from Notice to Proceed to Substantial Completion: 120 calender days

b. Time Period from Substantial Completion to Final Acceptance: 45 calender days

c. Total Time of Completion of Entire Project (a + b): 165 calender days

1. **BID:** Pursuant to the advertisement by the State of Colorado dated _____ the undersigned bidder hereby proposes to furnish all the labor and materials and to perform all the work required for the complete and prompt execution of everything described or shown in or reasonably implied from the Bidding Documents, including the Drawings and Specifications, for the work and for the base bid indicated above. Bidders should include all taxes that are applicable.
2. **EXAMINATION OF DOCUMENTS AND SITE:** The bidder has carefully examined the Bidding Documents, including the Drawings and Specifications, and has examined the site of the Work, so as to make certain of the conditions at the site and to gain a clear understanding of the work to be done.
3. **PARTIES INTERESTED IN BID:** The bidder hereby certifies that the only persons or parties interested in this Bid are those named herein, and that no other bidder or prospective bidder has given any information concerning this Bid. For State Public Works, not less than eighty percent of the labor employed on such projects shall consist of Colorado Labor C.R.S 8-17-101.
4. **BID GUARANTEE:** This Bid is accompanied by the required Bid Guarantee. You are authorized to hold said Bid Guarantee for a period of not more than thirty (30) days after the opening of the Bids for the work above indicated, unless the undersigned bidder is awarded the Contract, within said period, in which event the Director, State Buildings Programs, may retain said Bid Guarantee, until the undersigned bidder has executed the required Agreement and furnished the required Performance Bond, Labor and Material Payment Bond, Insurance Policy and Certificates of Insurance and Affidavit Regarding Unauthorized Immigrants.
5. **TIME OF COMPLETION: The bidder agrees to achieve Substantial Completion of the Project from the date of the Notice to Proceed within the number of calendar days entered above, and in addition, further agrees that the period between Substantial Completion and Final Acceptance of the Project will not exceed the number of calendar days noted above**. If awarded the Work, the bidder agrees to begin performance within ten (10) days from the date of the Notice to Proceed subject to Article 46, Time of Completion and Liquidated Damages of The General Conditions of the Contract, and agrees to prosecute the Work with due diligence to completion. The bidder represents that Article 7D of the Contractor's Agreement (SC-6.21) has been reviewed to determine the type and amount of any liquidated damages that may be specified for this contract.
6. **EXECUTION OF DOCUMENTS:** The bidder understands that if this Bid is accepted, bidder must execute the required Agreement and furnish the required Performance Bond, Labor and Material Payment Bond, Insurance Policy and Certificates of Insurance and Affidavit Regarding Unauthorized Immigrants within ten (10) days from the date of the Notice of Award, and that the bidder will be required to sign to acknowledge and accept the Contract Documents, including the Drawings and Specifications.
7. **ALTERNATES:** Refer to the Information for Bidders (SC-6.12) for Method of Award for Alternates and use State Form SBP-6.13.1 Bid Alternates form to be submitted with this bid form if alternates are requested by the institution/agency in the solicitation documents.
8. **Submit wage rates** (direct labor costs) for prime contractor and subcontractor as requested by the institution/agency in the solicitation documents.
9. **The right is reserved to waive informalities and to reject any and all Bids.**

Dated this _____ Day of _____ , 20 _____

THE BIDDER:

_____
Company Name

_____
Address (including city, state and zip)
Phone number: _____

_____
Signature

_____
Name (Print) and Title

SIGNATURES: If the Bid is being submitted by a Corporation, the Bid should be signed by an officer, i.e., President or Vice-President. If a sole proprietorship or a partnership is submitting the Bid, the Bid shall so indicate and be properly signed.

STATE OF COLORADO
OFFICE OF THE STATE ARCHITECT
STATE BUILDINGS PROGRAMS

BID ALTERNATES FORM

Institution/Agency: Colorado State University- Pueblo

Project No./Name: Project No.: 2018-046M17 / Replace Roof and Exterior Stairs – Two Buildings

Additive alternates will not be used if deductible alternates are used and deductible alternates will not be used if additive alternates are used.

Additive Alternates

Refer to specification section 01 23 00 for descriptions of the additive alternates. If the additive alternates are accepted, the base bid would be modified by the amount entered by the bidder.

A.A. No. 1	Base Bid: Provide aluminum panels with standoffs at the galvanized steel stair structure and guardrails..	
	Alternate Bid: Delete the aluminum panels with standoffs at the galvanized steel stair structure and guardrails. Provide glass panels with standoffs at the galvanized steel stair structure and guardrails.	Add $
A.A. No. 2	Base Bid:	
	Alternate Bid:	Add $
A.A. No. 3	Base Bid:	
	Alternate Bid:	Add $

Deductive Alternates (N/A)

THE BIDDER:

Company Name

Signature Date

STATE OF COLORADO
OFFICE OF THE STATE ARCHITECT
STATE BUILDINGS PROGRAMS

BID BOND

Institution/Agency: Colorado State University – Pueblo

Project No./Name: Project No.: 2018-046M17 / Replace Roof and Exterior Stairs – Two Buildings

KNOW ALL MEN BY THESE PRESENTS:

WHEREAS, _____ hereinafter called the "PRINCIPAL", is submitting a PROPOSAL for the above described project, to the STATE OF COLORADO, hereinafter called the "OBLIGEE".

WHEREAS, the Advertisement for Bids has required as a condition of receiving the Proposals that the Principal submit with the PROPOSAL GUARANTY in an amount not less than five per cent (5%) of the Proposal, which sum it is specifically agreed is to be forfeited as Liquidated Damages in the event that the Principal defaults in his obligation as hereinafter specified, and, in pursuance of which Requirement, this Bid is made, executed and delivered.

NOW THEREFORE, the Principal and _____ a corporation of the State of _____ _____, duly authorized to transact business in Colorado, as Surety, are held and firmly bound unto the Obligee, in the sum of five per cent (5%) of the Principal's total bid price, lawful money of the United States for the payment of which sum, well and truly to be made to the Obligee, we bind ourselves, our heirs, executors, administrators, successors and assigns, jointly and severally, firmly by these presents.

FURTHER THAT, a condition of the obligation that the Principal shall maintain his Proposal in full force and effect for thirty (30) days after the opening of the proposals for the project, or, if the Principal's Proposal is accepted, the Principal shall, within the prescribed time, execute the required Agreement, furnish the required Performance Bond, Labor and Material Payment Bond, Insurance Policy, and Certificates of Insurance, then this obligation shall be null and void, otherwise it shall remain in full force and effect, and subject to forfeiture upon demand as Liquidated Damages.

IN WITNESS WHEREOF said Principal and Surety have executed this Bond, this _____ day of _____, A.D., 20_____.

(Corporate Seal)

ATTEST

_____
Secretary

_____
Name (Print)

THE PRINCIPAL

_____
Company Name

_____
Address (including city, state and zip)
Phone number: _____

_____
Signature

_____
Name (Print) and Title

SIGNATURES If the "Principal" is doing business as a Corporation, the Bid Bond shall be signed by an officer, i.e., President or Vice President. The signature of the officer shall be attested to by the Secretary and properly sealed.

If the "Principal" is an individual or a partnership, the Bid Bond shall so indicate and be properly signed.

(Corporate Seal)

_____
Secretary

THE SURETY

_____

By _____
Attorney-in-Fact

THIS BOND MUST BE ACCOMPANIED BY POWER OF ATTORNEY, EFFECTIVELY DATED. FAILURE TO PROVIDE A PROPERLY EXECUTED BID BOND WITH A PROPERLY EXECUTED POWER OF ATTORNEY WILL RESULT IN THE BIDDER'S PROPOSAL BEING DEEMED NON-RESPONSIVE.

STATE OF COLORADO
OFFICE OF THE STATE ARCHITECT
STATE BUILDINGS PROGRAMS

NOTICE OF AWARD

Date of Notice: _____
Date to be inserted by the Principal Representative

Institution/Agency: Colorado State University – Pueblo

Project No./Name: Project No.: 2018-046M17 / Replace Roof and Exterior Stairs – Two Buildings

TO:

The State of Colorado, represented by the undersigned, has considered the Proposals submitted for the above described work.

Your Proposal, deemed to be in the best interest of the State of Colorado, in the amount of _____ DOLLARS AND NO/100* ($_____*) is hereby accepted, pending final execution of the Agreement.

You **are** required to execute the approved Agreement and to furnish the Performance Bond, Labor and Material Payment Bond, Insurance Policy and Certificates of Insurance within ten (10) days from the date of this Notice.

If you fail to execute said Agreement and to furnish said Performance Bond, Labor and Material Payment Bond, Insurance Policy and Certificates of Insurance, and Certification and Affidavit Regarding Unauthorized Immigrants within ten (10) days from the date of this Notice, the State Controller is entitled to retain the amount of the Proposal Guaranty submitted with your Proposal as Liquidated Damages. In this event, the right is reserved to consider all of your rights arising out of the acceptance of your Proposal as abandoned and to award the work covered by your Proposal to another, or to re-advertise the Project, or otherwise dispose thereof.

By _____ By _____

State Buildings Programs (of Authorized Delegate) — Date

Principal Representative (Institution or Agency) — Date

When completely executed, this form is to be sent by **certified mail** to the Contractor by the Principal Representative or delivered by any other means to which the parties agree.

STATE OF COLORADO
OFFICE OF THE STATE ARCHITECT
STATE BUILDINGS PROGRAMS

CONTRACTOR'S DESIGN/BID/BUILD (D/B/B) AGREEMENT

(STATE FORM SC-6.21)

CONTRACT ID NUMBER: _____

AGENCY IDENTIFICATION NUMBER: _____

PROJECT NUMBER: **2018-046M17**

PROJECT NAME: **Replace Roof and Exterior Stairs – Two Buildings**

STATE OF COLORADO
CONTRACTOR'S DESIGN/BID/BUILD AGREEMENT
(STATE FORM SC-6.21)

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STATE OF COLORADO
CONTRACTOR'S DESIGN/BID/BUILD (D/B/B) AGREEMENT
(STATE FORM SC-6.21)

Agency I.D. No.: _____ Contract ID No.: _____ Project No. _____

1. PARTIES. THIS AGREEMENT is entered into by and between the STATE OF COLORADO, acting by and through the *(agency)*, hereinafter referred to as the Principal Representative, and *(vendor name)* having its offices at *(vendor address)* hereinafter referred to as the Contractor.

2. EFFECTIVE DATE AND NOTICE OF NONLIABILITY. This Agreement shall not be effective or enforceable until it is approved and signed by the State Controller or its designee (hereinafter called the "Effective Date"), but shall be effective and enforceable thereafter in accordance with its provisions. The State shall not be liable to pay or reimburse Contractor for any performance hereunder or be bound by any provision hereof prior to the Effective Date.

WHEREAS, the Principal Representative intends to _____. Hereinafter called the Project; and

WHEREAS, authority exists in Law and Funds have been budgeted, appropriated, and otherwise made available, and a sufficient unencumbered balance thereof remains available for payment in Fund Number _____, Account Number_____, Contract Encumbrance Number_____, and

WHEREAS, this is a phase one waived contract, waiver number 156 Contractors Agreement for Capital Construction Form SC6.21.

WITNESSETH, that the State of Colorado and the Contractor agree as follows:

ARTICLE 1. PERFORMANCE OF THE WORK
The Contractor shall perform all of the Work required for the complete and prompt execution of everything described or shown in, or reasonably implied from the Contract Documents for the above referenced Project.

ARTICLE 2. PROVISIONS OF THE CONTRACT DOCUMENTS
The Contractor agrees to perform the Work to the highest industry standards and to the satisfaction of the State of Colorado and its Architect/Engineer in strict accordance with the provisions of the Contract Documents.

ARTICLE 3. TIME OF COMPLETION
The Contractor agrees to Substantially Complete the Project within 120 calendar days from the date of the Notice to Proceed, in addition, the Contractor agrees to finally complete the Project from Substantial Completion to Final Acceptance within 45 calendar days for a total time of completion of the entire Project of 165 calendar days. The Contractor shall perform the Work with due diligence to completion.

ARTICLE 4. ESSENTIAL CONDITION
Timely completion of the Project is an essential condition of this Agreement. The Contractor shall be subject to any liquidated damages described in Article 7D for failure to satisfactorily complete the Work within the time periods in Article 3 above.

ARTICLE 5. CONTRACT SUM
The Contractor shall be paid for the performance of this Agreement, subject to any additions and deductions as provided for in Articles 32, 34 and 35 of The General Conditions of the Construction Contract SC-6.23, the sum of _____ DOLLARS AND NO/100* ($_____*).

ARTICLE 6. CONTRACT DOCUMENTS
The Contract Documents, as enumerated in Article 1 of The General Conditions of the Contractor's Design/Bid/Build (D/B/B) Agreement SC-6.23, are all essential parts of this Agreement and are fully incorporated herein.

ARTICLE 7. OPTIONAL PROVISIONS AND ELECTIONS

The provisions of this Article 7 alter the Articles (The General Conditions of the Contractor's Design/Bid/Build Agreement SC-6.23) or enlarge upon them as indicated:

The Principal Representative and or the State Buildings Programs shall mark boxes and initial where applicable.

A. MODIFICATION OF ARTICLE 45. GUARANTEE INSPECTIONS AFTER COMPLETION

If the box below is marked the six month guarantee inspection is not required.

☐ _____ Principal Representative initial

B. MODIFICATION OF ARTICLE 27. LABOR AND WAGES

If the box is marked the Federal Davis-Bacon Act shall be applicable to the Project. The minimum wage rates to be paid on the Project shall be furnished by the Principal Representative and included in the Contract Documents.

☐ _____ Principal Representative initial

C. MODIFICATION OF ARTICLE 39. NON-BINDING DISPUTE RESOLUTION – FACILITATED NEGOTIATIONS

If the box is marked, and initialed by the State as noted, the requirement to participate in facilitated negotiations shall be deleted from this Contract. Article 39, Non-Binding Dispute Resolution – Facilitated Negotiations, shall be deleted in its entirety and all references to the right to the same where ever they appear in the contract shall be similarly deleted.

The box may be marked only for projects with an estimated value of less than $500,000.

☐ _____ Principal Representative initial

D. MODIFICATION OF ARTICLE 46. TIME OF COMPLETION AND LIQUIDATED DAMAGES

If an amount is indicated immediately below, liquidated damages shall be applicable to this Project as, and to, the extent shown below. Where an amount is indicated below, liquidated damages shall be assessed in accordance with and pursuant to the terms of The General Conditions of the Design/Bid/Build Agreement Article 46, Time of Completion And Liquidated Damages, in the amounts and as here indicated. The election of liquidated damages shall limit and control the parties right to damages only to the extent noted.

1. For the inability to use the Project, for each day after the number of calendar days specified in the Contractor's bid for the Project and the Agreement for achievement of Substantial Completion, until the day that the Project has achieved Substantial Completion and the Notice of Substantial Completion is issued, the Contractor agrees that an amount equal to _____ ($ 0) shall be assessed against Contractor from amounts due and payable to the Contractor under the Contract, or the Contractor and the Contractor's Surety shall pay to the Principal Representative such sum for any deficiency, if amounts on account thereof are deducted from remaining amounts due, but amounts remaining are insufficient to cover the entire assessment.

2. For damages related to or arising from additional administrative, technical, supervisory and professional expenses related to and arising from the extended closeout period, for each day in excess of the number of calendar days specified in the Contractor's bid for the Project and the Agreement to finally complete the Project as defined by the issuance of the Notice of Final Acceptance) after the issuance of the final Notice of Substantial Completion, the Contractor agrees that an amount equal to _____ ($ 0) shall be assessed against Contractor from amounts due and payable to the Contractor under the Contract, or the Contractor and the Contractor's Surety shall pay to the Principal Representative such sum for any deficiency, if amounts on account thereof are deducted from remaining amounts due but amounts remaining are insufficient to cover the entire assessment.

E. NOTICE IDENTIFICATION

All Notices pertaining to General Conditions or otherwise required to be given shall be transmitted in writing, to the individuals at the addresses listed below, and shall be deemed duly given when received by the parties at their addresses below or any subsequent persons or addresses provided to the other party in writing.

Notice to Principal Representative:

With copies to (State Buildings Programs (or Delegate) State of Colorado):

Notice to Contractor:

With copies to:

SIGNATURE APPROVALS:

THE PARTIES HERETO HAVE EXECUTED THIS CONTRACT

*Persons signing for Contractor hereby swear and affirm that they are authorized to act on Contractor's behalf and acknowledge that the State is relying on their representations to that effect. **Principal is not a recognized title and will not be accepted**

Project Name/Number: _____
Contract ID No.: _____

THE CONTRACTOR

_____
Legal Name of Contracting Entity

_____
*Signature

By _____
Name (print) Title

Date: _____

STATE OF COLORADO, acting by and through:
(Insert Name & Title of Agency or IHE)

By: _____
(Insert Name & Title of Person Signing for Agency or IHE)

Date: _____

APPROVED
DEPARTMENT OF PERSONNEL & ADMINISTRATION
STATE BUILDINGS PROGRAMS
State Architect (or authorized Delegate)

By: _____
(Insert Name of Authorized Individual)

Date: _____

ALL CONTRACTS MUST BE APPROVED BY THE STATE CONTROLLER:

CRS §24-30-202 requires the State Controller to approve all State Contracts. This Contract is not valid until signed and dated below by the State Controller or delegate. Contractor is not authorized to begin performance until such time. If Contractor begins performing prior thereto, the State of Colorado is not obligated to pay Contactor for such performance or for any goods and/or services provided hereunder.

APPROVED:
STATE OF COLORADO
STATE CONTROLLER'S OFFICE
State Controller (or authorized Delegate)

By: _____
(Insert Name & Title of Authorized Individual)

Date: _____

STATE OF COLORADO
CONTRACTOR'S DESIGN/BID/BUILD AGREEMENT
(STATE FORM SC-6.21)

EXHIBIT A

CONTRACTOR'S BID (Form SBP-6.13)

STATE OF COLORADO
CONTRACTOR'S DESIGN/BID/BUILD AGREEMENT
(STATE FORM SC-6.21)

EXHIBIT B

PERFORMANCE BOND (Form SC-6.22)

STATE OF COLORADO
CONTRACTOR'S DESIGN/BID/BUILD AGREEMENT
(STATE FORM SC-6.21)

EXHIBIT C

LABOR AND MATERIAL PAYMENT BOND (Form SC-6.221)

STATE OF COLORADO
CONTRACTOR'S DESIGN/BID/BUILD AGREEMENT
(STATE FORM SC-6.21)

EXHIBIT D

INSURANCE CERTIFICATE(S) (attached)

STATE OF COLORADO
CONTRACTOR'S DESIGN/BID/BUILD AGREEMENT
(STATE FORM SC-6.21)

EXHIBIT E

Certification and Affidavit Regarding Unauthorized Immigrants (required at contract signing prior to commencing work) (UI-1, attached)

STATE OF COLORADO
CONTRACTOR'S DESIGN/BID/BUILD AGREEMENT
(STATE FORM SC-6.21)

EXHIBIT F

Contract Management Information Construction Contractor – Performance Evaluation Report
(Form SB-228 C. v1) (if applicable, attached)

STATE OF COLORADO
CONTRACTOR'S DESIGN/BID/BUILD AGREEMENT
(STATE FORM SC-6.21)

EXHIBIT G

Building Code Compliance Policy: Coordination of Approved Building Codes, Plan Reviews and Building Inspections

STATE OF COLORADO
OFFICE OF THE STATE ARCHITECT
STATE BUILDINGS PROGRAMS

PERFORMANCE BOND

Institution/Agency: Colorado State University – Pueblo
Project No./Name: Project No.: 2018-046M17 / Replace Roof and Exterior Stairs – Two Buildings

BONDING COMPANY: DO NOT MAKE ANY CHANGES TO THE LANGUAGE IN THIS BOND.

KNOW ALL PERSONS BY THESE PRESENTS:

That the Contractor

as Principal and hereinafter called "Principal,"

and

as Surety and hereinafter called "Surety," a corporation organized and existing under the laws of _____ are held and firmly bound unto **the STATE OF COLORADO** acting by and through_____
(AGENCY OR INSTITUTION)

hereinafter called the "Principal Representative", in the sum of _____ _____ Dollars ($_____)

for the payment whereof the Principal and Surety bind themselves, their heirs, executors, administrators, successors and assigns, jointly and severally, firmly, by these presents.

WHEREAS, the Principal and the State of Colorado acting by and through the Principal Representative have entered into a certain Contract, hereinafter called "Contract," dated _____ _____, 20___, for the construction of a PROJECT described as

which Contract is hereby by reference made a part hereof;

NOW, THEREFORE, THE CONDITION OF THIS OBLIGATION, is such that, if the Principal shall promptly, fully and faithfully perform all the undertakings, covenants, terms, conditions and agreements of said Contract during the original term of said Contract any extensions thereof that may be granted by the Principal Representative with or without notice to the Surety, and during the life of any guaranty required under the Contract, and shall also well and truly perform and fulfill all undertakings, covenants, terms, conditions and agreements of any and all duly authorized modifications of said Contract that may hereafter be made, notice of which modifications to the Surety being hereby waived, then this obligation shall be null and void; otherwise it shall remain in full force and effect.

AND THE SAID SURETY, for value received hereby stipulates and agrees that whenever the Principal shall be, and declared by the Principal Representative to be in default under said Contract, the State of Colorado having performed its obligations thereunder, the Surety may promptly remedy the default or shall promptly (1) Complete the Contract in accordance with its terms and conditions, or (2) Obtain a bid or bids for submittal to the Principal Representative for completing the Contract in accordance with its terms and conditions, and upon determination by the Principal Representative and Surety of the lowest responsible bidder, arrange for a contract between such bidder and the State of Colorado acting by and through the Principal Representative and make available as work progresses (even though there should be a default or a succession of defaults under the contract or contracts of completion arranged under this paragraph) sufficient funds to pay the cost of completion, less the balance of the contract price but not exceeding, including other costs and damages for which the Surety may be liable hereunder, the amount hereinbefore set forth. The term "balance of the contract price" as herein used shall mean the total amount payable to the Principal under the Contract and any amendments thereto, less the amount properly paid by the State of Colorado to the Contractor.

No right of action shall accrue on this bond to or for the use of any person or corporation other than the State of Colorado.

IN WITNESS WHEREOF said Principal and Surety have executed this Bond, this _____ day of , A.D., _____ 20____.

(Corporate Seal)

THE PRINCIPAL

_____

ATTEST:

By: _____

Title: _____

_____
Secretary

(Corporate Seal)

SURETY

_____

By: _____
Attorney-in-fact

THIS BOND MUST BE ACCOMPANIED BY POWER OF ATTORNEY, EFFECTIVELY DATED

Note: This bond is issued simultaneously with another bond conditioned for the full and faithful payment for all labor and material of the contract.

STATE OF COLORADO
OFFICE OF THE STATE ARCHITECT
STATE BUILDINGS PROGRAMS

LABOR AND MATERIAL BOND

Institution/Agency: Colorado State University – Pueblo
Project No./Name: Project No.: 2018-046M17 / Replace Roof and Exterior Stairs – Two Buildings

BONDING COMPANY: DO NOT MAKE ANY CHANGES TO THE LANGUAGE IN THIS BOND.

KNOW ALL PERSONS BY THESE PRESENTS:

That the Contractor

as Principal and hereinafter called "Principal,"

and

as Surety and hereinafter called "Surety," a corporation organized and existing under the laws of _____ are held and firmly bound unto the STATE OF COLORADO acting by and through _____
(agency or institution)

hereinafter called "Principal Representative," and to all subcontractors and any others who have supplied or furnished or shall supply or furnish materials, rental machinery, tools, or equipment actually used in the performance of the hereinafter identified Contract, or who have performed or shall perform labor in the performance of or in connection with said Contract, hereinafter called "Obligees" in the sum of _____ _____ Dollars ($_____)

together with interest at the rate of eight per cent (8%) per annum on all payments becoming due in accordance with said Contract, from the time such payments shall become due until such payment shall be made, for the payment of which, well and truly made to the Obligees, the Principal and the Surety bind themselves, their heirs, executors, administrators, successors and assigns, jointly and severally, firmly, by these presents.

WHEREAS, the Principal and the State of Colorado acting by and through the Principal Representative have entered into a certain Contract, hereinafter called "Contract," dated _____, 20____ for the construction of a PROJECT described as

which Contract is hereby by reference made a part hereof;

NOW, THEREFORE, THE CONDITION OF THIS OBLIGATION is such that if the Principal and the Surety shall fully indemnify and save harmless the State of Colorado and the Principal Representative from and against any and all costs and damages, including patent infringements, which either may suffer by reason of any failure or failures of the Principal promptly and faithfully to perform all terms and conditions of said Contract and shall fully reimburse and repay the State of Colorado and the Principal Representative all outlay and expense which the State of Colorado and the Principal Representative may incur in making good any such failure or failures, and further, if the Principal and his subcontractors shall duly and promptly pay for any and all labor, materials, team hire, sustenance, provisions, provender, rental machinery, tools, or equipment and other supplies which have been or shall be used or consumed by said Principal or his subcontractors in the performance of the work of said Contract , and it said Principal shall duly and promptly pay all his subcontractors the sums due them for any and all materials, rental machinery, tools, or equipment and labor that have been or shall be furnished, supplied, performed or used in connection with performance of said Contract, and shall also fully indemnify and save harmless the State of Colorado and the Principal Representative to the extent of any and all expenditures which either or both of them may be required to make by reason of any failures or defaults by the Principal or any subcontractor in connection with such payments; then this obligation shall be null and void, otherwise it shall remain in full force and effect.

It is expressly understood and agreed that any alterations which may be made in the terms of said Contract or in the work to be done under said Contract, or any extension(s) of time for the performance of the Contract, or any forebearance on the part of either the State of Colorado or the Principal to any of the others, shall not in any way release the Principal and the Surety, or either of them, their heirs, executors, administrators, successors or assigns from their liability hereunder, notice to the Surety of any such alteration, extension or forbearance being hereby waived.

IN WITNESS WHEREOF, the Principal and the Surety have executed this Bond, this _____ day of _____, A.D., 20_____.

(Corporate Seal)

THE PRINCIPAL

_____

ATTEST:

By: _____

Title: _____

_____
Secretary

(Corporate Seal)

SURETY

_____

By: _____
Attorney-in-fact

THIS BOND MUST BE ACCOMPANIED BY POWER OF ATTORNEY, EFFECTIVELY DATED

Note: This bond is issued simultaneously with another bond conditioned for the full and faithful performance of the contract.

STATE OF COLORADO
OFFICE OF THE STATE ARCHITECT
STATE BUILDINGS PROGRAMS

NOTICE TO PROCEED (DESIGN/BID/BUILD CONTRACT)

Date of Notice: _____
Date to be inserted by the Principal Representative

Date/Description of Contract Documents: _____

Institution/Agency: Colorado State University - Pueblo

Project No./Name: Project No.: 2018-046M17 / Replace Roof and Exterior Stairs – Two Buildings

Attach Notice of Code Compliance from Code Review Agent/Building Official for Documents Listed Above

To:

This is to advise you that your Performance Bond, Labor and Material Payment Bond, Insurance Policy and Certificates of Insurance, and Affidavit Regarding Unauthorized Immigrants have been received. Our issuance of this Notice does not relieve you of responsibility to assure that the bond and insurance requirements of the Contract Documents are met for the duration of the Agreement. The Agreement dated _____ covering the above described work has been fully executed.

You are hereby authorized and directed to proceed within ten (10) days from date of this Notice as required in the Agreement. Any liquidated damages for failure to achieve Substantial Completion by the date agreed that may be applicable to this Contract will be calculated using the date of this Notice for the date of the commencement of the Work.

The completion date of the Project is _____ (M/D/YYYY).

By _____
State Buildings Programs (or Authorized Delegate) Date

By _____
Principal Representative (Institution or Agency) Date

When completely executed, this form is to be sent by certified mail to the Contractor by the Principal Representative; or by any other means to which the parties agree.

STATE OF COLORADO
OFFICE OF THE STATE ARCHITECT
STATE BUILDINGS PROGRAMS

CERTIFICATION AND AFFIDAVIT REGARDING ILLEGAL ALIENS

Institution/Agency: Colorado State University – Pueblo
Project No./Name: Project No.: 2018-046M17 / Replace Roof and Exterior Stairs – Two Buildings

The Vendor, whose name and signature appear below, certifies and agrees as follows:

1. The Vendor shall comply with the provisions of CRS 8-17.5-101 et seq. The Vendor shall not knowingly employ or contract with an illegal alien to perform work for the State or enter into a contract with a subcontractor that knowingly employs or contracts with an illegal alien.

2. The Vendor represents, warrants, and agrees that it (i) has verified that it does not employ any illegal aliens, through participation in the Basic Pilot Employment Verification Program administered by the Social Security Administration and Department of Homeland Security, and (ii) otherwise shall comply with the requirements of CRS 8-17.5-102(2)(b).

3. The Vendor shall comply with all reasonable requests made in the course of an investigation under CRS 8-17.5-102 by the Colorado Department of Labor and Employment. If the Vendor fails to comply with any requirement of this provision or CRS 8-17.5-101 et seq., the State may terminate work for breach and the Vendor shall be liable for actual and consequential damages to the State.

4. If the Vendor is a sole proprietor, the undersigned hereby swears or affirms under penalty of perjury under the laws of the State of Colorado that (check one):

   _____ I am a United States citizen, or

   _____ I am a Permanent Resident of the United States, or

   _____ I am lawfully present in the United States pursuant to Federal law.

   I understand that this sworn statement is required by law because I am a sole proprietor entering into a contract to perform work for the State of Colorado. I understand that state law requires me to provide proof that I am lawfully present in the United States prior to starting work for the State. I further acknowledge that I will comply with the requirements of CRS 24-76.5-101 et seq. and will produce the required form of identification prior to starting work. I acknowledge that making a false, fictitious, or fraudulent statement or representation in this sworn affidavit is punishable under the criminal laws of Colorado as perjury in the second degree under CRS 18-8-503 and it shall constitute a separate criminal offense each time a public benefit is fraudulently received.

CERTIFIED and AGREED to this _____ day of _____, 200___.

VENDOR:

_____ _____
Vendor Full Legal Name FEIN or Social Security Number

BY: _____ _____
Signature of Authorized Representative Title

STATE OF COLORADO
OFFICE OF THE STATE ARCHITECT
STATE BUILDINGS PROGRAMS

THE GENERAL CONDITIONS OF THE CONTRACTOR'S DESIGN/BID/BUILD (D/B/B) AGREEMENT

(STATE FORM SC-6.23)

Rev. 1/2014
SC-6.23

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Note: The sections of the General Conditions indicated in *italics* (Articles 35 General and 35A, 35B, 37, 38, 46, 48B, 49 and 50) are regulatory and cannot be modified except through appropriate rule making procedures through the Division of Finance and Procurement, Department of Personnel & Administration.

General Conditions of the Contractor's Design/Bid/Build Agreement

ARTICLE 1. DEFINITIONS

A. CONTRACT DOCUMENTS

The Contract Documents consist of the following some of which are procedural documents used in the administration and performance of the Agreement:

1. Contractor's Design/Bid/Build Agreement; (SC-6.21);
2. Performance Bond (SC-6.22) and Labor and Material Payment Bond (SC-6.221);
3. General Conditions of the Contractor's Design/Bid/Build Agreement (SC- 6.23) and if applicable, Supplementary General Conditions;
4. Detailed Specification Requirements, including all addenda issued prior to the opening of the bids; and,
5. Drawings, including all addenda issued prior to the opening of the bids.
6. Change Orders (SC-6.31) and Amendments (SC-6.0), if any, when properly executed.
7. Authorization to Bid (SBP-6.10)
8. Information for Bidders (SBP-6.12);
9. Bid (SBP-6.13);
10. Bid Bond (SBP-6.14);
11. Notice of Award (SBP-6.15);
12. Builder's risk insurance certificates of insurance (ACORD 25-S);
13. Liability and workers' compensation certificates of insurance;
14. Notice to Proceed (Design/Bid/Build) (SBP-6.26);
15. Notice of Approval of Occupancy/Use (SBP-01);
16. Notice of Partial Substantial Completion (SBP-071);
17. Notice of Substantial Completion (SBP-07);
18. Notice of Partial Final Acceptance (SC-6.27);
19. Notice of Final Acceptance (SBP-6.271);
20. Notice of Partial Contractor's Settlement (SC-7.3);
21. Notice of Contractor's Settlement (SBP-7.31);
22. Application and Certificate for Contractor's Payment (SBP-7.2);
23. Other procedural and reporting documents or forms referred to in the General Conditions, the Supplementary General Conditions, the Specifications or required by the State Buildings Programs or the Principal Representative, including but not necessarily limited to Pre-Acceptance Check List (SBP-05) and the Building Inspection Record (SBP-BIR). A list of the current standard State Buildings Programs forms applicable to this Contract may be obtained from the Principal Representative on request.

B. DEFINITIONS OF WORDS AND TERMS USED

1. AGREEMENT. The term "Agreement" shall mean the written agreement entered into by the State of Colorado acting by and through the Principal Representative and the Contractor for the performance of the Work and payment therefore, on State Form SC-6.21. The term Agreement when used without reference to State Form SC-6.21 may also refer to the entirety

of the parties' agreement to perform the Work described in the Contract Documents or reasonably inferable there from. The term "Contract" shall be interchangeable with this latter meaning of the term Agreement

2. ARCHITECT/ENGINEER. The term "Architect/Engineer" shall mean either the architect of record or the engineer of record under contract to the State of Colorado for the Project identified in the Contract Documents.
3. OCCUPANCY. The term "Occupancy" means occupancy taken by the State as Owner after the Date of Substantial Completion at a time when a building or other discrete physical portion of the Project is used for the purpose intended. The Date of Occupancy shall be the date of such first use, but shall not be prior to the date of execution of the Notice of Approval of Occupancy/Use. Prior to the date of execution of a Notice of Approval of Occupancy/Use, the state shall have no right to occupy and the project may not be considered safe for occupancy for the intended use.
4. CHANGE ORDER. The term "Change Order" means a written order, signed by a Procurement Officer, directing the Contractor to make changes in the Work, in accordance with Article 35A, The Value of Changed Work.
5. COLORADO LABOR. The term "Colorado labor", as provided in C.R.S. § 8-17-101(2)(a), as amended, means any person who is a resident of the state of Colorado, at the time of the public works project, without discrimination as to race, color, creed, sex, sexual orientation, marital status, national origin, ancestry, age, or religion except when sex or age is a bona fide occupational qualification. A resident of the state of Colorado is a person who can provide a valid Colorado driver's license, a valid Colorado state-issued photo identification, or documentation that he or she has resided in Colorado for the last thirty days.
6. CONTRACTOR. The word "Contractor" shall mean the person, company, firm, corporation or other legal entity entering into a contract with the State of Colorado acting by and through the Principal Representative
7. DAYS. The term "days" whether singular or plural shall mean calendar days unless expressly stated otherwise. Where the term "business days" is used it shall mean business days of the State of Colorado.
8. DRAWINGS. The term "Drawings" shall mean all drawings approved by appropriate State officials which have been prepared by the Architect/Engineer showing the work to be done, except that where a list of drawings is specifically enumerated in the Supplementary General Conditions or division 1 of the Specifications, the term shall mean the drawings so enumerated, including all addenda drawings.
9. EMERGENCY FIELD CHANGE ORDER. The term "Emergency Field Change Order" shall mean a written change order for extra work or a change in the work necessitated by an emergency as defined in Article 35C executed on State form SC 6.31 and identified as an Emergency Field Change Order. The use of such orders is limited to emergencies and to the amounts shown in Article 35C.
10. FINAL ACCEPTANCE. The terms "final acceptance" or "finally complete" mean the stage in the progress of the work, after substantial completion, when all remaining items of work have been completed, all requirements of the Contract Documents are satisfied and the Notice of Acceptance can be issued. Discrete physical portions of the Project may be separately and partially deemed finally complete at the discretion of the Principal Representative when that portion of the Project reaches such stage of completion and a partial Notice of Acceptance can be issued.
11. NOTICE. The term "Notice" shall mean any communication <u>in writing</u> from either contracting party to the other by such means of delivery that receipt cannot properly be denied. Notice shall be provided to the person identified to receive it in Article 7E (Contractor's Agreement SC-6.21), Notice Identification, or to such other person as either party identifies in writing to receive Notice. Notice by facsimile transmission where proper transmission is evidence shall be adequate where facsimile numbers are included in Article 7E (Contractor's Agreement SC-6.21). Notwithstanding an email delivery or return receipt, email Notice shall not be adequate. Acknowledgment of receipt of a voice message shall not be deemed to waive the requirement that Notice, where required, shall be in writing.

12. OWNER. The term “Owner” shall mean the Principal Representative.
13. PRINCIPAL REPRESENTATIVE. The term “Principal Representative ” shall be defined, as provided in § 24-30-1301(11), C.R.S., as the governing board of a state department, institution, or agency; or if there is no governing board, then the executive head of a state department, institution, or agency, as designated by the governor or the general assembly and as specifically identified in the Contract Documents, or shall have such other meaning as the term may otherwise be given in § 24-30-1301(11), C.R.S., as amended. The Principal Representative may delegate authority. The Contractor shall have the right to inquire regarding the delegated authority of any of the Principal Representative’s representatives on the project and shall be provided with a response in writing when requested.
14. PROCUREMENT OFFICER. The term “Procurement Officer ” means any person duly authorized to enter into and administer contracts and make written determinations with respect thereto. “Procurement Officer” includes an authorized representative of the Principal Representative acting within the limits of his or her authority.
15. PRODUCT DATA. The term “Product Data ” shall mean all submittals in the form of printed manufacturer’s literature, manufacturer’s specifications, and catalog cuts.
16. REASONABLY INFERABLE: The phrase “reasonably inferable” means that if an item or system is either shown or specified, all material and equipment normally furnished with such items or systems and needed to make a complete installation shall be provided whether mentioned or not, omitting only such parts as are specifically excepted, and shall include only components which the Contractor could reasonably anticipate based on his or her skill and knowledge using an objective, industry standard, not a subjective standard. This term takes into consideration the normal understanding that not every detail is to be given on the Drawings and Specifications. The phrase shall not, however, be construed to make the Contractor, rather than the Architect/Engineer, responsible for producing the Drawings and Specifications
17. SAMPLES. The term “Samples” shall mean examples of materials or work provided to establish the standard by which the Work will be judged.
18. SC. The term "SC" means "State Contract" which is used in connection with labeling applicable State form documents (e.g. "SC 6.23" is the State form number for these General Conditions of the Contractor’s Design/Bid/Build Agreement).
19. SBP. The term "SBP" means "State Buildings", which is used in connection with labeling applicable State form documents (e.g., "SBP-01" is the form number for Notice of Approval of Occupancy/Use).
20. SHOP DRAWINGS. The term “Shop Drawings” shall mean any and all detailed drawings prepared and submitted by Contractor, Subcontractor at any tier, vendors or manufacturers providing the products and equipment specified on the Drawings or called for in the Specifications.
21. SPECIFICATIONS. The term “Specifications” shall mean the requirements of the CSI divisions of the project manual prepared by the Architect/Engineer describing the work to be accomplished.
22. STATE BUILDINGS PROGRAMS. Shall refer to the Office of the State Architect within the Department of Personnel & Administration of Colorado State government responsible for project administration, review, approval and coordination of plans, construction procurement policy, contractual procedures, and code compliance and inspection of all buildings, public works and improvements erected for state purposes; except public roads and highways and projects under the supervision of the division of wildlife and the division of parks and outdoor recreation as provided in § 24-30-1301, *et seq*, C.R.S. The term State Buildings Programs shall also mean that individual within a State Department agency or institution, including institutions of higher education, who has signed an agreement accepting delegation to perform all or part of the responsibilities and functions of State Buildings Programs.
23. SUBMITTALS. The term “submittals” means drawings, lists, tables, documents and samples prepared by the Contractor to facilitate the progress of the work as required by these General Conditions or the Drawings and Specifications. They consist of Shop Drawings, Product Data, Samples, and various administrative support documents including but not limited to lists of subcontractors, construction progress schedules, schedules of values, applications for payment, inspection and test results, requests for information, various document logs, and as-

built drawings. Submittals are required by the Contract Documents, but except to the extent expressly specified otherwise are not themselves a part of the Contract Documents.

24. SUBSTANTIAL COMPLETION. The terms “substantial completion ” or “substantially complete ” mean the stage in the progress of the work when the construction is sufficiently complete, in accordance with the Contract Documents as modified by any Change Orders, so that the Work, or at the discretion of the Principal Representative, any designated portion thereof, is available for its intended use by the Principal Representative and a Notice of Substantial Completion can be issued. Portions of the Project may, at the discretion of the Principal Representative, be designated as substantially complete.
25. SURETY. The term “Surety ” shall mean the company providing the labor and material payment and performance bonds for the Contractor as obligor.
26. WORK. The term “Work ” shall mean all or part of the labor, materials, equipment, and other services required by the Contract Documents or otherwise required to be provided by the Contractor to meet the Contractor’s obligations under the Contract.

ARTICLE 2. EXECUTION, CORRELATION, INTENT OF DOCUMENTS, COMMUNICATION AND COOPERATION

A. EXECUTION

The Contractor, within ten (10) days from the date of Notice of Award, will be required to:

1. Execute the Agreement, State Form SC-6.21;
2. Furnish fully executed Performance and Labor and Material Payment Bonds on State Form s SC-6.22 and SC-6.221; and
3. Furnish certificates of insurance evidencing all required insurance on standard Acord forms designed for such purpose.
4. Furnish certified copies of any insurance policies requested by the Principal Representative.

B. CORRELATION

By execution of the Agreement the Contractor represents that the Contractor has visited the site, has become familiar with local conditions and local requirements under which the Work is to be performed, including the building code programs of the State Buildings Program as implemented by the Principal Representative, and has correlated personal observations with the requirements of the Contract Documents.

C. INTENT OF DOCUMENTS

The Contract Documents are complementary, and what is called for by any one document shall be as binding as if called for by all. The intention of the documents is to include all labor, materials, equipment and transportation necessary for the proper execution of the Work. Words describing materials or work which have a well-known technical or trade meaning shall be held to refer to such recognized standards.

In any event, if any error exists, or appears to exist, in the requirements of the Drawings or Specifications, or if any disagreement exists as to such requirements, the Contractor shall have the same explained or adjusted by the Architect/Engineer before proceeding with the work in question. In the event of the Contractor’s failure to give prior written Notice of any such errors or disagreements of which the Contractor or the Subcontractors at any tier are aware, the Contractor shall, at no additional cost to the Principal Representative, make good any damage to, or defect in, work which is caused by such omission.

Where a conflict occurs between or within standards, Specifications or Drawings, which is not resolved by reference to the precedence between the Contract Documents, the more stringent or higher quality requirements shall apply so long as such more stringent or higher quality requirements are reasonably inferable. The Architect/Engineer shall decide which requirements will provide the best installation.
With the exception noted in the following paragraph, the precedence of the Contract Documents is in the following sequence:

1. The Agreement (SC-6.21);

2. The Supplementary General Conditions, if any;
3. The General Conditions (SC-6.23); and
4. Drawings and Specifications, all as modified by any addenda.

Change Orders and Amendments, if any, to the Contract Documents take precedence over the original Contract Documents.

Notwithstanding the foregoing order of precedence, the Special Provisions of Article 52 of the General Conditions, Special Provisions, shall take precedence, rule and control over all other provisions of the Contract Documents.

Unless the context otherwise requires, form numbers in this document are for convenience only. In the event of any conflict between the form required by name or context and the form required by number, the form required by name or context shall control. The Contractor may obtain State forms from the Principal Representative upon request.

D. PARTNERING, COMMUNICATIONS AND COOPERATION

In recognition of the fact that conflicts, disagreements and disputes often arise during the performance of construction contracts, the Contractor and the Principal Representative aspire to encourage a relationship of open communication and cooperation between the employees and personnel of both, in which the objectives of the Contract may be better achieved and issues resolved in a more fully informed atmosphere.

The Contractor and the Principal Representative each agree to assign an individual who shall be fully authorized to negotiate and implement a voluntary partnering plan for the purpose of facilitating open communications between them. Within thirty days (30) of the Notice to Proceed, the assigned individuals shall meet to discuss development of an informal agreement to accomplish these goals.

The assigned individuals shall endeavor to reach an informal agreement, but shall have no such obligation. Any plans these parties voluntarily agree to implement shall result in no change to the contract amount, and no costs associated with such plan or its development shall be recoverable under any contract clause. In addition, no plan developed to facilitate open communication and cooperation shall alter, amend or waive any of the rights or duties of either party under the Contract unless and except by written Amendment to the Contract, nor shall anything in this clause or any subsequently developed partnering plan be deemed to create fiduciary duties between the parties unless expressly agreed in a written Amendment to the Contract. It is also recognized that projects with relatively low contract values may not justify the expense or special efforts required. In the case of small projects with an initial Contract value under $500,000, the requirements of the preceding paragraph shall not apply.

ARTICLE 3. COPIES FURNISHED

The Contractor will be furnished, free of charge, the number of copies of Drawings and Specifications as specified in the Contract Documents, or if no number is specified, all copies reasonably necessary for the execution of the work.

ARTICLE 4. OWNERSHIP OF DRAWINGS

Drawings or Specifications, or copies of either, furnished by the Architect/Engineer, are not to be used on any other work. At the completion of the Work, at the written request of the Architect/Engineer, the Contractor shall endeavor to return all Drawings and Specifications.

The Contractor may retain the Contractor's Contract Document set, copies of Drawings and Specifications used to contract with others for any portion of the Work and a marked up set of as-built drawings.

ARTICLE 5. ARCHITECT/ENGINEER'S STATUS

The Architect/Engineer is the representative of the Principal Representative for purposes of administration of the Contract, as provided in the Contract Documents and the Agreement. In case of termination of

employment or the death of the Architect/Engineer, the Principal Representative will appoint a capable Architect/Engineer against whom the Contractor makes no reasonable objection, whose status under the Contract shall be the same as that of the former Architect/Engineer.

ARTICLE 6. ARCHITECT/ENGINEER DECISIONS AND JUDGMENTS, ACCESS TO WORK AND INSPECTION

A. DECISIONS

The Architect/Engineer shall, within a reasonable time, make decisions on all matters relating to the execution and progress of the Work or the interpretation of the Contract Documents, and in the exercise of due diligence shall be reasonably available to the Contractor to timely interpret and make decisions with respect to questions relating to the design or concerning the Contract Documents.

B. JUDGMENTS

The Architect/Engineer is, in the first instance, the judge of the performance required by the Contract Documents as it relates to compliance with the Drawings and Specifications and quality of workmanship and materials.

The Architect/Engineer shall make judgments regarding whether directed work is extra or outside the scope of Work required by the Contract Documents at the time such direction is first given. If, in the Contractor's judgment, any performance directed by the Architect/Engineer is not required by the Contract Documents or if the Architect/Engineer does not make the judgment required, it shall be a condition precedent to the filing of any claim for additional cost related to such directed work that the Contractor, before performing such work, shall first obtain in writing, the Architect/Engineer's written decision that such directed work is included in the performance required by the Contract Documents. If the Architect/Engineer's direction to perform the work does not state that the work is within the performance required by the Contract Documents, the Contractor shall, in writing, request the Architect/Engineer to advise in writing whether the directed work will be considered extra work or work included in the performance required by the Contract Documents.

The Architect/Engineer shall respond to any such written request for such a decision within three (3) business days and if no response is provided, or if the Architect/Engineer's written decision is to the effect that the work is included in the performance required by the Contract Documents, the Contractor may file with the Principal Representative and the Architect/Engineer a Notice of claim in accordance with Article 36, Claims. Whether or not a Notice of claim is filed, the Contractor shall proceed with the ordered work. Disagreement with the decision of the Architect/Engineer shall not be grounds for the Contractor to refuse to perform the work directed or to suspend or terminate performance.

C. ACCESS TO WORK

The Architect/Engineer, the Principal Representative and representatives of State Buildings Programs shall at all times have access to the work. The Contractor shall provide proper facilities for such access and for their observations or inspection of the work.

D. INSPECTION

The Architect/Engineer has agreed to make, or that structural, mechanical, electrical engineers or other consultants will make, periodic visits to the site to generally observe the progress and quality of the Work to determine in general if the Work is proceeding in accordance with the Contract Documents. Observation may extend to all or any part of the Work and to the preparation, fabrication or manufacture of materials.

Without in any way meaning to be exclusive or to limit the responsibilities of the Architect/Engineer or the Contractor, the Architect/Engineer has agreed to observe, among other aspects of the Work, the following for compliance with the Contract Documents:

1. Bearing surfaces of excavations before concrete is placed based upon the findings and recommendations of the Principal Representative's soils engineering consultant;
2. Reinforcing steel after installation and before concrete is poured;

3. Structural concrete;
4. Laboratory reports on all concrete testing based upon the findings and recommendations of the Principal Representative's testing consultant;
5. Structural steel during and after erection and prior to its being covered or enclosed;
6. Steel welding; Principal Representative will furnish steel welding inspection consultant/agency if required or necessary for the project;
7. Mechanical and plumbing work following its installation and prior to its being covered or enclosed;
8. Electrical work following its installation and prior to its being covered or enclosed;
9. Compaction testing reports based upon the findings and recommendations of the Principal Representative's testing consultant; and
10. Any special or quality control testing required in the Contract Documents provided by the Principal Representative's testing consultant.

If the Specifications, the Architect/Engineer's instructions, laws, ordinances of any public authority require any work to be specifically tested or approved, the Contractor shall give the Architect/Engineer timely notice of its readiness for observation by the Architect/Engineer or inspection by another authority, and if the inspection is by another authority, of the date fixed for such inspection, required certificates of inspection being secured by the Contractor. The Contractor shall give all required Notices to the Principal Representative or his or her designee for inspections required for the building inspection program. It shall be the responsibility of the Contractor to determine the Notice required by the State pursuant to Building Inspection Record for the Project, according to State form SBP-B.I.R., or the equivalent form required by the Principal Representative as approved by the State Buildings Program. If any such work is covered up without approval or consent of the Architect/Engineer or prior to any building code inspection, it must, if required by the Architect/Engineer, the Principal Representative or the State Buildings Programs, be uncovered for examination, at the Contractor's expense. If such work is found to be not in accordance with the Contract Documents, the Contractor shall pay such costs, unless he or she shall show that the defect in the work was caused by another contractor engaged by the Principal Representative. In that event, the Principal Representative shall pay such cost. In addition, examination of questioned work may be ordered, and if so ordered, the work must be uncovered by the Contractor. If such work be found in accordance with the Contract Documents, the Contractor shall be reimbursed the cost of examination and replacement.

ARTICLE 7. CONTRACTOR'S SUPERINTENDENCE AND SUPERVISION

The Contractor shall employ, and keep present on the Project during its progress, a competent superintendent and any necessary assistants, all satisfactory to the Architect/Engineer and the Principal Representative. The superintendent shall not be changed except with the consent of the Architect/Engineer and the Principal Representative, unless the superintendent proves to be unsatisfactory to the Contractor and ceases to be in his or her employ. The superintendent shall represent the Contractor in his or her absence and all directions given to the superintendent shall be as binding as if given to the Contractor. Directions received by the superintendent shall be documented by the superintendent and confirmed in writing with the Contractor.

The Contractor shall give efficient supervision to the Work, using his or her best skill and attention. He or she shall carefully study and compare all Drawings, Specifications and other written instructions and shall without delay report any error, inconsistency or omission which he or she may discover in writing to the Architect/Engineer. The Contractor shall not be liable to the Principal Representative for damage to the extent it results from errors or deficiencies in the Contract Documents or other instructions by the Architect/Engineer, unless the Contractor knew or had reason to know, that damage would result by proceeding and the Contractor fails to so advise the Architect/Engineer.

The superintendent shall see that the Work is carried out in accordance with the Contract Documents and in a uniform, thorough and first-class manner in every respect. The Contractor's superintendent shall establish all lines, levels, and marks necessary to facilitate the operations of all concerned in the Contractor's Work. The Contractor shall lay out all work in a manner satisfactory to the Architect/Engineer, making permanent

records of all lines and levels required for excavation, grading, foundations, and for all other parts of the Work.

ARTICLE 8. MATERIALS AND EMPLOYEES

Unless otherwise stipulated, the Contractor shall provide and pay for all materials, labor, water, tools, equipment, light, power, transportation and other facilities necessary for the execution and completion of the Work.

Unless otherwise specified, all materials shall be new and both workmanship and materials shall be first class and of uniform quality. The Contractor shall, if required, furnish satisfactory evidence as to the kind and quality of materials.

The Contractor is fully responsible for all acts and omissions of the Contractor's employees and shall at all times enforce strict discipline and good order among employees on the site. The Contractor shall not employ on the Work any person reasonably deemed unfit by the Principal Representative or anyone not skilled in the work assigned to him.

ARTICLE 9. SURVEYS, PERMITS, LAWS, TAXES AND REGULATIONS

A. SURVEYS

The Principal Representative shall furnish all surveys, property lines and bench marks deemed necessary by the Architect/Engineer, unless otherwise specified.

B. PERMITS AND LICENSES

Permits and licenses necessary for the prosecution of the Work shall be secured and paid for by the Contractor. Unless otherwise specified in the Specifications, no local municipal or county building permit shall be required. However, State Buildings Programs requires each Principal Representative to administer a building code inspection program, the implementation of which may vary at each agency or institution of the State. The Contractors' employees shall become personally familiar with these local conditions and requirements and shall fully comply with such requirements. State electrical and plumbing permits are required, unless the requirement to obtain such permits is altered by State Building's Programs. The Contractor shall obtain and pay for such permits.

Easements for permanent structures or permanent changes in existing facilities shall be secured and paid for by the Principal Representative, unless otherwise specified.

C. TAXES

1. REFUND OF SALES AND USE TAXES

The Contractor shall pay all local taxes required to be paid, including but not necessarily limited to all sales and use taxes. If requested by the Principal Representative prior to issuance of the Notice to Proceed or directed in the Supplementary General Conditions or the Specifications, the Contractor shall maintain records of such payments in respect to the Work, which shall be separate and distinct from all other records maintained by the Contractor, and the Contractor shall furnish such data as may be necessary to enable the State of Colorado, acting by and through the Principal Representative, to obtain any refunds of such taxes which may be available under the laws, ordinances, rules or regulations applicable to such taxes. When so requested or directed, the Contractor shall require Subcontractors at all tiers to pay all local sales and use taxes required to be paid and to maintain records and furnish the Contractor with such data as may be necessary to obtain refunds of the taxes paid by such Subcontractors. No State sales and use taxes are to be paid on material to be used in this Project. On application by the purchaser or seller, the Department of Revenue shall issue to a Contractor or to a Subcontractor at any tier, a certificate or certificates of exemption per § 39-26-114(1)(d), C.R.S., and § 39-26-203, C.R.S.

2. FEDERAL TAXES

The Contractor shall exclude the amount of any applicable federal excise or manufacturers' taxes from the proposal. The Principal Representative will furnish the Contractor, on request exemption certificates.

D. LAWS AND REGULATIONS

The Contractor shall give all notices and comply with all laws, ordinances, rules and regulations bearing on the conduct of the Work as drawn or specified. If the Contractor observes that the Drawings or Specifications require work which is at variance therewith, the Contractor shall without delay notify the Architect/Engineer in writing and any necessary changes shall be adjusted as provided in Article 35, Changes In The Work.

The Contractor shall bear all costs arising from the performance of work required by the Drawings or Specifications that the Contractor knows to be contrary to such laws, ordinances, rules or regulations, if such work is performed without giving Notice to the Architect/Engineer.

ARTICLE 10. PROTECTION OF WORK AND PROPERTY

A. GENERAL PROVISIONS

The Contractor shall continuously maintain adequate protection of all work and materials, protect the property from injury or loss arising in connection with this Contract and adequately protect adjacent property as provided by law and the Contract Documents. The Contractor shall make good any damage, injury or loss, except to the extent:

1. Directly due to errors in the Contract Documents;
2. Caused by agents or employees of the Principal Representative; and,
3. Due to causes beyond the Contractor 's control and not to fault or negligence; provided such damage, injury or loss would not be covered by the insurance required to be carried by the Contractor;

B. SAFETY PRECAUTIONS

The Contractor shall take all necessary precautions for the safety of employees on the Project, and shall comply with all applicable provisions of federal, State and municipal safety laws and building codes to prevent accidents or injury to persons on, about or adjacent to the premises where the Work is being performed. He or she shall erect and properly maintain at all times, as required by the conditions and progress of the Work, all necessary safeguards for the protection of workers and the public and shall post danger signs warning against the hazards created by such features of construction as protruding nails, hoists, well holes, elevator hatchways, scaffolding, window openings, stairways and falling materials; and he or she shall designate a responsible member of his or her organization on the Project, whose duty shall be the prevention of accidents. The name and position of any person so designated shall be reported to the Architect/Engineer by the Contractor.

The Contractor shall provide all necessary bracing, shoring and tying of all structures, decks and framing to prevent any structural failure of any material which could result in damage to property or the injury or death of persons; take all precautions to insure that no part of any structure of any description is loaded beyond its carrying capacity with anything that will endanger its safety at any time during the execution of this Contract; and provide for the adequacy and safety of all scaffolding and hoisting equipment. The Contractor shall not permit open fires within the building enclosure. The Contractor shall construct and maintain all necessary temporary drainage and do all pumping necessary to keep excavations and floors, pits and trenches free of water. The Contractor shall be solely responsible for all construction means, methods, techniques, sequences and procedures, and for coordinating all portions of the Work, except as otherwise noted.

The Contractor shall take due precautions when obstructing sidewalks, streets or other public ways in any manner, and shall provide, erect and maintain barricades, temporary walkways, roadways, trench covers, colored lights or danger signals and any other devices necessary or required to assure the safe passage of pedestrians and automobiles.

C. EMERGENCIES

In an emergency affecting the safety of life or of the Work or of adjoining property, the Contractor without special instruction or authorization from the Architect/Engineer or Principal Representative, is hereby permitted to act, at his or her discretion, to prevent such threatened loss or injury; and he or she shall so act, without appeal, if so authorized or instructed. Provided the Contractor has no responsibilities for the emergency, if the Contractor incurs additional cost not otherwise recoverable from insurance or others on account of any such emergency work, the Contract sum shall be equitably adjusted in accordance with Article 35, Changes In The Work.

ARTICLE 11. DRAWINGS AND SPECIFICATIONS ON THE WORK

The Contractor shall keep on the job site one copy of the Contract Documents in good order, including current copies of all Drawings and Specifications for the Work, and any approved Shop Drawings, Product Data or Samples, and as-built drawings. As-built drawings shall be updated weekly by the Contractor and Subcontractors to reflect actual constructed conditions including dimensioned locations of underground work and the Contractor's failure to maintain such updates may be grounds to withhold portions of payments otherwise due in accordance with Article 33, Payments Withheld. All such documents shall be available to the Architect/Engineer and representatives of the State. In addition, the Contractor shall keep on the job site one copy of all approved addenda, Change Orders and requests for information issued for the Work.

The Contractor shall develop procedures to insure the currency and accuracy of as-built drawings and shall maintain on a current basis a log of requests for information and responses thereto, a Shop Drawing and Product Data submittal log, and a Sample submittal log to record the status of all necessary and required submittals.

ARTICLE 12. REQUESTS FOR INFORMATION AND SCHEDULES

A. REQUESTS FOR INFORMATION

The Architect/Engineer shall furnish additional instructions with reasonable promptness, by means of drawings or otherwise, necessary for the proper execution of the Work. All such drawings and instructions shall be consistent with the Contract Documents and reasonably inferable there from. The Architect/Engineer shall determine what additional instructions or drawings are necessary for the proper execution of the Work.

The Work shall be executed in conformity with such instructions and the Contractor shall do no work without proper drawings, specifications or instructions. If the Contractor believes additional instructions, specifications or drawings are needed for the performance of any portion of the Work, the Contractor shall give Notice of such need in writing through a request for information furnished to the Architect/Engineer sufficiently in advance of the need for such additional instructions, specifications or drawings to avoid delay and to allow the Architect/Engineer a reasonable time to respond. The Contractor shall maintain a log of the requests for information and the responses provided.

B. SCHEDULES

1. SUBMITTAL SCHEDULES

Prior to filing the Contractor ’s first application for payment, a schedule shall be prepared which may be preliminary to the extent required, fixing the dates for the submission and initial review of required Shop Drawings, Product Data and Samples for the beginning of manufacture and installation of materials, and for the completion of the various parts of the Work. It shall be prepared so as to cause no delay in the Work or in the work of any other contractor. The schedule shall be subject to change from time to time in accordance with the progress of the Work, and it shall be subject to the review and approval by the Architect/Engineer. It shall fix the dates at which the various Shop Drawings Product Data and Samples will be required from the Architect/Engineer. The Architect/Engineer, after review and agreement as to the time provided for initial review, shall review and comment on the Shop Drawings, Product Data and Samples in accordance with that schedule. The schedule shall be finalized, prepared and submitted with respect to each of the elements of the Work in time to avoid delay, considering reasonable periods for review, manufacture or installation.

At the time the schedule is prepared, the Contractor, the Architect/Engineer and Principal Representative shall jointly identify the Shop Drawing, Product Data and Samples, if any, which the Principal Representative shall receive simultaneously with the Architect/Engineer for the purposes of owner coordination with existing facility standards and systems. The Contractor shall furnish a copy for the Principal Representative when so requested. Transmittal of Shop Drawings and Product Data copies to the Principal Representative shall be solely for the convenience of the Principal Representative and shall neither create nor imply responsibility or duty of review by the Principal Representative.

The Contractor may also, or at the direction of the Principal Representative at any time shall, prepare and maintain a schedule, which may also be preliminary and subject to change to the extent required, fixing the dates for the initial responses to requests for information or for detail drawings which will be required from the Architect/Engineer to allow the beginning of manufacture, installation of materials and for the completion of the various parts of the Work. The schedule shall be subject to review and approval by the Architect/Engineer. The Architect/Engineer shall, after review and agreement, furnish responses and detail drawings in accordance with that schedule. Any such schedule shall be prepared and approved in time to avoid delay, considering reasonable periods for review, manufacture or installation, but so long as the request for information schedule is being maintained, it shall not be deemed to transfer responsibility to the Contractor for errors or omissions in the Contract Documents where circumstances make timely review and performance impossible.

The Architect/Engineer shall not unreasonably withhold approval of the Contractor's schedules and shall inform the Contractor and the Principal Representative of the basis of any refusal to agree to the Contractor's schedules. The Principal Representative shall attempt to resolve any disagreements.

2. SCHEDULE OF VALUES

Within twenty-one (21) calendar days after the date of the Notice to Proceed, the Contractor shall submit to the Architect/Engineer and Principal Representative, for approval, and to the State Buildings Programs when specifically requested, a complete itemized schedule of the values of the various parts of the Work, as estimated by the Contractor, aggregating the total price. The schedule of values shall be in such detail as the Architect/Engineer or the Principal Representative shall require, prepared on forms acceptable to the Principal Representative. It shall, at a minimum, identify on a separate line each division of the Specifications including the general conditions costs to be charged to the Project. The Contractor shall revise and resubmit the schedule of values for approval when, in the opinion of the Architect/Engineer or the Principal Representative, such resubmittal is required due to changes or modifications to the Contract Documents or the Contract sum.

The total cost of each line item so separately identified shall, when requested by the Architect/Engineer or the Principal Representative, be broken down into reasonable estimates of the value of:

a. Material, which shall include the cost of material actually built into the Project plus any local sales or use tax paid thereon; and,
b. Labor and other costs.

The cost of subcontracts shall be incorporated in the Contractor's schedule of values, and when requested by the Architect/Engineer or the Principal Representative, shall be separately shown as line items.

The Architect/Engineer shall review the proposed schedules and approve it after consultation with the Principal Representative, or advise the Contractor of any required revisions within ten (10) days of its receipt. In the event no action is taken on the submittal within ten days, the

Contractor may utilize the schedule of values as its submittal for payment until it is approved or until revisions are requested.

When the Architect/Engineer deems it appropriate to facilitate certification of the amounts due to the Contractor, further breakdown of subcontracts, including breakdown by labor and materials, may be directed.

This schedule of values, when approved, will be used in preparing Contractor's applications for payment on State Form SC-7.2, Application for Payment.

3. CONSTRUCTION SCHEDULES

Within twenty-one (21) calendar days after the date of the Notice to Proceed, the Contractor shall submit to the Architect/Engineer and the Principal Representative, and to the State Buildings Programs when specifically requested, on a form acceptable to them, an overall timetable of the construction schedule for the Project. Unless the Supplementary General Conditions or the Specifications allow scheduling with bar charts or other less sophisticated scheduling tools, the Contractor's schedule shall be a critical-path method (CPM) construction schedule. The CPM schedule shall start with the date of the Notice to Proceed and include submittals activities, the various construction activities, change order work (when applicable), close-out, testing, demonstration of equipment operation when called for in the Specifications, and acceptance. The CPM shall at a minimum correlate to the schedule of values line items and shall be cost loaded if requested by the Architect/Engineer or Principal Representative. The completion time shall be the time specified in the Agreement and all Project scheduling shall allocate float utilizing the full period available for construction as specified in the Agreement on State Form SC 6.13, without indication of early completion, unless such earlier completion is approved in writing by the Principal Representative and State Building Programs.

The time shown between the starting and completion dates of the various elements within the construction schedule shall represent one hundred per cent (100%) completion of each element.

All other elements of the CPM schedule shall be as required by the Specifications. In addition, the Contractor shall submit monthly updates of the construction schedule. These updates shall reflect the Contractor's "work in place" progress.

When requested by the Architect/Engineer, the Principal Representative or the State Buildings Programs, the Contractor shall revise the construction schedule to reflect changes in the schedule of values.

When the testing of materials is required by the Specifications, the Contractor shall also prepare and submit to the Architect/Engineer and the Principal Representative a schedule for testing in accordance with Article 14, Samples and Testing.

ARTICLE 13. SHOP DRAWINGS, PRODUCT DATA AND SAMPLES

A. SUBMITTAL PROCESS

The Contractor shall check and field verify all dimensions. The Contractor shall check, approve and submit to the Architect/Engineer in accordance with the schedule described in Article 12, Requests for Information and Schedules, all Shop Drawings, Product Data and Samples required by the specifications or required by the Contractor for the work of the various trades. All Drawings and Product Data shall contain identifying nomenclature and each submittal shall be accompanied by a letter of transmittal identifying in detail all enclosures. The number of copies of Shop Drawings and Product Data to be submitted shall be as specified in the Specifications and if no number is specified then three copies shall be submitted.

The Architect/Engineer shall review and comment on the Shop Drawings and Product Data within the time provided in the agreed upon schedule for conformance with information given and the design

concept expressed in, or reasonably inferred from, the Contract Documents. The nature of all corrections to be made to the Shop Drawings and Product Data, if any, shall be clearly noted, and the submittals shall be returned to the Contractor for such corrections. If a change in the scope of the Work is intended by revisions requested to any Shop Drawings and Product Data, the Contractor shall be requested to prepare a change proposal in accordance with Article 35, Changes In The Work. On resubmitted Shop Drawings, Product Data or Samples, the Contractor shall direct specific attention in writing on the transmittal cover to revisions other than those corrections requested by the Architect/Engineer on any previously checked submittal. The Architect/Engineer shall promptly review and comment on, and return, the resubmitted items.

The Contractor shall thereafter furnish such other copies in the form approved by the Architect/Engineer as may be needed for the prosecution of the work.

B. FABRICATION AND ORDERING

Fabrication shall be started by the Contractor only after receiving approved Shop Drawings from the Architect/Engineer. Materials shall be ordered in accordance with approved Product Data. Work which is improperly fabricated, whether through incorrect Shop Drawings, faulty workmanship or materials, will not be acceptable.

C. DEVIATIONS FROM DRAWINGS OR SPECIFICATIONS

The review and comments of the Architect/Engineer of Shop Drawings, Product Data or Samples shall not relieve the Contractor from responsibility for deviations from the Drawings or Specifications, unless he or she has in writing called the attention of the Architect/Engineer to such deviations at the time of submission, nor shall it relieve the Contractor from responsibility for errors of any sort in Shop Drawings or Product Data. Review and comments on Shop Drawings or Product Data containing identified deviations from the Contract Documents shall not be the basis for a Change Order or a claim based on a change in the scope of the Work unless Notice is given to the Architect/Engineer and Principal Representative of all additional costs, time and other impacts of the identified deviation by bring it to their attention in writing at the time the submittals are made, and any subsequent change in the Contract sum or the Contract time shall be limited to cost, time and impacts so identified.

D. CONTRACTOR REPRESENTATIONS

By preparing, approving, and/or submitting Shop Drawings, Product Data and Samples, the Contractor represents that the Contractor has determined and verified all materials, field measurements, and field construction criteria related thereto, and has checked and co-ordinated the information contained within each submittal with the requirements of the Work, the Project and the Contract Documents and prior reviews and approvals.

ARTICLE 14. SAMPLES AND TESTING

A. SAMPLES

The Contractor shall furnish for approval, with such promptness as to cause no delay in his or her work or in that of any other Contractor, all Samples as directed by the Architect/Engineer. The Architect/Engineer shall check and approve such Samples, with reasonable promptness, but only for conformance with the design intent of the Contract Documents and the Project, and for compliance with any submission requirements given in the Contract Documents.

B. TESTING - GENERAL

The Contractor shall provide such equipment and facilities as the Architect/Engineer may require for conducting field tests and for collecting and forwarding samples to be tested. Samples themselves shall not be incorporated into the Work after approval without the permission of the Architect/Engineer.

All materials or equipment proposed to be used may be tested at any time during their preparation or use. The Contractor shall furnish the required samples without charge and shall give sufficient Notice of the placing of orders to permit the testing thereof. Products may be sampled either prior to shipment or after being received at the site of the Work.

Tests shall be made by an accredited testing laboratory. Except as otherwise provided in the Specifications, sampling and testing of all materials, and the laboratory methods and testing equipment, shall be in accordance with the latest standards and tentative methods of the American Society of Testing Materials (ASTM). The cost of testing which is in addition to the requirements of the Specifications shall be paid by the Contractor if so directed by the Architect/Engineer, and the Contract sum shall be adjusted accordingly by Change Order ; provided however, that whenever testing shows portions of the Work to be deficient, all costs of testing including that required to verify the adequacy of repair or replacement work shall be the responsibility of the Contractor.

C. TESTING - CONCRETE AND SOILS

Unless otherwise specified or provided elsewhere in the Contract Documents, the Principal Representative will contract for and pay for the testing of concrete and for soils compaction testing through an independent laboratory or laboratories selected and approved by the Principal Representative. The Contractor shall assume the responsibility of arranging, scheduling and coordinating the concrete sample collection efforts and soils compaction efforts. Testing shall be performed in accordance with the requirements of the Specifications, and if no requirements are specified, the Contractor shall request instructions and testing shall be as directed by the Architect/Engineer or the soils engineer, as applicable, and in accordance with standard industry practices.

The Principal Representative and the Architect/Engineer shall be given reasonable advance notice of each concrete pour and reserve the right to either increase or decrease the number of cylinders or the frequency of tests.

Soil compaction testing shall be at random locations selected by the soils engineer. In general, soils compaction testing shall be as directed by the soils engineer and shall include all substrate prior to backfill or construction.

D. TESTING - OTHER

Additional testing required by the Specifications will be accomplished and paid for by the Principal Representative in a manner similar to that for concrete and soils unless noted otherwise in the Specifications. In any case, the Contractor will be responsible for arranging, scheduling and coordinating additional tests. Where the additional testing will be contracted and paid for by the Principal Representative the Contractor shall give the Principal Representative not less than one month advance written Notice of the date the first such test will be required.

ARTICLE 15. SUBCONTRACTS

After the contract is awarded, Contractor is required to provide written notice to the Principal Representative no later than twenty (20) days after deciding to perform services under this contract outside the United States or Colorado or to subcontract services under this contract to a subcontractor that will perform such services outside the United States or Colorado. The written notification must include, but need not be limited to, a statement of the type of services that will be performed at a location outside the United States or Colorado and the reason why it is necessary or advantageous to go outside the United States or Colorado to perform the services. All notices received by the State pursuant to outsourced services shall be posted on the Colorado Department of Personnel & Administration's website. *If Contractor knowingly fails to notify the Principal Representative of any outsourced services as specified herein, the Principal Representative, at its discretion, may terminate this contract as provided in C.R.S. § 24-102-206 (4).* (Does not apply to any project that receives federal moneys)

Prior to the Notice to Proceed to commence construction, the Contractor shall submit to the Architect/Engineer, the Principal Representative and State Buildings Programs a preliminary list of Subcontractors. It shall be as complete as possible at the time, showing all known Subcontractors planned for the work. The list shall be supplemented as other Subcontractors are determined by the Contractor and any such supplemental list shall be submitted to the Architect/Engineer, the Principal Representative and State Buildings Programs not less than ten (10) days before the Subcontractor commences work.

The Contractor's list shall include those Subcontractors, if any, which the Contractor indicated in its bid, would be employed for specific portions of the Work if such indication was requested in the bid documents issued by the State. The substitution of any Subcontractor listed in the Contractor's bid shall be justified in writing not less than ten (10) days after the date of the Notice to Proceed to commence construction, and shall be subject to the approval of the Principal Representative. For reasons such as the Subcontractor's refusal to perform as agreed, subsequent unavailability or later discovered bid errors, or other similar reasons, but not including the availability of a lower Subcontract price, such substitution may be approved. The Contractor shall bear any additional cost incurred by such substitutions.

The Contractor shall not employ any Subcontractor that the Architect/Engineer, within ten (10) days after the date of receipt of the Contractor's list of Subcontractors or any supplemental list, objects to in writing as being unacceptable to either the Architect/Engineer, the Principal Representative or State Buildings Programs. If a Subcontractor is deemed unacceptable, the Contractor shall propose a substitute Subcontractor and the Contract sum shall be adjusted by any demonstrated difference between the Subcontractor's bids, except where the Subcontractor has been debarred by the State or fails to meet qualifications of the Contract Documents to perform the work proposed.

The Contractor shall be fully responsible to the Principal Representative for the acts and omissions of Subcontractors and of persons either directly or indirectly employed by them. All instructions or orders in respect to work to be done by Subcontractors shall be given to the Contractor.

ARTICLE 16. RELATIONS OF CONTRACTOR AND SUBCONTRACTOR

The Contractor agrees to bind each Subcontractor to the terms of these General Conditions and to the requirements of the Drawings and Specifications, and any Addenda thereto, and also all the other Contract Documents, so far as applicable to the work of such Subcontractor. The Contractor further agrees to bind each Subcontractor to those terms of the General Conditions which expressly require that Subcontractors also be bound, including without limitation, requirements that Subcontractors waive all rights of subrogation, provide adequate general commercial liability and property insurance, automobile insurance and workers' compensation insurance as provided in Article 25, Insurance.

Nothing contained in the Contract Documents shall be deemed to create any contractual relationship whatsoever between any Subcontractor and the State of Colorado acting by and through its Principal Representative.

ARTICLE 17. MUTUAL RESPONSIBILITY OF CONTRACTORS

Should the Contractor cause damage to any separate contractor on the work, the Contractor agrees, upon due Notice, to settle with such contractor by agreement, if he or she will so settle. If such separate contractor sues the Principal Representative on account of any damage alleged to have been so sustained, the Principal Representative shall notify the Contractor, who shall defend such proceedings if requested to do so by Principal Representative. If any judgment against the Principal Representative arises there from, the Contractor shall pay or satisfy it and pay all costs and reasonable attorney fees incurred by the Principal Representative, in accordance with Article 52C, Indemnification, provided the Contractor was given due Notice of an opportunity to settle.

ARTICLE 18. SEPARATE CONTRACTS

The Principal Representative reserves the right to enter into other contracts in connection with the Project or the Contract. The Contractor shall afford other contractors reasonable opportunity for the introduction and storage of their materials and the execution of their work, and shall properly connect and coordinate his or her work with theirs. If any part of the Contractor's work depends, for proper execution or results, upon the work of any other contractor, the Contractor shall inspect and promptly report to the Architect/Engineer any defects in such work that render it unsuitable for such proper execution and results. Failure of the Contractor to so inspect and report shall constitute an acceptance of the other contractor's work as fit and proper for the reception of work, except as to defects which may develop in the other Contractor's work after the execution of the Contractor's work.

To insure the proper execution of subsequent work, the Contractor shall measure work already in place and shall at once report to the Architect/Engineer any discrepancy between the executed work and the Drawings.

ARTICLE 19. USE OF PREMISES

The Contractor shall confine apparatus, the storage of materials and the operations of workmen to limits indicated by law, ordinances, permits and any limits lines shown on the Drawings. The Contractor shall not unreasonably encumber the premises with materials.

The Contractor shall enforce all of the Architect/Engineer's instructions and prohibitions regarding, without limitation, such matters as signs, advertisements, fires and smoking.

ARTICLE 20. CUTTING, FITTING OR PATCHING

The Contractor shall do all cutting, fitting or patching of work that may be required to make its several parts come together properly and fit it to receive or be received by work of other Contractors shown upon, or reasonably inferred from, the Drawings and Specifications for the complete structure, and shall provide for such finishes to patched or fitted work as the Architect/Engineer may direct. The Contractor shall not endanger any work by cutting, excavating or otherwise altering the work and shall not cut or alter the work of any other Contractor save with the consent of the Architect/Engineer.

ARTICLE 21. UTILITIES

A. TEMPORARY UTILITIES

Unless otherwise specifically stated in the Specifications or on the Drawings, the Principal Representative shall be responsible for the locations of all utilities as shown on the Drawings or indicated elsewhere in the Specifications, subject to the Contractor's compliance with all statutory or regulatory requirements to call for utility locates. When actual conditions deviate from those shown the Contractor shall comply with the requirements of Article 37, Differing Site Conditions. The Contractor shall provide and pay for the installation of all temporary utilities required to supply all the power, light and water needed by him and other Contractors for their Work and shall install and maintain all such utilities in such manner as to protect the public and workmen and conform with any applicable laws and regulations. Upon completion of the work, he or she shall remove all such temporary utilities from the site. The Contractor shall pay for all consumption of power, light and water used by him or her and the other Contractors, without regard to whether such items are metered by temporary or permanent meters. The Superintendent shall have full authority over all trades and Subcontractors at any tier to prevent waste. The cut-off date on permanent meters shall be either the agreed date of the date of the Notice of Substantial Completion or the Notice of Approval of Occupancy/Use of the Project.

B. PROTECTION OF EXISTING UTILITIES

Where existing utilities, such as water mains, sanitary sewers, storm sewers and electrical conduits, are shown on the Drawings, the Contractor shall be responsible for the protection thereof, without regard to whether any such utilities are to be relocated or removed as a part of the Work. If any utilities are to be moved, the moving must be conducted in such manner as not to cause undue interruption or delay in the operation of the same.

C. CROSSING OF UTILITIES

When new construction crosses highways, railroads, streets, or utilities under the jurisdiction of State, city or other public agency, public utility or private entity, the Contractor shall secure proper written permission before executing such new construction. The Contractor will be required to furnish a proper release before final acceptance of the Work.

ARTICLE 22. UNSUITABLE CONDITIONS

The Contractor shall not work at any time, or permit any work to be done, under any conditions contrary to those recommended by manufacturers or industry standards which are otherwise proper, unsuited for proper execution, safety and performance. Any cost caused by ill-timed work shall be borne by the Contractor unless the timing of such work shall have been directed by the Architect/Engineer or the Principal Representative, after the award of the Contract, and the Contractor provided Notice of any additional cost.

ARTICLE 23. TEMPORARY FACILITIES

A. OFFICE FACILITIES

The Contractor shall provide and maintain without additional expense for the duration of the Project temporary office facilities, as required and as specified, for his or her own use and the use of the Architect/Engineer, representatives of the Principal Representative and State Buildings Programs.

B. TEMPORARY HEAT

The Contractor shall furnish and pay for all the labor, facilities, equipment, fuel and power necessary to supply temporary heating, ventilating and air conditioning, except to the extent otherwise specified, and shall be responsible for the installation, operation, maintenance and removal of such facilities and equipment. Unless otherwise specified, the permanent HVAC system shall not be used for temporary heat in whole or in part. If the Contractor desires to put the permanent system into use, in whole or in part, the Contractor shall set it into operation and furnish the necessary fuel and manpower to safely operate, protect and maintain that HVAC system. Any operation of all or any part of the permanent HVAC system including operation for testing purposes shall not constitute acceptance of the system, nor shall it relieve the Contractor of his or her one-year guarantee of the system from the date of the Notice of Substantial Completion of the entire Project, and if necessary due to prior operation, the Contractor shall provide manufacturers' extended warranties from the date of the Contractor's use prior to the date of the Notice of Substantial Completion.

C. WEATHER PROTECTION

The Contractor shall, at all times, provide protection against weather, so as to maintain all work, materials, apparatus and fixtures free from injury or damages.

D. DUST PARTITIONS

If the Work involves work in an occupied existing building, the Contractor shall erect and maintain during the progress of the work, suitable dust-proof temporary partitions, or more permanent partitions as specified, to protect such building and the occupants thereof.

E. BENCH MARKS

The Contractor shall maintain any site bench marks provided by the Principal Representative and shall establish any additional benchmarks specified by the Architect/Engineer as necessary for the Contractor to layout the work and ascertain all grades and levels as needed.

F. SIGN

The Contractor shall erect and permit one 4' x 8' sign only at the site to identify the Project as specified or directed by the Architect/Engineer which shall be maintained in good condition during the life of the Project.

G. SANITARY PROVISION

The Contractor shall provide and maintain suitable, clean, temporary sanitary toilet facilities for any and all workmen engaged on the Work, for the entire construction period, in strict compliance with the requirement of all applicable codes, regulations, laws and ordinances, and no other facilities, new or existing, may be used by any person on the Project. When the Project is complete the Contractor shall promptly remove them from the site, disinfect, and clean or treat the areas as required. If any new construction surfaces in the Project other than the toilet facilities provided for herein are soiled at any time, the entire areas so soiled shall be completely removed from the Project and rebuilt. In no event may present toilet facilities of any existing building at the site of the work be used by employees of any contractor.

ARTICLE 24. CLEANING UP

The Contractor shall keep the building and premises free from all surplus material, waste material, dirt and rubbish caused by employees or work, and at the completion of the Work shall remove all such surplus material, waste material, dirt, and rubbish, as well as all tools, equipment and scaffolding, and shall wash

and clean all window glass and plumbing fixtures, perform cleanup and cleaning required by the Specifications and leave all of the work clean unless more exact requirements are specified.

ARTICLE 25. INSURANCE

A. GENERAL

The Contractor shall procure and maintain all insurance requirements and limits as set forth below, at his or her own expense, for the length of time set forth in Contract requirements. The Contractor shall continue to provide evidence of such coverage to State of Colorado on an annual basis during the aforementioned period including all of the terms of the insurance and indemnification requirements of this agreement. All below insurance policies shall include a provision preventing cancellation without thirty (30) days' prior notice by certified mail. A completed Certificate of Insurance shall be filed with the Principal Representative and State Buildings Programs within ten (10) days after the date of the Notice of Award, said Certificate to specifically state the inclusion of the coverages and provisions set forth herein and shall state whether the coverage is "claims made" or "per occurrence".

B. COMMERCIAL GENERAL LIABILITY INSURANCE (CGL)

This insurance must protect the Contractor from all claims for bodily injury, including death and all claims for destruction of or damage to property (other than the Work itself), arising out of or in connection with any operations under this Contract, whether such operations be by the Contractor or by any Subcontractor under him or anyone directly or indirectly employed by the Contractor or by a Subcontractor. All such insurance shall be written with limits and coverages as specified below and shall be written on an occurrence form.

General Aggregate	$2,000,000
Products – Completed Operations Aggregate	$2,000,000
Each Occurrence	$1,000,000
Personal Injury	$1,000,000

The following coverages shall be included in the CGL:

1. Per project general aggregate (CG 25 03 or similar)
2. Additional Insured status in favor of the State of Colorado and any other parties as outlined in The Contract and must include both ONGOING Operations AND COMPLETED Operations per CG2010 10/01 and CG 2037 10/01 or equivalent as permitted by law.
3. The policy shall be endorsed to be **primary and non-contributory** with any insurance maintained by Additional Insureds.
4. A waiver of Subrogation in favor of all Additional Insured parties.
5. Personal Injury Liability
6. Contractual Liability coverage to support indemnification obligation per Article 53.I
7. Explosion, collapse and underground (xcu)

The following exclusionary endorsements are prohibited in the CGL policy:

1. Damage to Work performed by Subcontract/Vendor (CG 22-94 or similar)
2. Contractual Liability Coverage Exclusion modifying or deleting the definition of an "insured contract" from the unaltered SO CG 0001 1001 policy from (CG 24 26 or similar)
3. If applicable to the Work to be performed: Residential or multi-family
4. If applicable to the Work to be performed :Exterior insulation finish systems
5. If applicable to the Work to be performed: Subsidence or Earth Movement

The Contractor shall maintain general liability coverage including Products and Completed Operations insurance, and the Additional Insured with primary and non-contributory coverage as specified in this Contract for three (3) years after completion of the project.

C. AUTOMOBILE LIABILITY INSURANCE

and business auto liability covering liability arising out of any auto (including owned, hired and non-owned autos).

Combined Bodily Injury and Property Damage Liability
(Combined Single Limit): $1,000,000 each accident

Coverages:
Specific waiver of subrogation

D. WORKERS' COMPENSATION INSURANCE

The Contractor shall procure and maintain Workers' Compensation Insurance at his or her own expense during the life of this Contract, including occupational disease provisions for all employees per statutory requirements. Policy shall contain a waiver of subrogation in favor of the State of Colorado.

The Contractor shall also require each Subcontractor to furnish Workers' Compensation Insurance, including occupational disease provisions for all of the latter's employees, and to the extent not furnished, the Contractor accepts full liability and responsibility for Subcontractor's employees.

In cases where any class of employees engaged in hazardous work under this Contract at the site of the Project is not protected under the Workers' Compensation statute, the Contractor shall provide, and shall cause each Subcontractor to provide, adequate and suitable insurance for the protection of employees not otherwise protected.

E. UMBRELLA LIABILITY INSURANCE (for construction projects exceeding $10,000,000, provide the following coverage):

The Contractor shall maintain umbrella/excess liability insurance on an occurrence basis in excess of the underlying insurance described in Section B-D above. Coverage shall follow the terms of the underlying insurance, included the additional insured and waiver of subrogation provisions. The amounts of insurance required in Sections above may be satisfied by the Contractor purchasing coverage for the limits specified or by any combination of underlying and umbrella limits, so long as the total amount of insurance is not less than the limits specified in each section previously mentioned.

Each occurrence	$5,000,000
Aggregate	$5,000,000

F. BUILDER'S RISK INSURANCE

Unless otherwise expressly stated in the Supplementary General Conditions (e.g. where the State elects to provide for projects with a completed value of less than $1,000,000), the Contractor shall purchase and maintain, in a company or companies lawfully authorized to do business in the jurisdiction in which the Project is located, property insurance written on a builder's risk "all-risk" or equivalent policy form in the amount of the initial Contract Sum, plus value of subsequent Contract Modifications and cost of materials supplied or installed by others, comprising total value for the entire Project at the site on a replacement cost basis without optional deductibles. Such property insurance shall be maintained, unless otherwise provided in the Contract Documents or otherwise agreed in writing by all persons and entities who are beneficiaries of such insurance, until final payment has been made or until no person or entity other than the Owner has an insurable interest in the property, or the Date of Notice specified on the Notice of Acceptance, State Form SBP-6.27 or whichever is later.

This insurance shall include interests of the Owner, the Contractor, Subcontractors and Sub-subcontractors in the Project as named insureds.

All associated deductibles shall be the responsibility of the Contractor. Such policy may have a deductible clause but not to exceed ten thousand dollars ($10,000.00).

Property insurance shall be on an "all risk" or equivalent policy form and shall include, without limitation, insurance against the perils of fire (with extended coverage) and physical loss or damage

including, without duplication of coverage, theft, vandalism, malicious mischief, collapse, earthquake, flood, windstorm, falsework, testing and startup, temporary buildings and debris removal including demolition occasioned by enforcement of any applicable legal requirements, and shall cover reasonable compensation for Architect's and Contractor's services and expenses required as a result of such insured loss.

Contractor shall maintain Builders Risk coverage including partial use by Owner.
The Contractor shall waive all rights of subrogation as regards the State of Colorado and the Principal Representative, its officials, its officers, its agents and its employees, all while acting within the scope and course of their employment For damages caused by fire or thoer causes of loss to the extent covered by property insurance obtained pursuant to this Section or other property insurance applicable to the Work. The Contractor shall require all Subcontractors at any tier to similarly waive all such rights of subrogation and shall expressly include such a waiver in all subcontracts.

Upon request, the amount of such insurance shall be increased to include the cost of any additional work to be done on the Project, or materials or equipment to be incorporated in the Project, under other independent contracts let or to be let. In such event, the Contractor shall be reimbursed for this cost as his or her share of the insurance in the same ratio as the ratio of the insurance represented by such independent contracts let or to be let to the total insurance carried.

The Principal Representative, with approval of the State Controller, shall have the power to adjust and settle any loss. Unless it is agreed otherwise, all monies received shall be applied first on rebuilding or repairing the destroyed or injured work.

G. POLLUTION LIABILITY INSURANCE

If Contractor is providing directly or indirectly work with pollution/environmental hazards, the Contractor must provide or cause those conducting the work to provide Pollution Liability Insurance coverage. Pollution Liability policy must include contractual liability coverage. State of Colorado must be included as additional insureds on the policy. The policy limits shall be in the amount of $1,000,000 with maximum deductible of $25,000 to be paid by the Subcontractor/Vendor.

H. ADDITIONAL MISCELLANEOUS INSURANCE PROVISIONS

Certificates of Insurance and/or insurance policies required under this Contract shall be subject to the following stipulations and additional requirements:

1. Any and all deductibles or self-insured retentions contained in any Insurance policy shall be assumed by and at the sole risk of the Contractor;
2. If any of the said policies shall fail at any time to meet the requirements of the Contract Documents as to form or substance, or if a company issuing any such policy shall be or at any time cease to be approved by the Division of Insurance of the State of Colorado, or be or cease to be in compliance with any stricter requirements of the Contract Documents, the Contractor shall promptly obtain a new policy, submit the same to the Principal Representative and State Building Programs for approval if requested, and submit a Certificate of Insurance as hereinbefore provided. Upon failure of the Contractor to furnish, deliver and maintain such insurance as provided herein, this Contract, in the sole discretion of the State of Colorado, may be immediately declared suspended, discontinued, or terminated. Failure of the Contractor in obtaining and/or maintaining any required insurance shall not relieve the Contractor from any liability under the Contract, nor shall the insurance requirements be construed to conflict with the obligations of the Contractor concerning indemnification;
3. All requisite insurance shall be obtained from financially responsible insurance companies, authorized to do business in the State of Colorado and acceptable to the Principal Representative;
4. Receipt, review or acceptance by the Principal Representative of any insurance policies or certificates of insurance required by this Contract shall not be construed as a waiver or relieve the Contractor from its obligation to meet the insurance requirements contained in these General Conditions.

ARTICLE 26. CONTRACTOR'S PERFORMANCE AND PAYMENT BONDS

The Contractor shall furnish a Performance Bond and a Labor and Material Payment Bond on State Forms SC-6.22, Performance Bond, and SC-6.221, Labor and Material Payment Bond, or such other forms as State Buildings Programs may approve for the Project, executed by a corporate Surety authorized to do business in the State of Colorado and in the full amount of the Contract sum. The expense of these bonds shall be borne by the Contractor and the bonds shall be filed with State Buildings Programs.

If, at any time, a Surety on such a bond is found to be, or ceases to be in strict compliance with any qualification requirements of the Contract Documents or the bid documents, or loses its right to do business in the State of Colorado, another Surety will be required, which the Contractor shall furnish to State Buildings Programs within ten (10) days after receipt of Notice from the State or after the Contractor otherwise becomes aware of such conditions.

ARTICLE 27. LABOR AND WAGES

In accordance with laws of Colorado, C.R.S. § 8-17-101(1), as amended, Colorado labor shall be employed to perform at least eighty percent of the work. If the Federal Davis-Bacon Act shall be applicable to the Project, as indicated in Article 6B (Design/Bid/Build Agreement), Modification of Article 27, the minimum wage rates to be paid on the Project will be specified in the Contract Documents.

ARTICLE 28. ROYALTIES AND PATENTS

The Contractor shall be responsible for assuring that all rights to use of products and systems have been properly arranged and shall take such action as may be necessary to avoid delay, at no additional charge to the Principal Representative, where such right is challenged during the course of the work. The Contractor shall pay all royalties and license fees required to be paid and shall defend all suits or claims for infringement of any patent rights and shall save the State of Colorado harmless from loss on account thereof, in accordance with Article 52C, Indemnification; provided, however, the Contractor shall not be responsible for such loss or defense for any copyright violations contained in the Contract Documents prepared by the Architect/Engineer or the Principal Representative of which the Contractor is unaware, or for any patent violations based on specified processes that the Contractor is unaware are patented or that the Contractor should not have had reason to believe were patented.

ARTICLE 29. ASSIGNMENT

Except as otherwise provided hereafter the Contractor shall not assign the whole or any part of this Contract without the written consent of the Principal Representative. This provision shall not be construed to prohibit assignments of the right to payment to the extent permitted by C.R.S. § 4-9-406, et. seq., as amended, provided that written Notice of assignment adequate to identify the rights assigned is received by the Principal Representative and the controller for the agency, department, or institution executing this Contract (as distinguished from the State Controller). Such assignment of the right to payment shall not be deemed valid until receipt by the Principal Representative and such controller and the Contractor assumes the risk that such written Notice of assignment is received by the Principal Representative and the controller for the agency, department, or institution involved. In case the Contractor assigns all or part of any moneys due or to become due under this Contract, the instrument of assignment shall contain a clause substantially to the effect that it is agreed that the right of the assignee in and to any moneys due or to become due to the Contractor shall be subject to all claims of all persons, firms, and corporations for services rendered or materials supplied for the performance of the work called for in this Contract, whether said service or materials were supplied prior to or after the assignment. Nothing in this Article shall be deemed a waiver of any other defenses available to the State against the Contractor or the assignee.

ARTICLE 30. CORRECTION OF WORK BEFORE ACCEPTANCE

The Contractor shall promptly remove from the premises all work or materials condemned or declared irreparably defective as failing to conform to the Contract Documents on receipt of written Notice from the Architect/Engineer or the Principal Representative, whether incorporated in the Work or not. If such materials shall have been incorporated in the Work, or if any unsatisfactory work is discovered, the Contractor shall promptly replace and re-execute his or her work in accordance with the requirements of the Contract Documents without expense to the Principal Representative, and shall also bear the expense of making good all work of other contractors destroyed or damaged by the removal or replacement of such defective material or work.

If the Contractor does not remove such condemned or irreparably defective work or material within a reasonable time, the Principal Representative may, after giving a second seven (7) day advance Notice to the Contractor and the Surety, remove them and may store the material at the Contractor's expense. The Principal Representative may accomplish the removal and replacement with its own forces or with another Contractor. If the Contractor does not pay the expense of such removal and pay all storage charges within ten (10) days thereafter, the Principal Representative may, upon ten (10) days' written Notice, sell such material at auction or at private sale and account for the net proceeds thereof, after deducting all costs and expenses which should have been borne by the Contractor. If the Contractor shall commence and diligently pursue such removal and replacement before the expiration of the seven day period, or if the Contractor shall show good cause in conjunction with submittal of a revised CPM schedule showing when the work will be performed and why such removal of condemned work should be scheduled for a later date, the Principal Representative shall not proceed to remove or replace the condemned work.

Should any defective work or material be discovered during the process of construction, or should reasonable doubt arise as to whether certain material or work is in accordance with the Contract Documents, the value of such defective or questionable material or work shall not be included in any application for payment, or if previously included, shall be deducted by the Architect/Engineer from the next application submitted by the Contractor.

If the Contractor does not perform repair, correction and replacement of defective work, in lieu of proceeding by issuance of a Notice of intent to remove condemned work as outlined above, the Principal Representative may, not less than seven (7) days after giving the original written Notice of the need to repair, correct, or replace defective work, deduct all costs and expenses of replacement or correction as instructed by the Architect/Engineer from the Contractor's next application for payment in addition to the value of the defective work or material. The Principal Representative may also make an equitable deduction from the Contract sum by unilateral Change Order, in accordance with Article 33, Payments Withheld and Article 35, Changes In The Work.

If the Contractor disagrees with the Notice to remove work or materials condemned or declared irreparably defective, the Contractor may request facilitated negotiation of the issue and the Principal Representative's right to proceed with removal and to deduct costs and expenses of repair shall be suspended and tolled until such time as the parties meet and negotiate the issue

During construction, whenever the Architect/Engineer has advised the Contractor in writing, in the Specifications, by reference to Article 6, Architect/Engineer Decisions And Judgments, of these General Conditions or elsewhere in the Contract Documents of a need to observe materials in place prior to their being permanently covered up, it shall be the Contractor's responsibility to notify the Architect/Engineer at least forty-eight (48) hours in advance of such covering operation. If the Contractor fails to provide such notification, Contractor shall, at his or her expense, uncover such portions of the work as required by the Architect/Engineer for observation, and reinstall such covering after observation. When a covering operation is continued from day to day, notification of the commencement of a single continuing covering operation shall suffice for the activity specified so long as it proceeds regularly and without interruption from day to day, in which event the Contractor shall coordinate with the Architect/Engineer regarding the continuing covering operation.

ARTICLE 31. APPLICATIONS FOR PAYMENTS

A. CONTRACTOR'S SUBMITTALS

On or before the first day of each month and no more than five days prior thereto, the Contractor may submit applications for payment for the work performed during such month covering the portion of the Work completed as of the date indicated, and payments on account of this Contract shall be due within thirty (30) days after the last day of the period for which payment is requested. The Contractor shall submit the application for payment to the Architect/Engineer on State forms SBP-7.2, Certificate for Contractor's Payment, or such other format as the State Buildings Programs shall approve, in an itemized format in accordance with the schedule of values or a cost loaded CPM when required, supported to the extent reasonably required by the Architect/Engineer or the Principal Representative by receipts or other vouchers, showing payments for materials and labor, prior payments and payments to be made to Subcontractors and such other evidence of the Contractor's right to payments as the Architect/Engineer or Principal Representative may direct.

If payments are made on account of materials not incorporated in the Work but delivered and suitably stored at the site, or at some other location agreed upon in writing, such payments shall be conditioned upon submission by the Contractor of bills of sale or such other procedure as will establish the Principal Representative's title to such material or otherwise adequately protect the Principal Representative's interests, and shall provide proof of insurance whenever requested by the Principal Representative or the Architect/Engineer, and shall be subject to the right to inspect the materials at the request of either the Architect/Engineer or the Principal Representative.

All applications for payment, except the final application, and the payments there under, shall be subject to correction in the next application rendered following the discovery of any error.

B. ARCHITECT/ENGINEER CERTIFICATION

In accordance with the Architect/Engineer's agreement with the Principal Representative, the Architect/Engineer after appropriate observation of the progress of the work shall certify to the Principal Representative the amount that the Contractor is entitled to, and forward the application to the Principal Representative. If the Architect/Engineer certifies an amount different from the amount requested or otherwise alters the Contractor's application for payment, a copy shall be forwarded to the Contractor.

If the Architect/Engineer is unable to certify all or portions of the amount requested due to the absence or lack of required supporting evidence, the Architect/Engineer shall advise the Contractor of the deficiency. If the deficiency is not corrected at the end of ten (10) days, the Architect/Engineer may either certify the remaining amounts properly supported to which the Contractor is entitled, or return the application for payment to the Contractor for revision with a written explanation as to why it could not be certified.

C. RETAINAGE WITHHELD

Unless otherwise provided in the Supplementary General Conditions, an amount equivalent to five percent (5%) of the amount shown to be due the Contractor on each application for payment shall be withheld until the work required by the Contract has been performed. The withheld percentage of the contract price of any such work, improvement, or construction shall be administered according to § 24-91-101, et seq., C.R.S., as amended, and except as provided in § 24-91-103, C.R.S., as amended, and Article 31D, shall be retained until the Work or discrete portions of the Work, have been completed satisfactorily, finally or partially accepted, and advertised for final settlement as further provided in Article 41.

D. RELEASE OF RETAINAGE

The Contractor may, for satisfactory and substantial reasons shown to the Principal Representative's satisfaction, make a written request to the Principal Representative and the Architect/Engineer for release of part or all of the withheld percentage applicable to the work of a Subcontractor which has completed the subcontracted work in a manner finally acceptable to the Architect/Engineer, the Contractor, and the Principal Representative. Any such request shall be supported by a written

approval from the Surety furnishing the Contractor's bonds and any surety that has provided a bond for the Subcontractor. The release of any such withheld percentage shall be further supported by such other evidence as the Architect/Engineer or the Principal Representative may require, including but not limited to, evidence of prior payments made to the Subcontractor, copies of the Subcontractor's contract with the Contractor, any applicable warranties, as-built information, maintenance manuals and other customary close-out documentation. Neither the Principal Representative nor the Architect Engineer shall be obligated to review such documentation nor shall they be deemed to assume any obligations to third parties by any review undertaken.

The Contractor's obligation under these General Conditions to guarantee work for one year from the date of the Notice of Substantial Completion or the date of any Notice of Partial Substantial Completion of the applicable portion or phase of the Project, shall be unaffected by such partial release; unless a Notice of Partial Substantial Completion is issued for the work subject to the release of retainage.

Any rights of the Principal Representative which might be terminated by or from the date of any final acceptance of the Work, whether at common law or by the terms of this Contract, shall not be affected by such partial release of retainage prior to any final acceptance of the entire Project.

The Contractor remains fully responsible for the Subcontractor's work and assumes any risk that might arise by virtue of the partial release to the Subcontractor of the withheld percentage, including the risk that the Subcontractor may not have fully paid for all materials, labor and equipment furnished to the Project.

If the Principal Representative considers the Contractor's request for such release satisfactory and supported by substantial reasons, the Architect/Engineer shall make a "final inspection" of the applicable portion of the Project to determine whether the Subcontractor 's work has been completed in accordance with the Contract Documents. A final punch list shall be made for the Subcontractor's work and the procedures of Article 41, Completion, Final Inspection, Acceptance and Settlement, shall be followed for that portion of the work, except that advertisement of the intent to make final payment to the Subcontractor shall be required only if the Principal Representative has reason to believe that a supplier or Subcontractor to the Subcontractor for which the request is made, may not have been fully paid for all labor and materials furnished to the Project.

ARTICLE 32. CERTIFICATES FOR PAYMENTS

State Form SBP-7.2, Certificate For Contractor's Payment, and its continuation detail sheets, when submitted, shall constitute the Certificate of Contractor 's Application for Payment, and shall be a representation by the Contractor to the Principal Representative that the Work has progressed to the point indicated, the quality of the Work is in accordance with the Contract Documents, and materials for which payment is requested have been incorporated into the Project except as noted in the application. If requested by the Principal Representative the Certificate of Contractor's Application for Payment shall be sworn under oath and notarized.

ARTICLE 33. PAYMENTS WITHHELD

The Architect/Engineer, the Principal Representative or State Buildings Programs may withhold, or on account of subsequently discovered evidence nullify, the whole or any part of any application on account of, but not limited to any of the following:

1. Defective work not remedied;
2. Claims filed or reasonable evidence indicating probable filing of claims;
3. Failure of the Contractor to make payments to Subcontractors for material or labor;
4. A reasonable doubt that the Contract can be completed for the balance of the contract price then unpaid;
5. Damage or injury to another contractor or any other person, persons or property except to the extent of coverage by a policy of insurance;

6. Failure to obtain necessary permits or licenses or to comply with applicable laws, ordinances, codes, rules or regulations or the directions of the Architect/Engineer;
7. Failure to submit a monthly construction schedule;
8. Failure of the Contractor to keep work progressing in accordance with the time schedule;
9. Failure to keep a superintendent on the work;
10. Failure to maintain as built drawings of the work in progress;
11. Unauthorized deviations by the Contractor from the Contract Documents; or
12. On account of liquidated damages.

In addition, the Architect Engineer, Principal Representative or State Buildings Programs may withhold or nullify the whole or any part of any application for any reason noted elsewhere in these General Conditions of the Contractor's Design/Bid/Build Agreement. Nullification shall mean reduction of amounts shown as previously paid on the application. The amount withheld or nullified may be in such amount as the Architect/Engineer or the Principal Representative estimates to be required to allow the State to accomplish the Work, cure the failure and cover any damages or injuries, including an allowance for attorneys fees and costs where appropriate. When the grounds for such withholding or nullifying are removed, payment shall be made for the amounts thus withheld or nullified on such grounds.

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ARTICLE 34. DEDUCTIONS FOR UNCORRECTED WORK

If the Architect/Engineer and the Principal Representative deem it inexpedient to correct work injured or not performed in accordance with the Contract Documents, the Principal Representative may, after consultation with the Architect/Engineer and ten (10) days' Notice to the Contractor of intent to do so, make reasonable reductions from the amounts otherwise due the Contractor on the next application for payment. Notice shall specify the amount or terms of any contemplated reduction. The Contractor may during this period elect to correct or perform the work. If the Contractor does not elect to correct or perform the work, an equitable deduction from the Contract sum shall be made by Change Order, in accordance with Article 35, Changes In The Work, unilaterally if necessary. If either party elects facilitation of this issue after Notice is given, the ten-day notice period shall be extended and tolled until facilitation has occurred.

ARTICLE 35. CHANGES IN THE WORK

The Principal Representative, or such other Procurement Officer as the Principal Representative may designate, without invalidating the Agreement, and with the approval of State Buildings Programs and the State Controller, may order extra work or make changes with or without the consent of the Contractor as hereafter provided, by altering, adding to or deducting from the Work, the Contract sum being adjusted accordingly. All such changes in the Work shall be within the general scope of and be executed under the conditions of the Contract, except that any claim for extension of time made necessary due to the change or any claim of other delay or other impacts caused by or resulting from the change in the Work shall be presented by the Contractor and adjusted by Change Order to the extent known at the time such change is ordered and before proceeding with the extra or changed work. Any claims for extension of time or of delay or other impacts, and any costs associated with extension of time, delay or other impacts, which are not presented before proceeding with the change in the Work, and which are not adjusted by Change Order to the extent known, shall be waived.

The Architect/Engineer shall have authority to make minor changes in the Work, not involving extra cost, and not inconsistent with the intent of the Contract Documents, but otherwise, except in an emergency endangering life or property, no extra work or change in the Contract Documents shall be made unless by 1) a written Change Order, approved by the Principal Representative, State Buildings Programs, and the State Controller prior to proceeding with the changed work; or 2) by an Emergency Field Change Order approved by the Principal Representative and State Buildings Programs as hereafter provided in Article 35C, Emergency Field Ordered Changed Work; or 3) by an allocation in writing of any allowance already provided in the encumbered contract amount, the Contract sum being later adjusted to decrease the Contract sum by any unallocated or unexpended amounts remaining in such allowance. No change to the Contract sum shall be valid unless so ordered.

A. THE VALUE OF CHANGED WORK

1. *The value of any extra work or changes in the Work shall be determined by agreement in one or more of the following ways:*
   a. *By estimate and acceptance of a lump-sum amount;*
   b. *By unit prices specified in the Agreement, or subsequently agreed upon, that are extended by specific quantities;*
   c. *By actual cost plus a fixed fee in a lump sum amount for profit, overhead and all indirect and off-site home office costs, the latter amount agreed upon in writing prior to starting the extra or changed work.*
2. *Where the Contractor and the Principal Representative cannot agree on the value of extra work, the Principal Representative may order the Contractor to perform the changes in the Work and a Change Order may be unilaterally issued based on an estimate of the change in the Work prepared by the Architect/Engineer. The value of the change in the Work shall be the Principal Representative's determination of the amount of equitable adjustment attributable to the extra work or change. The Principal Representative's determination shall be subject to appeal by the Contractor pursuant to the claims process in Article 36, Claims. The Principal Representative is the Procurement Officer for purposes of all of the remedies provisions of the Contract.*
3. *Except as otherwise provided in Article 35B, Detailed Breakdown, below, the Cost Principles of the Colorado Procurement Rules in effect on the date of this Contract, pursuant to § 24-107-101, C.R.S., as amended, shall govern all Contract changes.*

B. DETAILED BREAKDOWN

In all cases where the value of the extra or changed work is not known based on unit prices in the Contractor 's bid or the Agreement, a detailed change proposal shall be submitted by the Contractor on a Change Order Proposal (SC-6.312), or in such other format as the State Buildings Program approves, with which the Principal Representative may require an itemized list of materials, equipment and labor, indicating quantities, time and cost for completion of the changed work.

Such detailed change proposals shall be stated in lump sum amounts and shall be supported by a separate breakdown, which shall include estimates of all or part of the following when requested by the Architect/Engineer or the Principal Representative:

1. *Materials, indicating quantities and unit prices including taxes and delivery costs if any (separated where appropriate into general, mechanical and electrical and/or other Subcontractors' work; and the Principal Representative may require in its discretion any significant subcontract costs to be similarly and separately broken down).*
2. *Labor costs, indicating hourly rates and time and labor burden to include Social Security and other payroll taxes such as unemployment, benefits and other customary burdens.*
3. *Costs of project management time and superintendence time of personnel stationed at the site, and other field supervision time, but only where a time extension, other than a weather delay, is approved as part of the Change Order, and only where such project management time and superintendence time is directly attributable to and required by the change; provided however that additional cost of on-site superintendence shall be allowable whenever in the opinion of the Architect/Engineer the impact of multiple change requests to be concurrently performed will result in inadequate levels of supervision to assure a proper result unless additional superintendence is provided.*
4. *Construction equipment (including small tools). Expenses for equipment and fuel shall be based on customary commercially reasonable rental rates and schedules. Equipment and hand tool costs shall not include the cost of items customarily owned by workers.*
5. *Workers' compensation costs, if not included in labor burden.*
6. *The cost of commercial general liability and property damage insurance premiums but only to the extent charged the Contractor as a result of the changed work.*

7. Overhead and profit, as hereafter specified.
8. Builder's risk insurance premium costs.
9. Bond premium costs.
10. Testing costs not otherwise excluded by these General Conditions.
11. Subcontract costs.

Unless modified in the Supplementary General Conditions, overhead and profit shall not exceed the percentages set forth in the table below.

	OVERHEAD	*PROFIT*	*COMMISSION*
To the Contractor or to Subcontractors for the portion of work performed with their own forces:	*10%*	*5%*	
To the Contractor or to Subcontractors for work performed by others at a tier immediately below either of them:	*5%*		*5%*

Overhead shall include: a) insurance premium for policies not purchased for the Project and itemized above, b) home office costs for office management, administrative and supervisory personnel and assistants, c) estimating and change order preparation costs, d) incidental job burdens, e) legal costs, f) data processing costs, g) interest costs on capital, h) general office expenses except those attributable to increased rental expenses for temporary facilities, and all other indirect costs, but shall not include the Social Security tax and other direct labor burdens. The term "work" as used in the proceeding table shall include labor, materials and equipment and the "Commission" shall include all costs and profit for carrying the subcontracted work at the tiers below except direct costs as listed in items 1 through 11 above if any.

On proposals for work involving both additions and credits in the amount of the Contract sum, the overhead and profit will be allowed on the net increase only. On proposals resulting in a net deduct to the amount of the Contract sum, profit on the deducted amount shall be returned to the Principal Representative at fifty percent (50%) of the rate specified. The inadequacy of the profit specified shall not be a basis for refusal to submit a proposal.

Except in the case of Change Orders or Emergency Field Change Orders agreed to on the basis of a lump sum amount or unit prices as described in paragraphs 35A1 and 35A2 above, The Value of Changed Work, the Contractor shall keep and present a correct and fully auditable account of the several items of cost, together with vouchers, receipts, time cards and other proof of costs incurred, summarized on a Change Order form (SC-6.31) using such format for supporting documentation as the Principal Representative and State Buildings Programs approve. This requirement applies equally to work done by Subcontractors. Only auditable costs shall be reimbursable on Change Orders where the value is determined on the basis of actual cost plus a fixed fee pursuant to paragraph 35A3 above, or where unilaterally determined by the Principal Representative on the basis of an equitable adjustment in accordance with the Procurement Rules, as described above in Article 35A, The Value Of Changed Work.

Except for proposals for work involving both additions and credits, changed work shall be adjusted and considered separately for work either added or omitted. The amount of adjustment for work omitted shall be estimated at the time it is directed to be omitted, and when reasonable to do so, the agreed adjustment shall be reflected on the schedule of values used for the next Contractor 's application for payment.

The Principal Representative reserves the right to contract with any person or firm other than the Contractor for any or all extra work; however, unless specifically required in the Contract Documents, the Contractor shall have no responsibility without additional compensation to supervise or coordinate the work of persons or firms separately contracted by the Principal Representative.

C. HAZARDOUS MATERIALS

1. The Principal Representative represents that it has undertaken an examination of the site of the Work and has determined that there are no hazardous substances, as defined below, which the Contractor could reasonably encounter in its performance of the Work. In the event the Principal Representative so discovers hazardous substances, the Principal Representative shall render harmless such hazards before the Contractor commences the work.

2. In the event the Contractor encounters any materials reasonably believed to be hazardous substances which have not been rendered harmless, the Contractor shall immediately stop work in the area affected and report the condition to the Principal Representative, in writing. For purposes of this Agreement, "hazardous substances" shall include asbestos, lead, polychlorinated biphenyl (PCB) and any or all of those substances defined as "hazardous substance", "hazardous waste", or "dangerous or extremely hazardous wastes" as those terms are used in the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) and the Resource Conservation and Recovery Act (RCRA), and shall also include materials regulated by the Toxic Substances Control Act (TSCA), the Clean Air Act, the Air Quality Act, the Clean Water Act, and the Occupational Safety and Health Act. The Work in the affected area shall not therefore be resumed except by written agreement of the Principal Representative and the Contractor, if in fact materials that are hazardous substances have not been rendered harmless. The Work in the affected area shall be resumed only in the absence of the hazardous substances or when it has been rendered harmless or by written agreement of the Principal Representative and the Contractor.

3. **The contractor shall not be required to perform work without consent in any areas where it reasonably believes hazardous substances that have not been rendered harmless are present.**

D. EMERGENCY FIELD CHANGE ORDERED WORK

The Principal Representative, without invalidating the Agreement, and with the approval of State Buildings Programs and without the approval of the State Controller, may order extra work or make changes in the case of an emergency that is a threat to life or property or where the likelihood of delays in processing a normal Change Order will result in substantial delays and or significant cost increases for the Project. Emergency Field Orders are not to be used solely to expedite normal Change Order processing absent a clear showing of a high potential for significant and substantial cost or delay. Such changes in the Work may be directed through issuance of an Emergency Field Change Order signed by the Contractor, the Principal Representative (or by a designee specifically appointed to do so in writing), and approved by the Director of State Buildings Program or his or her delegate. The change shall be directed using an Emergency Field Change Order form (SC-6.31E).

If the amount of the adjustment of the Contract price and time for completion can be determined at the time of issuance of the Emergency Field Change Order, those adjustments shall be reflected on the face of the Emergency Field Change Order. Otherwise, the Emergency Field Change Order shall reflect a not to exceed (NTE) amount for any schedule adjustment (increasing or decreasing the time for completion) and an NTE amount for any adjustment to Contract sum, which NTE amount shall represent the maximum amount of adjustment to which the Contractor will be entitled, including direct and indirect costs of changed work, as well as any direct or indirect costs attributable to delays, inefficiencies or other impacts arising out of the change. Emergency Field Change Orders directed in accordance with this provision need not bear the approval signatures of the State Controller.

On Emergency Field Change Orders where the price and schedule have not been finally determined, the Contractor shall submit final costs for adjustment as soon as practicable. No later than seven (7) days after issuance, except as otherwise permitted, and every seven days thereafter, the Contractor shall report all costs to the Principal Representative and the Architect/Engineer. The final adjustment of the Emergency Field Change Order amount and the adjustment to the Project time for completion shall be prepared on a normal Change Order from (SC-6.31) in accordance with the procedures

described in Article 35A, The Value of Changed Work, and B, Detailed Breakdown, above. Unless otherwise provided in writing signed by the Director of State Buildings Programs to the Principal Representative and the Contractor, describing the extent and limits of any greater authority, individual Emergency Field Change Orders shall not be issued for more than $25,000, nor shall the cumulative value of Emergency Field Change Orders exceed an amount of $100,000.

E. APPROPRIATION LIMITATIONS - § 24-91-103.6, C.R.S., as amended

The amount of money appropriated, as shown on the Agreement (SC 6.21), is equal to or in excess of the Contract amount. No Change Order, Emergency Field Change Order, or other type of order or directive shall be issued by the Principal Representative, or any agent acting on his or her behalf, which directs additional compensable work to be performed, which work causes the aggregate amount payable under the Contract to exceed the amount appropriated for the original Contract, as shown on the Agreement (SC-6.21), unless one of the following occurs: (1) the Contractor is provided written assurance from the Principal Representative that sufficient additional lawful appropriations exist to cover the cost of the additional work; or (2) the work is covered by a contractor remedy provision under the Contract, such as a claim for extra cost. By way of example only, no assurance is required for any order, directive or instruction by the Architect/Engineer or the Principal Representative to perform work which is determined to be within the performance required by the Contract Documents; the Contractor's remedy shall be as described elsewhere in these General Conditions.

Written assurance shall be in the form of an Amendment to the Contract reciting the source and amount of such appropriation available for the Project. No remedy granting provision of this Contract shall obligate the Principal Representative to seek appropriations to cover costs in excess of the amounts recited as available to pay for the work to be performed.

ARTICLE 36. CLAIMS

It is the intent of these General Conditions to provide procedures for speedy and timely resolution of disagreements and disputes at the lowest level possible. In the spirit of on the job resolution of job site issues, the parties are encouraged to use the partnering processes of Article 2D, Partnering, Communications and Cooperation, before turning to the more formal claims processes described in this Article 36, Claims. The use of non-binding dispute resolution, whether through the formal processes described in Article 39, Non-Binding Dispute Resolution – Facilitated Negotiations, or through less formal alternative processes developed as part of a partnering plan, are also encouraged. Where such process cannot resolve the issues in dispute, the claims process that follows is intended to cause the issues to be presented, decided and where necessary, documented in close proximity to the events from which the issues arise. To that end, and in summary of the remedy granting process that follows commencing with the next paragraph of this Article 36, Claims, the Contractor shall 1) first, seek a decision by the Architect/Engineer, and 2) shall second, informally present the claim to Principal Representative as described hereafter, and 3) failing resolution in the field, give Notice of intent to exercise statutory rights of review of a formal contract controversy, and 4) seek resolution outside the Contract as provided by the Procurement Code.

If the Contractor claims that any instructions, by detailed drawings, or otherwise, or any other act or omission of the Architect/Engineer or Principal Representative affecting the scope of the Contractor's work, involve extra cost, extra time or changes in the scope of the Work under this Contract, the Contractor shall have the right to assert a claim for such costs or time, provided that before either proceeding to execute such work (except in an emergency endangering life or property), or filing a Notice of claim, the Contractor shall have obtained or requested a written decision of the Architect/Engineer following the procedures as provided in Article 6A and B, Architect/Engineer Decisions and Judgments, respectively; provided, however, that in the case of a directed change in the Work pursuant to Article 36A4, no written judgment or decision of the Architect/Engineer is required. If the Contractor is delayed by the lack of a response to a request for a decision by the Architect/Engineer, the Contractor shall give Notice in accordance with Article 38, Delays And Extensions Of Time.

Unless it is the Architect/Engineer's judgment and determination that the work is not included in the performance required by the Contract Documents, the Contractor shall proceed with the work as originally

directed. Where the Contractor's claim involves a dispute concerning the value of work unilaterally directed pursuant to Article 35A3 the Contractor shall also proceed with the work as originally directed while his or her claim is being considered.

The Contractor shall give the Principal Representative and the Architect/Engineer Notice of any claim promptly after the receipt of the Architect/Engineer's decision, but in no case later than three (3) business days after receipt of the Architect/Engineer's decision (or no later than ten (10) days from the date of the Contractor's request for a decision when the Architect/Engineer fails to decide as provided in Article 6). The Notice of claim shall state the grounds for the claim and the amount of the claim to the extent known in accordance with the procedures of Article 35, Changes In The Work. The period in which Notice must be given may be extended by the Principal Representative if requested in writing by the Contractor with good cause shown, but any such extension to be effective shall be in writing.

The Principal Representative shall respond in writing, with a copy to the Architect/Engineer, within a reasonable time, and except where a request for facilitation of negotiation has been made as hereafter provided, in no case later than seven (7) business days (or at such other time as the Contractor and Principal Representative agree) after receipt of the Contractor's Notice of claim regarding such instructions or alleged act or omission. If no response to the Contractor's claim is received within seven (7) business days of Contractor's Notice (or at such other time as the Contractor and Principal Representative agree) and the instructions have not been retracted, it shall be deemed that the Principal Representative has denied the claim.

The Principal Representative may grant or deny the claim in whole or in part, and a Change Order shall be issued if the claim is granted. To the extent any portion of claim is granted where costs are not clearly shown, the Principal Representative may direct that the value of that portion of the work be determined by any method allowed in Article 35A, The Value of Changed Work. Except in the case of a deemed denial, the Principal Representative shall provide a written explanation regarding any portion of the Contractor's claim that is denied.

If the Contractor disagrees with the Principal Representative's judgment and determination on the claim and seeks an equitable adjustment of the Contract sum or time for performance, he or she shall give Notice of intent to exercise his or her statutory right to seek a decision on the contract controversy within ten (10) days of receipt of the Principal Representative's decision denying the claim. A "contract controversy," as such term is used in the Colorado Procurement Code, § 24-109-106, C.R.S., shall not arise until the initial claim process described above in this Article 36 has been properly exhausted by the Contractor. The Contractor's failure to proceed with work directed by the Architect/Engineer or to exhaust the claim process provided above in this Article 36, shall constitute an abandonment of the claim by the Contractor and a waiver of the right to contest the decision in any forum.

At the time of filing the Notice of intent to exercise his or her statutory right to seek a decision on the contract controversy, the Contractor may request that the Principal Representative defer a decision on the contract controversy until a later date or until the end of the Project. If the Principal Representative agrees, he or she shall so advise the Contractor in writing. If no such request is made, or if the Principal Representative does not agree to such a request, the Principal Representative shall render a written decision within twenty (20) business days and advise the Contractor of the reasons for any denial. Unless the claim has been decided by the Principal Representative (as opposed to delegates of the Principal Representative), the person who renders the decision on this statutory contract controversy shall not be the same person who decided the claim. To the extent any portion of the contract controversy is granted where costs are not clearly shown, the Principal Representative may direct that the value of that portion of the work be determined by any method allowed in Article 35A, The Value of Changed Work. In the event of a denial the Principal Representative shall give Notice to the Contractor of his or her right to administrative and judicial reviews as provided in the Colorado Procurement Code, § 24-109-201 *et seq*, C.R.S., as amended. If no decision regarding the contract controversy is issued within twenty (20) business days of the Contractor's giving Notice (or such other date as the Contractor and Principal Representative have agreed), and the instructions have not been retracted or the alleged act or omission have not been corrected, it shall be deemed that the Principal Representative has ruled by denial on the contract controversy. Except in the case of a deemed

denial, the Principal Representative shall provide an explanation regarding any portion of the contract controversy that involves denial of the Contractor's claim.

Either the Contractor or the Principal Representative may request facilitation of negotiations concerning the claim or the contract controversy, and if requested, the parties shall consult and negotiate before the Principal Representative decides the issue. Any request for facilitation by the Contractor shall be made at the time of the giving of Notice of the claim or Notice of the contract controversy. Facilitation shall extend the time for the Principal Representative to respond by commencing the applicable period at the completion of the facilitated negotiation, which shall be the last day of the parties' meeting, unless otherwise agreed in writing.

Disagreement with the decision of the Architect Engineer, or the decision of the Principal Representative to deny any claim or denying the contract controversy, shall not be grounds for the Contractor to refuse to perform the work directed or to suspend or terminate performance. During the period that any claim or contract controversy decision is pending under this Article 36, Claims, the Contractor shall proceed diligently with the work directed.

In all cases where the Contractor proceeds with the work and seeks equitable adjustment by filing a claim and or statutory appeal, the Contractor shall keep a correct account of the extra cost, in accordance with Article 35B, Detailed Breakdown supported by receipts. The Principal Representative shall be entitled to reject any claim or contract controversy whenever the foregoing procedures are not followed and such accounts and receipts are not presented.

The payments to the Contractor in respect of such extra costs shall be limited to reimbursement for the current additional expenditure by the Contractor made necessary by the change in the work, plus a reasonable amount for overhead and profit, determined in accordance with Article 35B, Detailed Breakdown, determined solely with reference to the additional work, if any, required by the change.

ARTICLE 37. DIFFERING SITE CONDITIONS

A. NOTICE IN WRITING

The Contractor shall promptly, and where possible before conditions are disturbed, give the Architect/Engineer and the Principal Representative Notice in writing of:

1. *subsurface or latent physical conditions at the site differing materially from those indicated in or reasonably assumed from the information provided in the Contract Documents; and,*
2. *unknown physical conditions at the site, of an unusual nature, differing materially from those ordinarily encountered and generally recognized as inherent in work of the character provided for in the Contract Documents.*

The Architect/Engineer shall promptly investigate the conditions, and if it is found that such conditions do materially so differ and cause an increase or decrease in the Contractor 's costs of performance of any part of the work required by the Contract Documents, whether or not such work is changed as a result of such conditions, an equitable adjustment shall be made and the Contract sum shall be modified in accordance with Article 35, Changes In The Work.

If the time required for completion of the work affected by such materially differing conditions will extend the work on the critical path as indicated on the CPM schedule, the time for completion shall also be equitably adjusted.

B. LIMITATIONS

No claim of the Contractor under this clause shall be allowed unless the Contractor has given the Notice required in Article 37A, Notice In Writing, above. The time prescribed for presentation and adjustment in Articles 36, Claims and 38, Delays And Extensions Of Time, shall be reasonably extended by the State to the extent required by the nature of the differing conditions; provided, however, that even when so extended no claim by the Contractor for an equitable adjustment hereunder shall be allowed if not quantified and

presented prior to the date the Contractor requests a final inspection pursuant to Article 41A, Notice Of Completion.

ARTICLE 38. DELAYS AND EXTENSIONS OF TIME

If the Contractor is delayed at any time in the progress of the Work by any act or neglect of the State of Colorado or the Architect/Engineer, or of any employee or agent of either, or by any separately employed Contractor or by strikes, lockouts, fire, unusual delay in transportation, unavoidable casualties or any other causes beyond the Contractor's control, including weather delays as defined below, the time of Completion of the Work shall be extended for a period equal to such portion of the period of delays directly affecting the completion of the Work as the Contractor shall be able to show he or she could not have avoided by the exercise of due diligence.

The Contractor shall provide Notice in writing to the Architect/Engineer, the Principal Representative and State Buildings Programs within three (3) business days from the beginning of such delay and shall file a written claim for an extension of time within seven (7) business days after the period of such delay has ceased, otherwise, any claim for an extension of time is waived.

Provided that the Contractor has submitted reasonable schedules for approval when required by Article 12, Requests for Information and Schedules, if no schedule is agreed to fixing the dates on which the responses to requests for information or detail drawings will be needed, or Shop Drawings, Product Data or Samples are to be reviewed as required or allowed by Article 12B, Schedules, no extension of time will be allowed for the Architect/ Engineer's failure to furnish such detail drawings as needed, or for the failure to initially review Shop Drawings, Product Data or Samples, except in respect of that part of any delay in furnishing detail drawings or instructions extending beyond a reasonable period after written demand for such detailed drawings or instructions is received by the Architect/Engineer. In any event, any claim for an extension of time for such cause will be recognized only to the extent of delay directly caused by failure to furnish detail drawings or instructions or to review Shop Drawings, Product Data or Samples pursuant to schedule, after such demand.

All claims for extension of time due to a delay claimed to arise or result from ordered changes in the scope of the Work, or due to instructions claimed to increase the scope of the Work, shall be presented to the Architect/Engineer, the Principal Representative and State Buildings Programs as part of a claim for extra cost, if any, in accordance with Article 36, Claims, and in accordance with the Change Order procedures required by Article 35, Changes In The Work.

Except as otherwise provided in this paragraph, no extension of time shall be granted when the Contractor has failed to utilize a CPM schedule or otherwise identify the Project's critical path as specified in Article 12, Requests for Information and Schedules, or has elected not to do so when allowed by the Supplementary General Conditions or the Specifications to use less sophisticated scheduling tools, or has failed to maintain such a schedule. Delay directly affecting the completion of the Work shall result in an extension of time only to the extent that completion of the Work was affected by impacts to the critical path shown on Contractor's CPM schedule. Where the circumstances make it indisputable in the opinion of the Architect/Engineer that the delay affected the completion of the Work so directly that the additional notice of the schedule impact by reference to a CPM schedule was unnecessary, a reasonable extension of time may be granted.

Extension of the time for completion of the Work will be granted for delays due to weather conditions only when the Contractor demonstrates that such conditions were more severe and extended than those reflected by the ten-year average for the month, as evidenced by the Climatological Data, U. S. Department of Commerce, for the Project area.

Extensions of the time for completion of the Work due to weather will be granted on the basis of one and three tenths (1.3) calendar days for every day that the Contractor would have worked but was unable to work, with each separate extension figured to the nearest whole calendar day.

For weather delays and delays caused by events, acts or omissions not within the control of the Principal Representative or any person acting on the Principal Representative's behalf, the Contractor shall be

entitled to an extension of time only and shall not be entitled to recovery of additional cost due to or resulting from such delays. This Article does not, however, preclude the recovery of damages for delay by either party under other provisions in the Contract Documents.

ARTICLE 39. NON-BINDING DISPUTE RESOLUTION – FACILITATED NEGOTIATIONS

The Contractor and Principal Representative agree to designate one or more mutually acceptable persons willing and able to facilitate negotiations and communications for the resolution of conflicts, disagreements or disputes between them at the specific request of either party with regard to any Project decision of either of them or any decision of the Architect/Engineer. The designation of such person(s) shall not carry any obligation to use their services except that each party agrees that if the other party requests the intervention of such person(s) with respect to any such conflict, dispute or disagreement, the non-requesting party shall participate in good faith attempts to negotiate a resolution of the issue in dispute. If the parties cannot agree on a mutually acceptable person to serve in this capacity one shall be so appointed; provided, however, that either party may request the director of State Buildings Programs to appoint such a person, who, if appointed, shall be accepted for this purpose by both the Contractor and the Principal Representative.

The cost, if any, of the facilitative services of the person(s) so designated shall be shared if the parties so agree in any partnering plan; or in the absence of agreement the cost shall be borne by the party requesting the facilitation of negotiation.

Any dispute, claim, question or disagreement arising from or relating to the Contract or an alleged breach of the Contract may be subject to a request by either party for facilitated negotiation subject to the limitations hereafter listed, and the parties shall participate by consultation and negotiation with each other, as guided by the facilitator and with recognition of their mutual interests, in an attempt to reach an equitable solution satisfactory to both parties.

The obligation to participate in facilitated negotiations shall be as described above and elsewhere in these General Conditions, as by way of example in Article 36, Claims, or Article 34, Deductions for Uncorrected Work, and to the extent not more particularly described or limited elsewhere, each party's obligations shall be as follows:

1. a party shall not initiate communication with the facilitator regarding the issues in dispute; except that any request for facilitation shall be made in writing with copies sent, faxed or delivered to the other party;
2. a party shall prepare a brief written description of its position if so requested by the facilitator (who may elect to first discuss the parties' positions with each party separately in the interest of time and expense);
3. a party shall respond to any reasonable request for copies of documents requested by the facilitator, but such requests, if voluminous, may consist of an offer to allow the facilitator access to the parties' documents;
4. a party shall review any meeting agenda proposed by a facilitator and endeavor to be informed on the subjects to be discussed;
5. a party shall meet with the other party and the facilitator at a mutually acceptable place and time, or, if none can be agreed to, at the time and place designated by the facilitator for a period not to exceed four hours unless the parties agree to a longer period;
6. a party shall endeavor to assure that any facilitation meeting shall be attended by any other persons in their employ that the facilitator requests be present, if reasonably available, including the Architect/Engineer;
7. each party shall participate in such facilitated face-to-face negotiations of the issues in dispute through persons fully authorized to resolve the issue in dispute;
8. each party shall be obligated to participate in negotiations requested by the other party and to perform the specific obligations described in paragraphs (1) through (10) this Article 39, Facilitated Negotiation, no more than three times during the course of the Project;
9. neither party shall be under any obligation to resolve any issue by facilitated negotiation, but each agrees to participate in good faith and the Principal Representative shall direct the Architect/Engineer to appropriately document any resolution or agreement reached and to

execute any Amendment or Change Order to the Contract necessary to implement their agreement; and,

10. any discussions and documents prepared exclusively for use in the negotiations shall be deemed to be matters pertaining to settlement negotiations and shall not be subsequently available in further proceedings except to the extent of any documented agreement.

In accordance with State Fiscal Rules and Article 52F, Choice of Law; No Arbitration, nothing in this Article 39 shall be deemed to call for arbitration or otherwise obligate the State to participate in any form of binding alternative dispute resolution.

A partnering plan developed as described in Article 2D, Communications and Cooperation, may modify or expand the requirements of this Article but may not reduce the obligation to participate in facilitated negotiations when applicable. In the case of small projects estimated to be valued under $500,000, the requirements of this Article may be deleted from this Contract, by modification in Article 7 (Contractor's Agreement SC-6.21), Optional Provisions And Elections. When so modified, the references to the parties' right to elect facilitated negotiation elsewhere in these General Conditions shall be deleted.

ARTICLE 40. RIGHT OF OCCUPANCY

The Principal Representative shall have the right to take possession of and to use any completed or partially completed portions of the Work, even if the time for completing the entire Work or portions of the Work has not expired and even if the Work has not been finally accepted, and the Contractor shall fully cooperate with the Principal Representative to allow such possession and use. Such possession and use shall not constitute an acceptance of such portions of the Work.

Prior to any occupancy of the Project, an inspection shall be made by the Principal Representative, State Buildings Programs and the Contractor. Such inspection shall be made for the purpose of ensuring that the building is secure, protected by operation safety systems as designed, operable exits, power, lighting and HVAC systems, and otherwise ready for the occupancy intended and the Notice of Substantial Completion has been issued for the occupancy intended. The inspection shall also document existing finish conditions to allow assessment of any damage by occupants. The Contractor shall assist the Principal Representative in completing and executing State Form SBP-01, Approval of Occupancy/Use, prior to the Principal Representative's possession and use. Any and all areas so occupied will be subject to a final inspection when the Contractor complies with Article 41, Completion, Final Inspection, Acceptance and Settlement.

ARTICLE 41. COMPLETION, FINAL INSPECTION, ACCEPTANCE AND SETTLEMENT

A. NOTICE OF COMPLETION

When the Work, or a discrete physical portion of the Work (as hereafter described) which the Principal Representative has agreed to accept separately, is substantially complete and ready for final inspection, the Contractor shall file a written Notice with the Architect/Engineer that the Work, or such discrete physical portion, in the opinion of the Contractor, is substantially complete under the terms of the Contract. The Contractor shall prepare and submit with such Notice a comprehensive list of items to be completed or corrected prior to final payment, which shall be subject to review and additions as the Architect/Engineer or the Principal Representative shall determine after inspection. If the Architect/Engineer or the Principal Representative believe that any of the items on the list of items submitted, or any other item of work to be corrected or completed, or the cumulative number of items of work to be corrected or completed, will prevent a determination that the Work is substantially complete, those items shall be completed by the Contractor and the Notice shall then be resubmitted.

B. FINAL INSPECTION

Within ten (10) days after the Contractor files written Notice that the Work is substantially complete, the Architect/Engineer, the Principal Representative, and the Contractor shall make a "final inspection" of the Project to determine whether the Work is substantially complete and has been completed in accordance with the Contract Documents. State Buildings Programs shall be notified of the inspection not less than three (3) business days in advance of the inspection. The Contractor shall provide the Principal Representative and the Architect/Engineer an updated punch list in sufficient detail to fully outline the following:

1. work to be completed, if any; and
2. work not in compliance with the Drawings or Specifications, if any.

A final punch list shall be made by the Architect/Engineer in sufficient detail to fully outline to the Contractor:

1. work to be completed, if any;
2. work not in compliance with the Drawings or Specifications, if any; and
3. unsatisfactory work for any reason, if any.

The required number of copies of the final punch list will be countersigned by the authorized representative of the Principal Representative and will then be transmitted by the Architect/Engineer to the Contractor, the Principal Representative, and State Buildings Programs. The Architect/Engineer's final punch list shall control over the Contractor's preliminary punch list.

C. NOTICE OF SUBSTANTIAL COMPLETION

Notice of Substantial Completion shall establish the date of substantial completion of the Project. The Contractor acknowledges and agrees that because the departments, agencies and institutions of the State of Colorado are generally involved with the business of the public at large, greater care must be taken in establishing the date of substantial completion than might otherwise be the case to ensure that a project or building or discrete physical portion of the Work is fully usable and safe for public use, and that such care necessarily raises the standard by which the concept of substantial completion is applied for a public building.

The Notice of Substantial Completion shall not be issued until the following have been fully established:

1. All required building code inspections have been called for and the appropriate code officials have affixed their signatures to the Building Inspection Record indicating successful completion of all required code inspections;
2. All required corrections noted on the Building Inspection Record shall have been completed unless the Architect/Engineer, the Principal Representative and State Buildings Programs, in their complete and absolute discretion, all concur that the condition requiring the remaining correction is not in any way life threatening, does not otherwise endanger persons or property, and does not result in any undue inconvenience or hardship to the Principal Representative or the public;
3. The building, structure or Project can be fully and comfortably used by the Principal Representative and the public without undue interference by the Contractor’s employees and workers during the completion of the final punch list taking into consideration the nature of the public uses intended and taking into consideration any stage or level of completion of HVAC system commissioning or other system testing required by the Specifications to be completed prior to issuance of the Notice of Substantial Completion;
4. The Project has been fully cleaned as required by these General Conditions, and as required by any stricter requirements of the Specifications, and the overall state of completion is appropriate for presentation to the public; and
5. The Contractor has provided a schedule for the completion of each and every item identified on the punch list which specifies the Subcontractor or trade responsible for the work, and the dates the completion or correction of the item will be commenced and finished; such schedule will show completion of all remaining final punch list items within the period indicated in the Contract for final punch list completion prior to Final Acceptance, with the exception of only those items which are beyond the control of the Contractor despite due diligence. The schedule shall provide for a reasonable punch list inspection process. Unless liquidated damages have been specified in Article 7D(2) (Contractor’s Agreement SC-6.21), the cost to the Principal Representative, if any, for re-inspections due to failure to adhere to the Contractor’s proposed punch-list completion schedule shall be the responsibility of the

Contractor and may be deducted by the Principal Representative from final amounts due to the Contractor.

Substantial completion of the entire Project shall not be conclusively established by a decision by the Principal Representative to take possession and use of a portion, or all of the Project, where portions of the Project cannot meet all the criteria noted above. Notice of Substantial Completion for the entire Project shall, however, only be withheld for substantial reasons when the Principal Representative has taken possession and uses all of the Project in accordance with the terms of Article 40, Right Of Occupancy. Failure to furnish the required completion schedule shall constitute a substantial reason for withholding the issuance of any Notice of Substantial Completion.

The Contractor shall have the right to request a final inspection of any discrete physical portion of the Project when in the opinion of the Principal Representative, The Architect/Engineer and State Buildings Programs a final punch list can be reasonably prepared, without confusion as to which portions of the Project are referred to in any subsequent Notice of Partial Final Settlement which might be issued after such portion is finally accepted. Discrete physical portions of the Project may be, but shall not necessarily be limited to, such portions of the Project as separate buildings where a Project consists of multiple buildings. Similarly, an addition to an existing building where the Project also calls for renovation or remodeling of the existing building may constitute a discrete physical portion of the Project. In such circumstances, when in the opinion of the Principal Representative, the Architect/Engineer and State Buildings Programs, the requirements for issuance of a Notice of Substantial Completion can be satisfied with respect to the discrete portion of the Project, a partial Notice of Substantial Completion may be issued for such discrete physical portion of the Project.

D. NOTICE OF ACCEPTANCE

The Notice of Acceptance shall establish the completion date of the Project. It shall not be authorized until the Contractor shall have performed all of the work to allow completion and approval of the Pre-Acceptance Checklist (SBP-05).

Where partial Notices of Substantial Completion have been issued, partial Notices of Final Acceptance may be similarly issued when appropriate for that portion of the Work. Partial Notice of Final Acceptance may also be issued to exclude the work described in Change Orders executed during late stages of the Project where a later completion date for the Change Ordered work is expressly provided for in the Contract as amended by the Change Order, provided the work can be adequately described to allow partial advertisement of any Notice of Partial Final Settlement to be issued without confusion as to the work included for which final payment will be made.

E. SETTLEMENT

Final payment and settlement shall be made on the date fixed and published for such payment except as hereafter provided. The Principal Representative shall not authorize final payment until all items on the Pre-Acceptance check list (SBP-05) have been completed, the Notice of Acceptance issued, and the Notice of Contractors Settlement published. If the work shall be substantially completed, but Final Acceptance and completion thereof shall be prevented through delay in correction of minor defects, or unavailability of materials or other causes beyond the control of the Contractor, the Principal Representative in his or her discretion may release all amounts due to the Contractor except such amounts as may be in excess of three times the cost of completing the unfinished work or the cost of correcting the defective work, as estimated by the Architect/Engineer and approved by State Buildings Programs. Before the Principal Representative may issue the Notice of Contractor's Settlement and advertise the Project for final payment, the Contractor shall have corrected all items on the punch list except those items for which delayed performance is expressly permitted, subject to withholding for the cost thereof, and shall have:

1. Delivered to the Principal Representative:

    a. All guarantees and warranties;
    b. All statements to support local sales tax refunds, if any;

c. Three (3) complete bound sets of required operating maintenance instructions; and,
d. One (1) set of as-built Contract Documents showing all job changes.

2. Demonstrated to the operating personnel of the Principal Representative the proper operation and maintenance of all equipment.

3. Delivered to the State of Colorado Department of Personnel & Administration in accordance with C.R.S. § 24-103-210:

   a. A written disclosure of the five most costly goods incorporated into the project, including iron, steel, or related manufactured goods and the total cost and country of origin of those five goods and whether the project was subject to any existing domestic content preferences.

Upon completion of the foregoing the Project shall be advertised in accordance with the Notice of Contractor's Settlement by two publications of Notice, the last publication appearing at least ten (10) days prior to the time of final settlement. Publication and final settlement should not be postponed or delayed solely by virtue of unresolved claims against the Project or the Contractor from Subcontractors, suppliers or materialmen based on good faith disputes; the resolution of the question of payment in such cases being directed by statute.

Except as hereafter provided, on the date of final settlement thus advertised, provided the Contractor has submitted a written Notice to the Architect/Engineer that no claims have been filed, and further provided the Principal Representative shall have received no claims, final payments and settlement shall be made in full. If any unpaid claim for labor, materials, rental machinery, tools, supplies or equipment is filed before payment in full of all sums due the Contractor, the Principal Representative and the State Controller shall withhold from the Contractor on the date established for final settlement, sufficient funds to insure the payment of such claim, until the same shall have been paid or withdrawn, such payment or withdrawal to be evidenced by filing a receipt in full or an order for withdrawal signed by the claimant or his or her duly authorized agent or assignee. The amount so withheld may be in the amount of 125% of the claims or such other amount as the Principal Representative reasonably deems necessary to cover expected legal expenses. Such withheld amounts shall be in addition to any amount withheld based on the cost to compete unfinished work or the cost to repair defective work. However, as provided by statute, such funds shall not be withheld longer than ninety (90) days following the date fixed for final settlement with the Contractor, as set forth in the published Notice of Contractor's Settlement, unless an action at law shall be commenced within that time to enforce such unpaid claim and a Notice of such action at law shall have been filed with the Principal Representative and the State Controller. At the expiration of the ninety (90) day period, the Principal Representative shall authorize the State Controller to release to the Contractor all other money not the subject of such action at law or withheld based on the cost to compete unfinished work or the cost to repair defective work.

Notices of Partial Final Settlement may be similarly advertised, provided all conditions precedent have been satisfied as though that portion of the work affected stood alone, a Notice of Partial Acceptance has been issued, and the consent of surety to the partial final settlement has been obtained in writing. Thereafter, partial final payments may be made to the Contractor subject to the same conditions regarding unpaid claims.

ARTICLE 42. GENERAL WARRANTY AND CORRECTION OF WORK AFTER ACCEPTANCE

The Contractor warrants that the materials used and the equipment furnished shall be new and of good quality unless specified to the contrary. The Contractor further warrants that the Work shall in all respects be free from material defects not permitted by the Specifications and shall be in accordance with the requirements of the Contract Documents. Neither the final certificate for payment nor any provision in the Contract Documents shall relieve the Contractor of responsibility for defects or faulty materials or workmanship. The Contractor shall be responsible to the Principal Representative for such warranties for the longest period permitted by any applicable statute of limitations.

In addition to these general warranties, and without limitation of these general warranties, for a period of one year after the date of any Notice of Substantial Completion, or any Notice of Partial Substantial Completion if applicable, the Contractor shall remedy defects, and faulty workmanship or materials, and work not in accordance with the Contract Documents which was not accepted at the time of the Notice of Final Acceptance, all in accordance with the provisions of Article 44, One-Year Guarantee And Special Guarantees And Warranties.

ARTICLE 43. LIENS

Colorado statutes do not provide for any right of lien against public buildings. In lieu thereof, § 38-26-107, C.R.S., provides adequate relief for any claimant having furnished labor, materials, rental machinery, tools, equipment, or services toward construction of the particular public work in that final payment may not be made to a Contractor until all such creditors have been put on Notice by publication in the public press of such pending payment and given opportunity for a period of up to ninety (90) days to stop payment to the Contractor in the amount of such claims.

ARTICLE 44. ONE-YEAR GUARANTEE AND SPECIAL GUARANTEES AND WARRANTIES

A. ONE-YEAR GUARANTEE OF THE WORK

The Contractor shall guarantee to remedy defects and repair or replace the Work for a period of one year from the date of the Notice of Substantial Completion or from the dates of any partial Notices of Substantial Completion issued for discrete physical portions of the Work. The Contractor shall remedy any defects due to faulty materials or workmanship and shall pay for, repair and replace any damage to other work resulting there from, which shall appear within a period of one year from the date of such Notice(s) of Substantial Completion. The Contractor shall also remedy any deviation from the requirements of the Contract Documents which shall later be discovered within a period of one year from the date of the Notice of Substantial Completion; provided, however, that the Contractor shall not be required to remedy deviations from the requirements of the Contract Documents where such deviations were obvious, apparent and accepted by the Architect/Engineer or the Principal Representative at the time of the Notice of Final Acceptance. The Principal Representative shall give Notice of observed defects or other work requiring correction with reasonable promptness. Such Notice shall be in writing to the Architect/Engineer and the Contractor.

The one year guarantee of the Contractor's work may run separately for discrete physical portions of the Work for which partial Notices of Substantial Completion have been issued, however, it shall run from the last Notice of Substantial Completion with respect to all or any systems common to the work to which more than one Notice of Substantial Completion may apply.

This one-year guarantee shall not be construed to limit the Contractor's general warranty described in Article 42, General Warranty and Correction of Work After Acceptance, that all materials and equipment are new and of good quality, unless specified to the contrary, and that the Work shall in all respects be free from material defects not permitted by the Specifications and in accordance with the requirements of the Contract Documents.

B. SPECIAL GUARANTEES AND WARRANTIES

In case of work performed for which product, manufacturers or other special warranties are required by the Specifications, the Contractor shall secure the required warranties and deliver copies thereof to the Principal Representative through the Architect/Engineer upon completion of the work.

These product, manufacturers or other special warranties, as such, do not in any way lessen the Contractor's responsibilities under the Contract. Whenever guarantees or warranties are required by the Specifications for a longer period than one year, such longer period shall govern.

ARTICLE 45. GUARANTEE INSPECTIONS AFTER COMPLETION

The Architect/Engineer, the Principal Representative and the Contractor together shall make at least two (2) complete inspections of the work after the Work has been determined to be substantially complete and accepted. One such inspection, the "Six-Month Guarantee Inspection," shall be made approximately six (6)

months after date of the Notice of Substantial Completion, unless in the case of smaller projects valued under $500,000 this inspection is declined in Article 7A (Contractor's Agreement SC-6.21), Modification of Article 45, in which case the inspection to occur at six months shall not be required. Another such inspection, the "Eleven-Month Guaranty Inspection" shall be made approximately eleven (11) months after the date of the Notice of Substantial Completion. The Principal Representative shall schedule and so notify all parties concerned, including State Buildings Programs, of these inspections. If more than one Notice of Substantial Completion has been issued at the reasonable discretion of the Principal Representative separate eleven month inspections may be required where the one year guarantees do not run reasonably concurrent.

Written punch lists and reports of these inspections shall be made by the Architect/Engineer and forwarded to the Contractor, the Principal Representative, State Buildings Programs, and all other participants within ten (10) days after the completion of the inspections. The punch list shall itemize all guarantee items, prior punch list items still to be corrected or completed and any other requirements of the Contract Documents to be completed which were not waived by final acceptance because they were not obvious or could not reasonably have been previously observed. The Contractor shall immediately initiate such remedial work as may be necessary to correct any deficiencies or defective work shown by this report, and shall promptly complete all such remedial work in a manner satisfactory to the Architect/Engineer, the Principal Representative and State Buildings Programs.

If the Contractor fails to promptly correct all deficiencies and defects shown by this report, the Principal Representative may do so, after giving the Contractor ten (10) days written Notice of intention to do so.

The State of Colorado, acting by and through the Principal Representative, shall be entitled to collect from the Contractor all costs and expenses incurred by it in correcting such deficiencies and defects, as well as all damages resulting from such deficiencies and defects.

ARTICLE 46. TIME OF COMPLETION AND LIQUIDATED DAMAGES

It is hereby understood and mutually agreed, by and between the parties hereto, that the date of beginning, rate of progress, and the time for completion of the Work to be done hereunder are ESSENTIAL CONDITIONS of this Agreement, and it is understood and agreed that the Work embraced in this Contract shall be commenced at the time specified in the Notice to Proceed (SC-6.26).

It is further agreed that time is of the essence of each and every portion of this Contract, and of any portion of the Work described on the Drawings or Specifications, wherein a definite and certain length of time is fixed for the performance of any act whatsoever. The parties further agree that where under the Contract additional time is allowed for the completion of the Work or any identified portion of the Work, the new time limit or limits fixed by such extension of the time for completion shall be of the essence of this Agreement.

The Contractor acknowledges that subject to any limitations in the Advertisement for Bids, issued for the Project, the Contractor's bid is consistent with and considers the number of days to substantially complete the Project and the number of days to finally complete the Project to which the parties may have stipulated in the Agreement, which stipulation was based on the Contractor's bid. The Contractor agrees that work shall be prosecuted regularly, diligently and uninterruptedly at such rate of progress as will ensure the Project will be substantially complete, and fully and finally complete, as recognized by the issuance of all required Notices of Substantial Completion and Notices of Final Acceptance, within any times stipulated and specified in the Agreement, as the same may be amended by Change Order or other written modification, and that the Principal Representative will be damaged if the times of completion are delayed.

It is expressly understood and agreed, by and between the parties hereto, that the times for the Substantial Completion of the Work or for the final acceptance of the Work as may be stipulated in the Agreement, and as applied here and in Article 7D (Contractor's Agreement SC-6.21), Modifications of Article 46, are reasonable times for these stages of completion of the Work, taking into such consideration all factors, including the average climatic range and usual industrial conditions prevailing in the locality of the building operations.

If the Contractor shall neglect, fail or refuse to complete the Work within the times specified in the Agreement, such failure shall constitute a breach of the terms of the Contract and the State of Colorado, acting by and through the Principal Representative, shall be entitled to liquidated damages for such neglect, failure or refusal, as specified in Article 7D (Contractor's Agreement SC-6.21), Modification of Article 46.

The Contractor and the Contractor's Surety shall be jointly liable for and shall pay the Principal Representative, or the Principal Representative may withhold, the sums hereinafter stipulated as liquidated damages for each calendar day of delay until the entire Project is 1) substantially completed, and the Notice (or all Notices) of Substantial Completion are issued, 2) finally complete and accepted and the Notice (or all Notices) of Acceptance are issued, or 3) both. Delay in substantial completion shall be measured from the Date of the Notice to Proceed and delay in final completion and acceptance shall be measured from the Date of the Notice of Substantial Completion.

In the first instance, specified in Article 7D(1) (Contractor's Agreement SC-6.21), Modification of Article 46, liquidated damages, if any, shall be the amount specified therein, for each calendar day of delay beginning after the stipulated number of days for Substantial Completion from the date of the Notice to Proceed, until the date of the Notice of Substantial Completion. Unless otherwise specified in any Supplementary General Conditions, in the event of any partial *Notice of Substantial Completion, liquidated damages shall accrue until all required Notices of Substantial Completion are issued.*

In the second instance, specified in Article 7D(2) (Contractor's Agreement SC-6.21), Modification of Article 46, liquidated damages, if any, shall be the amount specified in Article 7D (Contractor's Agreement SC-6.21), Modification of Article 46, for each calendar day in excess of the number of calendar days specified in the Contractor's bid for the Project and stipulated in the Agreement to finally complete the Project (as defined by the issuance of the Notice of Acceptance) after the final Notice of Substantial Completion has been issued.

In the third instance, when so specified in both Articles 7D(1) and (2) (Contractor's Agreement SC-6.21), both types of liquidated damages shall be separately assessed where those delays have occurred.

The parties expressly agree that said amounts are a reasonable estimate of the presumed actual damages that would result from any of the breaches listed, and that any liquidated damages that are assessed have been agreed to in light of the difficulty of ascertaining the actual damages that would be caused by any of these breaches at the time this Contract was formed; the liquidated damages in the first instance representing an estimate of damages due to the inability to use the Project; the liquidated damages in the second instance representing an estimate of damages due to the additional administrative, technical, supervisory and professional expenses related to and arising from the extended closeout period including delivery of any or all guarantees and warranties, the submittals of sales and use tax payment forms, the calling for the final inspection and the completion of the final punch list.

The parties also agree and understand that the liquidated damages to be assessed in each instance are separate and distinct, although potentially cumulative, damages for the separate and distinct breaches of delayed substantial completion or final acceptance. Such liquidated damages shall not be avoided by virtue of the fact of concurrent delay caused by the Principal Representative, or anyone acting on behalf of the Principal Representative, but in such event the period of delay for which liquidated damages are assessed shall be equitably adjusted in accordance with Article 38, Delays And Extensions Of Time.

ARTICLE 47. DAMAGES

If either party to this Contract shall suffer damage under this Contract in any manner because of any wrongful act or neglect of the other party or of anyone employed by either of them, then the party suffering damage shall be reimbursed by the other party for such damage. Except to the extent of damages liquidated for the Contractor's failure to achieve timely completion as set forth in Article 46, Time of Completion and Liquidated Damages, the Principal Representative shall be responsible for, and at his or her option may insure against, loss of use of any existing property not included in the Work, due to fire or otherwise, however caused. Notwithstanding the foregoing, or any other provision of this Contract, to the contrary, no term or condition of this contract shall be construed or interpreted as a waiver, express or

implied, of any of the immunities, rights, benefits, protection, or other provisions of the Colorado Governmental Immunity Act, Section 24-10-101, *et seq.*, CRS, as now or hereafter amended. The parties understand and agree that liability for claims for injuries to persons arising out of negligence of the State of Colorado, its departments, institutions, agencies, boards, officials and employees is controlled and limited by the provisions of Section 24-101-101, *et seq.*, CRS, as now or hereafter amended and the risk management statutes, Section 24-30-1501, *et seq.*, CRS, as now or hereafter amended.

Notice of intent to file a claim under this clause shall be made in writing to the party liable within a reasonable time of the first observance of such damage and not later than the time of final payment, except that in the case of claims by the Principal Representative involving warranties against faulty work or materials Notice shall be required only to the extent stipulated elsewhere in these General Conditions. Claims made to the Principal Representative involving extra cost or extra time arising by virtue of instructions to the Contractor to which Article 36, Claims, applies shall be made in accordance with Article 36. Other claims arising under the Contract involving extra cost or extra time which are made to the Principal Representative under this clause shall also be made in accordance with the procedures of Article 36, whether or not arising by virtue of instructions to the Contractor; provided however that it shall not be necessary to first obtain or request a written judgment of the Architect/Engineer.

Provided written Notice of intent to file a claim is provided as required in the preceding paragraph, nothing in this Article shall limit or restrict the rights of either party to bring an action at law or to seek other relief to which either party may be entitled, including consequential damages, if any, and shall not be construed to limit the time during which any action might be brought. Nothing in these General Conditions shall be deemed to limit the period of time during which any action may be brought as a matter of contract, tort, warranty or otherwise, it being the intent of the parties to allow any and all actions at law or in equity for such periods as the law permits. All such rights shall, however be subject to the obligation to assert claims and to appeal denials pursuant to Article 36, Claims, where applicable.

ARTICLE 48. STATE'S RIGHT TO DO THE WORK; TEMPORARY SUSPENSION OF WORK; DELAY DAMAGES

A. STATE'S RIGHT TO DO THE WORK

If after receipt of Notice to do so, the Contractor should neglect to prosecute the Work properly or fail to perform any provision of the Contract, the Principal Representative, after a second seven (7) days' advance written Notice to the Contractor and the Surety may, without prejudice to any other remedy the Principal Representative may have, take control of all or a portion of the Work, as the Principal Representative deems necessary and make good such deficiencies deducting the cost thereof from the payment then or thereafter due the Contractor, as provided in Article 30, Correction Of Work Before Acceptance and Article 33, Payments Withheld, provided, however, that the Architect/Engineer shall approve the amount charged to the Contractor by approval of the Change Order.

B. TEMPORARY SUSPENSION OF WORK

The State, acting for itself or by and through the Architect/Engineer, shall have the authority to suspend the Work, either wholly or in part, for such period or periods as may be deemed necessary due to:

1. *Unsuitable weather;*
2. *Faulty workmanship;*
3. *Improper superintendence;*
4. *Contractor 's failure to carry out orders or to perform any provision of the Contract Documents;*
5: *Loss of, or restrictions to, appropriations;*
6. *Conditions, which may be considered unfavorable for the prosecution of the Work.*

If it should become necessary to stop work for an indefinite period, the Contractor shall store materials in such manner that they will not become an obstruction or become damaged in any way; and he or she shall take every precaution to prevent damage to or deterioration of the Work, provide suitable drainage and erect temporary structures where necessary.

Notice of suspension of work shall be provided to the Contractor in writing stating the reasons therefore. The Contractor shall again proceed with the work when so notified in writing.

The Contractor understands and agrees that the State of Colorado cannot predict with certainty future revenues and could ultimately lack the revenue to fund the appropriations applicable to this Contract. The Contractor further acknowledges and agrees that in such event that State may, upon Notice to the Contractor, suspend the work in anticipation of a termination of the Contract for the convenience of the State, pursuant to Article 50, Termination For Convenience of State. If the Contract is not so terminated the Contract sum and the Contract time shall be equitably adjusted at the time the Principal Representative directs the work to be recommenced and gives Notice that the revenue to fund the appropriation is available.

C. DELAY DAMAGES

The Principal Representative and the State of Colorado shall be liable to the Contractor for the payment of any claim for extra costs, extra compensation or damages occasioned by hindrances or delays encountered in the work only when and to the limited extent that such hindrance or delay is caused by an act or omission within the control of the Principal Representative, the Architect/Engineer or other persons or entities acting on behalf of the Principal Representative. Further, the Principal Representative and the State of Colorado shall be liable to the Contractor for the payment of such a claim only if the Contractor has provided required Notice of the delay or impact, or has presented its claim for an extension of time or claim of other delay or other impact due to changes ordered in the work before proceeding with the changed work. Except as otherwise provided, claims for extension of time shall be Noticed and filed in accordance with Article 38, Delays and Extensions of Time, within three (3) business days of the beginning of the delay with any claim filed within seven (7) days after the delay has ceased, or such claim is waived. Claims for extension of time or for other delay or other impact resulting from changes ordered in the Work shall be presented and adjusted as provided in Article 35, Changes in the Work.

ARTICLE 49. STATE'S RIGHTS TO TERMINATE CONTRACT

A. GENERAL

If the Contractor should be adjudged bankrupt, or if he or she should make a general assignment for the benefit of his or her creditors, or if a receiver should be appointed to take over his affairs, or if he or she should fail to prosecute his or her work with due diligence and carry the work forward in accordance with the construction schedule and the time limits set forth in the Contract Documents, or if he or she should fail to subsequently perform one or more of the provisions of the Contract Documents to be performed by him, the Principal Representative may serve written Notice on the Contractor and the Surety on performance and payment bonds, stating his or her intention to exercise one of the remedies hereinafter set forth and the grounds upon which the Principal Representative bases his or her right to exercise such remedy.

In such event, unless the matter complained of is satisfactorily cleared within ten (10) days after delivery of such Notice, the Principal Representative may, without prejudice to any other right or remedy, exercise one of such remedies at once, having first obtained the concurrence of the Architect/Engineer in writing that sufficient cause exists to justify such action.

B. CONDITIONS AND PROCEDURES

1. *The Principal Representative may terminate the services of the Contractor, which termination shall take effect immediately upon service of Notice thereof on the Contractor and his or her Surety, whereupon the Surety shall have the right to take over and perform the Contract. If the Surety does not provide Notice to the Principal Representative of its intent to commence performance of the Contract within ten (10) days after delivery of the Notice of termination, the Principal Representative may take over the Work, take possession of and use all materials, tools, equipment and appliances on the premises and prosecute the Work to completion by such means as he or she shall deem best. In the event of such termination of his or her service, the Contractor shall not be entitled to any further payment under the Contract until the Work is completed and accepted. If the Principal Representative takes over the Work and if*

the unpaid balance of the contract price exceeds the cost of completing the Work, including compensation for any damages or expenses incurred by the Principal Representative through the default of the Contractor, such excess shall be paid to the Contractor. If, however, the cost, expenses and damages as certified by the Architect/Engineer exceed such unpaid balance of the contract price, the Contractor and his or her Surety shall pay the difference to the Principal Representative.

2. *The Principal Representative may require the Surety on the Contractor 's bond to take control of the Work and see to it that all the deficiencies of the Contractor are made good, with due diligence within ten (10) days of delivery of Notice to the Surety to do so. As between the Principal Representative and the Surety, the cost of making good such deficiencies shall all be borne by the Surety. If the Surety takes over the Work, either by election upon termination of the services of the Contractor pursuant to Section B(1) of this Article 49, State's Right To Terminate Contract, or upon instructions from the Principal Representative to do so, the provisions of the Contract Documents shall govern the work to be done by the Surety, the Surety being substituted for the Contractor as to such provisions, including provisions as to payment for the Work, the times of completion and provisions of this Article as to the right of the Principal Representative to do the Work or to take control of all or a portion of the Work.*
3. *The Principal Representative may take control of all or a portion of the Work and make good the deficiencies of the Contractor, or the Surety if the Surety has been substituted for the Contractor, with or without terminating the Contract, employing such additional help as the Principal Representative deems advisable in accordance with the provisions of Article 48A, State's Right To Do The Work; Temporary Suspension Of Work; Delay Damages. In such event, the Principal Representative shall be entitled to collect from the Contractor and his or her Surety, or to deduct from any payment then or thereafter due the Contractor, the costs incurred in having such deficiencies made good and any damages or expenses incurred through the default of Contractor, provided the Architect/Engineer approves the amount thus charged to the Contractor.*

   If the Contract is not terminated, a Change Order to the Contract shall be executed, unilaterally if necessary, in accordance with the procedures of Article 35, Changes In The Work.

C. ADDITIONAL CONDITIONS

If any termination by the Principal Representative for cause is later determined to have been improper, the termination shall be automatically converted to and deemed to be a termination by the Principal Representative for convenience and the Contractor shall be limited in recovery to the compensation provided for in Article 50, Termination For Convenience Of State. Termination by the Contractor shall not be subject to such conversion.

ARTICLE 50. TERMINATION FOR CONVENIENCE OF STATE

A. NOTICE OF TERMINATION

The performance of Work under this Contract may be terminated, in whole or from time to time in part, by the State whenever for any reason the Principal Representative shall determine that such termination is in the best interest of State. Termination of work hereunder shall be effected by delivery to the Contractor of a Notice of such termination specifying the extent to which the performance of work under the Contract is terminated and the date upon which such termination becomes effective.

B. PROCEDURES

After receipt of the Notice of termination, the Contractor shall, to the extent appropriate to the termination, cancel outstanding commitments hereunder covering the procurement of materials, supplies, equipment and miscellaneous items. In addition, the Contractor shall exercise all reasonable diligence to accomplish the cancellation or diversion of all applicable outstanding commitments covering personal performance of any work terminated by the Notice. With respect to such canceled commitments, the Contractor agrees to:

1. *settle all outstanding liabilities and all claims arising out of such cancellation of commitments, with approval or ratification of the Principal Representative, to the extent he or she may require, which approval or ratification shall be final for all purposes of this clause; and,*

2. *assign to the State, in the manner, at the time, and to the extent directed by the Principal Representative, all of the right, title, and interest of the Contractor under the orders and subcontracts so terminated, in which case the State shall have the right, in its discretion, to settle or pay any or all claims arising out of the termination of such orders and subcontracts.*

The Contractor shall submit his or her termination claim to the Principal Representative promptly after receipt of a Notice of termination, but in no event later than three (3) months from the effective date thereof, unless one or more extensions in writing are granted by the Principal Representative upon written request of the Contractor within such three month period or authorized extension thereof. Upon failure of the Contractor to submit his or her termination claim within the time allowed, the Principal Representative may determine, on the basis of information available to him, the amount, if any, due to the Contractor by reason of the termination and shall thereupon pay to the Contractor the amount so determined.

Costs claimed, agreed to, or determined pursuant to the preceding and following paragraph shall be in accordance with the provisions of § 24-107-101, C.R.S., as amended and associated Cost Principles of the Colorado Procurement Rules as in effect on the date of this Contract.

Subject to the preceding provisions, the Contractor and the Principal Representative may agree upon the whole or any part of the amount or amounts to be paid to the Contractor by reason of the termination under this clause, which amount or amounts may include any reasonable cancellation charges thereby incurred by the Contractor and any reasonable loss upon outstanding commitments for personal services which he or she is unable to cancel; provided, however, that in connection with any outstanding commitments for personal services which the Contractor is unable to cancel, the Contractor shall have exercised reasonable diligence to divert such commitments to other activities and operations. Any such agreement shall be embodied in an Amendment to this Contract and the Contractor shall be paid the agreed amount.

The State may from time to time, under such terms and conditions as it may prescribe, make partial payments against costs incurred by the Contractor in connection with the termination portion of this Contract, whenever, in the opinion of the Principal Representative, the aggregate of such payments is within the amount to which the Contractor will be entitled hereunder.

The Contractor agrees to transfer title and deliver to the State, in the manner, at the time, and to the extent, if any, directed by the Principal Representative, such information and items which, if the Contract had been completed, would have been required to be furnished to the State, including:

a. *completed or partially completed plans, Drawings and information; and,*
b. *materials or equipment produced or in process or acquired in connection with the performance of the work terminated by the Notice.*

Other than the above, any termination inventory resulting from the termination of the Contract may, with written approval of the Principal Representative, be sold or acquired by the Contractor under the conditions prescribed by and at a price or prices approved by the Principal Representative. The proceeds of any such disposition shall be applied in reduction of any payments to be made by the State to the Contractor under this Contract or shall otherwise be credited to the price or cost of work covered by this Contract or paid in such other manners as the Principal Representative may direct. Pending final disposition of property arising from the termination, the Contractor agrees to take such action as may be necessary, or as the Principal Representative may direct, for the protection and preservation of the property related to this Contract which is in the possession of the Contractor and in which the State has or may acquire an interest.

Any disputes as to questions of fact, which may arise hereunder, shall be subject to the Remedies provisions of the Colorado Procurement Code, §§ 24-109-101, et seq., C.R.S., as amended.

ARTICLE 51. CONTRACTOR'S RIGHT TO STOP WORK AND/OR TERMINATE CONTRACT

If the Work shall be stopped under an order of any court or other public authority for a period of three (3) months through no act or fault of the Contractor or of any one employed by him, then the Contractor may on seven (7) days' written Notice to the Principal Representative and the Architect/Engineer stop work or terminate this Contract and recover from the Principal Representative payment for all work executed, any losses sustained on any plant or material, and a reasonable profit. If the Architect/Engineer shall fail to issue or otherwise act in writing upon any certificate for payment within ten (10) days after it is presented and received by the Architect/Engineer, as provided in Article 31, Applications For Payments, or if the Principal Representative shall fail to pay the Contractor any sum certified that is not disputed in whole or in part by the Principal Representative in writing to the Contractor and the Architect/Engineer within thirty (30) days after the Architect/Engineer's certification, then the Contractor may on ten (10) days' written Notice to the Principal Representative and the Architect/Engineer stop work and/or give written Notice of intention to terminate this Contract.

If the Principal Representative shall thereafter fail to pay the Contractor any amount certified by the Architect/Engineer and not disputed in writing by the Principal Representative within ten (10) days after receipt of such Notice, then the Contractor may terminate this Contract and recover from the Principal Representative payment for all work executed, any losses sustained upon any plant or materials, and a reasonable profit. The Principal Representative's right to dispute an amount certified by the Architect/Engineer shall not relieve the Principal Representative of the obligation to pay amounts not in dispute as certified by the Architect/Engineer.

ARTICLE 52. SPECIAL PROVISIONS

A. CONTROLLER'S APPROVAL CRS 24-30-202(1)

This Contract shall not be deemed valid until it has been approved by the Colorado State Controller or designee.

B. FUND AVAILABILITY CRS 24-30-202(5.5)

Financial obligations of the State payable after the current fiscal year are contingent upon funds for that purpose being appropriated, budgeted, and otherwise made available

C. GOVERNMENTAL IMMUNITY

No term or condition of this contract shall be construed or interpreted as a waiver, express or implied, of any of the immunities, rights, benefits, protections, or other provisions, of the Colorado Governmental Immunity Act, CRS §24-10-101 et seq., or the Federal Tort Claims Act, 28 U.S.C. §§1346(b) and 2671 et seq., as applicable now or hereafter amended.

D. INDEPENDENT CONTRACTOR 4 CCR 801-2

Contractor shall perform its duties hereunder as an independent contractor and not as an employee. Neither Contractor nor any agent or employee of Contractor shall be deemed to be an agent or employee of the State. Contractor and its employees and agents are not entitled to unemployment insurance or workers compensation benefits through the State and the State shall not pay for or otherwise provide such coverage for Contractor or any of its agents or employees. Unemployment insurance benefits will be available to Contractor and its employees and agents only if such coverage is made available by Contractor or a third party. Contractor shall pay when due all applicable employment taxes and income taxes and local head taxes incurred pursuant to this contract. Contractor shall not have authorization, express or implied, to bind the State to any agreement, liability or understanding, except as expressly set forth herein. Contractor shall (a) provide and keep in force workers' compensation and unemployment compensation insurance in the amounts required by law, (b) provide proof thereof when requested by the State, and (c) be solely responsible for its acts and those of its employees and agents.

E. COMPLIANCE WITH LAW

Contractor shall strictly comply with all applicable federal and State laws, rules, and regulations in effect or hereafter established, including, without limitation, laws applicable to discrimination and unfair employment practices.

F. CHOICE OF LAW

Colorado law, and rules and regulations issued pursuant thereto, shall be applied in the interpretation, execution, and enforcement of this contract. Any provision included or incorporated herein by reference which conflicts with said laws, rules, and regulations shall be null and void. Any provision incorporated herein by reference which purports to negate this or any other Special Provision in whole or in part shall not be valid or enforceable or available in any action at law, whether by way of complaint, defense, or otherwise. Any provision rendered null and void by the operation of this provision shall not invalidate the remainder of this contract, to the extent capable of execution.

G. BINDING ARBITRATION PROHIBITED

The State of Colorado does not agree to binding arbitration by any extra-judicial body or person. Any provision to the contrary in this contract or incorporated herein by reference shall be null and void.

H. **SOFTWARE PIRACY PROHIBITION. Governor's Executive Order D 002 00**

State or other public funds payable under this contract shall not be used for the acquisition, operation, or maintenance of computer software in violation of federal copyright laws or applicable licensing restrictions. Contractor hereby certifies and warrants that, during the term of this contract and any extensions, Contractor has and shall maintain in place appropriate systems and controls to prevent such improper use of public funds. If the State determines that Contractor is in violation of this provision, the State may exercise any remedy available at law or in equity or under this contract, including, without limitation, immediate termination of this contract and any remedy consistent with federal copyright laws or applicable licensing restrictions.

I. EMPLOYEE FINANCIAL INTEREST/CONFLICT OF INTEREST CRS 24-18-201 & CRS 24-50-507

The signatories aver that to their knowledge, no employee of the State has any personal or beneficial interest whatsoever in the service or property described in this contract. Contractor has no interest and shall not acquire any interest, direct or indirect, that would conflict in any manner or degree with the performance of Contractor's services and Contractor shall not employ any person having such known interests.

J. VENDOR OFFSET CRS 24-30-202(1) & CRS 24-30-202.4

Subject to CRS §24-30-202.4 (3.5), the State Controller may withhold payment under the State's vendor offset intercept system for debts owed to State agencies for: **(a)** unpaid child support debts or child support arrearages; **(b)** unpaid balances of tax, accrued interest, or other charges specified in CRS §39-21-101, et seq.; **(c)** unpaid loans due to the Student Loan Division of the Department of Higher Education; **(d)** amounts required to be paid to the Unemployment Compensation Fund; and **(e)** other unpaid debts owing to the State as a result of final agency determination or judicial action.

K. PUBLIC CONTRACTS FOR SERVICES. **CRS §8-17.5-101**. [***Not Applicable to agreements relating to the offer, issuance, or sale of securities, investment advisory services or fund management services, sponsored projects, intergovernmental agreements, or information technology services or products and services***] Contractor certifies, warrants, and agrees that it does not knowingly employ or contract with an illegal alien who will perform work under this contract and will confirm the employment eligibility of all employees who are newly hired for employment in the United States to perform work under this contract, through participation in the E-Verify Program or the Department program established pursuant to CRS §8-17.5-102(5)(c), Contractor shall not knowingly employ or contract with an illegal alien to perform work under this contract or enter into a contract with a subcontractor that fails to certify to Contractor that the subcontractor shall not knowingly employ or contract with an illegal alien to perform work under this contract. Contractor **(a)** shall not use E-Verify Program or Department program procedures to undertake pre-employment screening of job applicants while this contract is being performed, **(b)** shall notify the subcontractor and the contracting State agency within three days if Contractor has actual knowledge that a subcontractor is employing or contracting with an illegal alien for work under this contract, **(c)** shall terminate the subcontract if a subcontractor does not stop employing or contracting with the illegal alien within three days of receiving the notice, and **(d)** shall comply with reasonable requests made in the course of an

investigation, undertaken pursuant to CRS §8-17.5-102(5), by the Colorado Department of Labor and Employment. If Contractor participates in the Department program, Contractor shall deliver to the contracting State agency, Institution of Higher Education or political subdivision a written, notarized affirmation, affirming that Contractor has examined the legal work status of such employee, and shall comply with all of the other requirements of the Department program. If Contractor fails to comply with any requirement of this provision or CRS §8-17.5-101 et seq., the contracting State agency, institution of higher education or political subdivision may terminate this contract for breach and, if so terminated, Contractor shall be liable for damages.

L. PUBLIC CONTRACTS WITH NATURAL PERSONS. CRS §24-76.5-101.

Contractor, if a natural person eighteen (18) years of age or older, hereby swears and affirms under penalty of perjury that he or she (a) is a citizen or otherwise lawfully present in the United States pursuant to federal law, (b) shall comply with the provisions of CRS §24-76.5-101 et seq., and (c) has produced one form of identification required by CRS §24-76.5-103 prior to the effective date of this contract.

ARTICLE 53. MISCELLANEOUS PROVISIONS

A. CONSTRUCTION OF LANGUAGE

The language used in these General Conditions shall be construed as a whole according to its plain meaning, and not strictly for or against any party. Such construction shall, however, construe language to interpret the intent of the parties giving due consideration to the order of precedence noted in Article 2C, Intent of Documents.

B. SEVERABILITY

Provided this Agreement can be executed and performance of the obligations of the Parties accomplished within its intent, the provisions hereof are severable and any provision that is declared invalid or becomes inoperable for any reason shall not affect the validity of any other provision hereof, provided that the Parties can continue to perform their obligations under this Agreement in accordance with its intent.

C. SECTION HEADINGS

The captions and headings in this Agreement are for convenience of reference only, and shall not be used to interpret, define, or limit its provisions.

D. AUTHORITY

Each person executing the Agreement and its Exhibits in a representative capacity expressly represents and warrants that he or she has been duly authorized by one of the parties to execute the Agreement and has authority to bind said party to the terms and conditions hereof.

E. INTEGRATION OF UNDERSTANDING

This Contract is intended as the complete integration of all understandings between the parties and supersedes all prior negotiations, representations, or agreements, whether written or oral. No prior or contemporaneous addition, deletion, or other amendment hereto shall have any force or effect whatsoever, unless embodied herein in writing. No subsequent novation, renewal, addition, deletion, or other amendment hereto shall have any force or effect unless embodied in a written Change Order or Amendment to this Contract.

F. VENUE

All suits or actions related to this Agreement shall be filed and proceedings held in the State of Colorado and exclusive venue shall be in the City and County of Denver.

G. NO THIRD PARTY BENEFICIARIES

Enforcement of this Agreement and all rights and obligations hereunder are reserved solely to the Parties. Any services or benefits which third parties receive as a result of this Contract are incidental to the Contract, and do not create any rights for such third parties.

H. WAIVER

Waiver of any breach under a term, provision, or requirement of this Agreement, or any right or remedy hereunder, whether explicitly or by lack of enforcement, shall not be construed or deemed as a waiver of any subsequent breach of such term, provision or requirement, or of any other term, provision, or requirement.

I. INDEMNIFICATION

Contractor shall indemnify, save, and hold harmless the State, its employees and agents, against any and all claims, damages, liability and court awards including costs, expenses, and attorney fees , to the extent such claims are caused by any negligent act or omission of the Contractor, its employees, agents, subcontractors or assignees pursuant to the terms of this Contract, but not to the extent such claims are caused by any negligent act or omission of, or breach of contract by, the State, its employees, agents, other contractors or assignees, or other parties not under control of or responsible to the Contractor.

J. STATEWIDE CONTRACT MANAGEMENT SYSTEM

If the maximum amount payable to Contractor under this Contract is $100,000 or greater, either on the Effective Date or at anytime thereafter, this section shall apply.

Contractor agrees to be governed, and to abide, by the provisions of CRS 24-102-205, 24-102-206, 24-103-601, 24-103.5-101, 24-105-101, and 24-105-102 concerning the monitoring of vendor performance on state contracts and inclusion of contract performance information in a statewide contract management system.

Contractor's performance shall be subject to Evaluation and Review in accordance with the terms and conditions of this Contract, State law, including C.R.S 24-103.5-101, and State Fiscal Rules, Policies and Guidance. Evaluation and Review of Contractor's performance shall be part of the normal contract administration process and Contractor's performance will be systematically recorded in the statewide Contract Management System. Areas of Evaluation and Review shall include, but shall not be limited to quality, cost and timeliness. Collection of information relevant to the performance of Contractor's obligations under this Contract shall be determined by the specific requirements of such obligations and shall include factors tailored to match the requirements of Contractor's obligations. Such performance information shall be entered into the statewide Contract Management System at intervals established herein and a final Evaluation, Review and Rating shall be rendered within 30 days of the end of the Contract term. Contractor shall be notified following each performance Evaluation and Review, and shall address or correct any identified problem in a timely manner and maintain work progress.

Should the final performance Evaluation and Review determine that Contractor demonstrated a gross failure to meet the performance measures established hereunder, the Executive Director of the Colorado Department of Personnel and Administration (Executive Director), upon request by the Principal Representative, and showing of good cause, may debar Contractor and prohibit Contractor from bidding on future contracts. Contractor may contest the final Evaluation, Review and Rating by: (a) filing rebuttal statements, which may result in either removal or correction of the evaluation (CRS 24-105-102(6)), or (b) under CRS 24-105-102(6), exercising the debarment protest and appeal rights provided in CRS 24-109-106, 107, 201 or 202, which may result in the reversal of the debarment and reinstatement of Contractor, by the Executive Director, upon a showing of good cause.

K. CORA DISCLOSURE

To the extent not prohibited by federal law, this Agreement and the performance measures and standards under CRS §24-103.5-101, if any, are subject to public release through the Colorado Open Records Act, CRS §24-72-101, et seq.

STATE OF COLORADO
OFFICE OF THE STATE ARCHITECT
STATE BUILDINGS PROGRAMS

NOTICE OF SUBSTANTIAL COMPLETION

Date of Substantial Completion: _____
Date to be inserted by the Principal Representative

Institution/Agency: Colorado State Universisty - Pueblo

Project No./Name: Project No.: 2018-046M17 / Replace Roof and Exterior Stairs – Two Buildings

TO:

Principal Representative

and

Contractor

This is to advise you that the Work has been reviewed, inspected and determined, to the best knowledge, information and belief of the Architect/Engineer, to be substantially complete as of the date noted above in accordance with the criteria outlined in Article 41 of The General Conditions of the Contract in SC-6.23 and SC-8.1 or Article 17.3 in SC-6.4 and the Specifications, including without limitation a) suitable for occupancy, b) inspected for code compliance with Building Inspection Records signed by code officials for the State, c) determined to be fully and comfortably usable, and d) fully cleaned and appropriate for presentation to the public.

A punch list of work to be completed, work not in compliance with the Drawings or Specifications, and unsatisfactory work is attached hereto, along with the Contractor's schedule for the completion of each and every item identified on the punch list specifying the Subcontractor or trade responsible for the work, and the dates the completion or correction will be commenced and finished within any period indicated in the Agreement for punch list completion prior to Final Acceptance.

Except as stated on the reverse side of this Notice of Substantial Completion, all manufacturers' warranties, other special warranties and the Contractor's one-year obligation to perform remedial work, shall commence on the Date of Substantial Completion noted above.

This Notice of Substantial Completion shall be effective and establish the Date of Substantial Completion only when fully executed by the Contractor and the Principal Representative. The Principal Representative accepts the Work as substantially complete as of the Date of Substantial Completion herein noted. The Contractor agrees to complete or correct the Work identified on the attached punch list and to do so in accordance with attached punch list completion schedule

Architect/Engineer	Date	Contractor	Date
State Buildings Programs	Date	Principal Representative	Date

(or Authorized Delegate) (Institution or Agency)

The responsibilities of the Principal Representative and the Contractor for security, maintenance, heat, utilities, and insurance shall be as specified in the Contract Documents or as otherwise hereafter noted:

Exceptions, if any, to the commencement of warranties shall be:

The attached final punch list consists of _____ pages, and the attached Contractor's schedule showing the dates of commencement and completion of each punch list item consists of _____ pages.

When completely executed, this form shall be sent to the Contractor and the Principal Representative with a copy to State Buildings Programs.

STATE OF COLORADO
OFFICE OF THE STATE ARCHITECT
STATE BUILDINGS PROGRAMS

NOTICE OF FINAL ACCEPTANCE

Date of Notice of Acceptance: _____

Date to be inserted by A/E after consultation with the Principal Representative

Institution/Agency: Colorado State University – Pueblo

Project No./Name: Project No.: 2018-046M17 / Replace Roof and Exterior Stairs – Two Buildings

TO:

Notice is hereby given that the State of Colorado, acting by and through the _____, accepts as complete* the above numbered project.

State Buildings Programs (or Authorized Delegate)	Date	Principal Representative (Institution or Agency)	Date

*When completely executed, this form is to be sent by certified mail to the Contractor by the Principal Representative.

STATE OF COLORADO
OFFICE OF THE STATE ARCHITECT
STATE BUILDINGS PROGRAMS

NOTICE OF CONTRACTOR'S SETTLEMENT

Institution/Agency: Colorado State University – Pueblo
Notice Number:
Project No./Title: Project No.: 2018-046M17 / Replace Roof and Exterior Stairs – Two Buildings

Notice is hereby given that on *date* at *address* Colorado, final settlement will be made by the STATE OF COLORADO with *vendor name*, hereinafter called the "CONTRACTOR", for and on account of the contract for the construction of a PROJECT as referenced above.

1. Any person, co-partnership, association or corporation who has an unpaid claim against the said project, for or on account of the furnishing of labor, materials, team hire, sustenance, provisions, provender, rental machinery, tools. or equipment and other supplies used or consumed by such Contractor or any of his subcontractors In or about the performance of said work, may at any time up to and including said time of such final settlement, file a verified statement of the amount due and unpaid on account of such claim

2. All such claims shall be filed with the Authority for College, Institution, Department or Agency.

3. Failure on the part of a creditor to file such statement prior to such final settlement will relieve the State of Colorado from any and all liability for such claim

Authorized Facility Manager or Authorized Individual

Name: _____
Approval Date: _____
Agency: _____
Phone: _____
Fax: _____
Email: _____

MEDIA OF PUBLICATION:

PUBLICATION DATES:
First:

Second: (At least ten (10) days prior to above settlement date)

NOTES TO EDITOR:

Transmit two (2) copies of the Affidavit of Publication, and invoice, to:

SECTION 01 10 00

SUMMARY

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Contract description.

B. Contractor's use of site and premises.

C. Future work.

D. Work sequence.

E. Owner occupancy.

F. Specification Conventions.

1.2 CONTRACT DESCRIPTION

A. Work of the Project includes expansion renovation of the Art/Music complex – Hoag Hall and Music Classroom Building. Also includes replacement of existing exterior stair at lower level Art-Music plaza, including but not limited to :
   1. Remove and Replace existing foam and built-up roofing systems including insulation, flashing, roof drains, and miscellaneous items.\
   2. Demolition, removal of existing exterior concrete stair and structure, replacing with a new steel/ aluminum stair.
   3. Perform Work for a stipulated sum in accordance with Conditions of the Contract.

1.3 CONTRACTOR'S USE OF SITE

A. Limit use of site to allow:
   1. Owner occupancy and emergency egress from interior and exterior areas of the building.
   2. Owner’s schedule for non-work days to accommodate critical tenant class or function schedules.

B. Access to Site: As coordinated by the Owner.

C. Construction Operations: Limited to areas as described by the Owner.

D. Time Restrictions for Performing the Work: As described by the Owner to accommodate class schedules and/or special events on campus.

E. Utility or Equipment Outages and Shutdown: Only per written coordination and scheduling with the Owner.

F. Access through the building interiors for construction activities is prohibited except for possible coordination of the building exit paths.

G. Work which requires interior building access/work shall be scheduled with the owner 48 hours in advance. Work shall conform to the Owner’s building schedule.

H. The Contractor shall protect existing parking, walking and courtyard areas with tarps, wood panels or other materials, to prevent damage from equipment or vehicle oil and hydraulic fluids spills.

1.4 WORK SEQUENCE

A. Construct Work in stages to accommodate Owner's occupancy requirements during construction period, coordinate construction schedule and operations with Owner.

B. Work shall be started and completed in its entirety without phased work schedules. Up to three (3) punch-lists may be generated, one each for each building’s roof and one for the exterior stair each immediately following completion of that portion of the Work.

1.5 OWNER OCCUPANCY

A. The Owner will occupy the buildings and the site during the entire period of construction for the conduct of normal operations on campus.

B. Cooperate with Owner to minimize conflict, and to facilitate Owner's operations.

C. Schedule the Work to accommodate Owner occupancy and exiting requirements.

1.6 SPECIFICATION CONVENTIONS

A. These specifications are written in imperative mood and streamlined form. This imperative language is directed to the Contractor, unless specifically noted otherwise. The words “shall be” are included by inference where a colon (:) is used within sentences or phrases.

END OF SECTION

SECTION 01 23 00

ALTERNATES

PART 1 GENERAL

1.1 SUMMARY:

A. WORK INCLUDED: This Section includes a summary of Alternates to be included in the Contractor's bid and specifies administrative and procedural requirements for the submission and acceptance of Alternatives.

B. RELATED WORK:

1. Refer to Drawings and individual Specification Sections for additional provisions or more complete descriptions of Alternates.

2. Refer to Section 01 "Product Requirements" for procedures for product options and submission of Contractor-proposed substitutions.

C. RELATED DOCUMENTS: Drawings, General and Supplementary Conditions, and applicable provisions of other Division 1 Sections apply to this Section.

1.2 PROCEDURES:

A. PURPOSE: In order to enable the Owner to compare total costs where alternate materials, products, equipment, methods, or finishes might be used in the Work, Alternates have been proposed as described on the Drawings and in the various Sections of theses Specifications.

B. MODIFICATIONS TO RELATED WORK: If the Owner elects to not accept one or more of the proposed Alternates, make all modifications to the Work required by the furnishing and installation of the Alternate item, without additional cost or other adjustment to the Contract Sum other than as noted on the Bid Form for the Alternate.

C. METHOD OF PROPOSAL: The Bid Form contains spaces for stating the additional cost or deduction which will result from the Owner's acceptance of each proposed Alternate. No further adjustment will be made to the Contract Sum other than the stated amount for each Alternate, if accepted.

PART 2 PRODUCTS (Not Used)

PART 3 EXECUTION

3.1 SCHEDULE OF ALTERNATES:

A. ADDITIVE ALTERNATE NO. 1-

1. Base Bid: Provide aluminum panels with standoffs at the galvanized steel stair structure and guardrails.

2. Alternate Bid: Delete the aluminum panels with standoffs at the galvanized steel stair structure and guardrails. Provide glass panels with standoffs at the galvanized steel stair structure and guardrails.

END OF SECTION

SECTION 01 25 00

SUBSTITUTION PROCEDURES

PART 1 GENERAL

1.1 SUMMARY

A. Section includes administrative and procedural requirements for substitutions.

B. Related Sections:
   1. Division 01 Section "Alternates" for products selected under an alternate.
   2. Division 01 Section "Product Requirements" for requirements for submitting comparable product submittals for products by listed manufacturers.
   3. Divisions 02 through 33 Sections for specific requirements and limitations for substitutions.

1.2 DEFINITIONS

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

1.3 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. Substitution Request – During the Bidding Period: Use CSI Form 1.5C or form acceptable to Owner and Architect. Architect will consider requests for Substitution only prior to (5) days before project Bid.
   2. Substitution Request – Post Bid: Not permitted except as allowed elsewhere in this section.
   3. Documentation: Show compliance with requirements for substitutions and the following, as applicable:
      a. Statement indicating why specified product or fabrication or installation cannot be provided, if applicable.
      b. Coordination information, including a list of changes or modifications needed to other parts of the Work and to construction performed by Owner and separate contractors, that will be necessary to accommodate proposed substitution. Changes in the Work are the Contractor’s financial and performance responsibility.
      c. Detailed comparison 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 installations for completed projects with project names and addresses and names and addresses of architects and owners.

h. Material test reports from a 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 or applicable code organization.

j. Detailed comparison of Contractor's construction schedule using proposed substitution with products specified for the Work, including effect on the overall Contract Time. If specified product or method of construction cannot be provided within the 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 of proposed substitution to produce indicated results.

4. Architect's Action: If necessary, Architect will request additional information or documentation for evaluation within seven days of receipt of a 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: Pre-Bid Addendum, 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.

1.4 QUALITY ASSURANCE

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

1.5 PROCEDURES

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

PART 2 GENERAL

2.1 SUBSTITUTIONS

A. Substitutions for Cause: Submit requests for substitution immediately upon discovery of need for change, but not later than 15 days prior to time required for preparation and review of related submittals. Substitutions relating to delivery time of an item shall only be made prior to Bid.

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. Substitution request is fully documented and properly submitted.
c. Requested substitution will not adversely affect Contractor's construction schedule.
d. Requested substitution has received necessary approvals of authorities having jurisdiction.
e. Requested substitution is compatible with other portions of the Work.
f. Requested substitution has been coordinated with other portions of the Work.
g. Requested substitution provides specified warranty.
h. 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 SECTION

SECTION 01 26 00

CONTRACT MODIFICATION PROCEDURES

PART 1 GENERAL

1.1 SUMMARY

A. Section includes administrative and procedural requirements for handling and processing Contract modifications.

B. Related Sections:
   1. Division 01 Section "Product Requirements" for administrative procedures for handling requests for substitutions made after Contract award.

1.2 MINOR CHANGES IN THE WORK

A. Architect will issue supplemental instructions authorizing minor changes in the Work, not involving adjustment to the Contract Sum or the Contract Time, on AIA Document G710, "Architect's Supplemental Instructions."

1.3 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 Specifications.
   1. Proposal Requests issued by Architect are not instructions either to stop work in progress or to execute the proposed change.
   2. Within time specified in 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 an 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.
      e. Quotation Form: Use forms acceptable to Owner and Architect.

B. Contractor-Initiated Proposals: If latent or changed conditions require modifications to the Contract, Contractor may initiate a claim by submitting a request for a 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 taxes, 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 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.
6. Comply with requirements in Division 01 Section "Substitution Procedures" if the proposed change requires substitution of one product or system for product or system specified.
7. Proposal Request Form: Use form acceptable to Owner and Architect.

1.4 CHANGE ORDER PROCEDURES

A. Change Order Bulletin: Architect will issue a Change Order Bulletin on State of Colorado Form SC-6.311 – Change Order Bulletin. A Change Order Bulletin instructs Contractor to prepare pricing for a change in the Work, for possible inclusion in a subsequent Change Order. Sample form attached at the end of this Section.
   1. The Change Order Bulletin shall contain a complete description of change in the Work. It shall also designate the method to be followed to determine change in the Contract Sum or the Contract Time.

B. Change Order Proposal: Contractor will prepare a Change Order Proposal on State of Colorado Form SC-6.312 – Change Order Proposal. Change Order Proposal shall include Contractor’s detailed proposal for work including additional / reduced costs and time in accordance with Article 35 of the General Conditions. Sample form attached at the end of this Section.

C. Change Order: Following review, Architect will issue a Change Order on State of Colorado Form SC-6.312 – Change Order to finalize the work and costs included in the Change Order Proposal. No work is to proceed until Change Order has been fully executed by Owner. Sample form attached at the end of this Section.
   1. Package order for signature and approval, all stapled together:
      a. Change Order.
      b. Change Order Proposal with back-up documentation.
      c. Change Order Bulletin.

D. Documentation: Maintain detailed records on a time and material basis of work required by the Change Order Bulletin.
   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 SECTION

SECTION 01 31 00

PROJECT MANAGEMENT AND COORDINATION

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Coordination and project conditions.

B. Field engineering.

C. Preconstruction meeting.

D. Site mobilization meeting.

E. Progress meetings.

F. Pre-installation meetings.

G. Cutting and patching.

H. Special procedures.

1.2 COORDINATION AND PROJECT CONDITIONS

A. Coordinate scheduling, submittals, and Work of various sections of Project Manual to ensure efficient and orderly sequence of installation of interdependent construction elements, with provisions for accommodating items installed later.

B. Coordinate scheduling with the Owner’s class and campus use schedule.

C. Coordinate scheduling to minimize the risk of blocking access to the building’s required egress paths.

D. Verify utility requirements and characteristics of operating equipment are compatible with building utilities. Coordinate work of various sections having interdependent responsibilities for installing, connecting to, and placing in service, operating equipment.

E. Coordinate reuse requirements for support and operation of existing mechanical and electrical Work indicated diagrammatically on Drawings.

F. In finished areas except as otherwise indicated, conceal pipes, and wiring within construction. Coordinate locations of fixtures and outlets with finish elements.

G. Coordinate completion and clean-up of Work of separate sections in preparation for Substantial Completion and for portions of Work designated for Owner's partial occupancy.

H. After Owner occupancy of premises, coordinate access to site for correction of defective Work and Work not in accordance with Contract Documents, to minimize disruption of Owner's activities.

I. Within 5 days of commencement of construction, submit a list of Contractor's principal staff assigned to the project. Identify individuals, their responsibilities, their locations, email addresses and phone numbers.

1.3 PRECONSTRUCTION MEETING

A. Owner will schedule meeting after Notice to Proceed.

B. Attendance Required: Owner, Architect/Engineer, Waterproofing subcontractor, Steel subcontractor and Contractor.

C. Agenda:
1. Execution of Owner-Contractor Agreement.
2. Submission of executed bonds and insurance certificates.
3. Distribution of Contract Documents.
4. Submission of list of Subcontractors, list of products, schedule of values, and progress schedule.
5. Designation of personnel representing parties in Contract, and Architect/Engineer.
6. Procedures and processing of field decisions, submittals, substitutions, applications for payments, proposal request, Change Orders, and Contract closeout procedures.
7. Scheduling.

D. Record minutes and distribute copies within three days after meeting to participants, with two copies to Architect/Engineer, Owner, and those affected by decisions made.

1.4 SITE MOBILIZATION MEETING

A. Owner will schedule meeting at Project site prior to Contractor occupancy.

B. Attendance Required: Owner, Architect/Engineer, Contractor and Contractor's Superintendent.

C. Agenda:
1. Use of premises by Owner and Contractor.
2. Owner's requirements and partial occupancy.
3. Construction facilities and controls provided by Owner.
4. Temporary utilities provided by Owner.
5. Survey and building layouts.
6. Security and housekeeping procedures.
7. Schedules.
8. Application for payment procedures.
9. Procedures for testing.
10. Procedures for maintaining record documents.
11. Requirements for start-up of equipment.
12. Inspection and acceptance of equipment put into service during construction period.

D. Record minutes and distribute copies within three days after meeting to participants, with two copies to Architect/Engineer, Owner, and those affected by decisions made.

1.5 PROGRESS MEETINGS

A. Schedule and administer meetings throughout progress of the Work at maximum once weekly intervals.

B. Make arrangements for meetings, prepare agenda with copies for participants and preside at meetings.

C. Attendance Required: Job superintendent, major subcontractors and suppliers, Owner, Architect/Engineer, as appropriate to agenda topics for each meeting.

D. Agenda:
1. Review minutes of previous meetings.
2. Review of Work progress.
3. Field observations, problems, and decisions.
4. Identification of problems impeding planned progress.
5. Review of submittals schedule and status of submittals.
6. Review of off-site fabrication and delivery schedules.
7. Maintenance of progress schedule.
8. Corrective measures to regain projected schedules.
9. Planned progress during succeeding work period.
10. Coordination of projected progress.
11. Maintenance of quality and work standards.
12. Effect of proposed changes on progress schedule and coordination.
13. Other business relating to Work.

E. Record minutes and distribute copies within three days after meeting to participants, with two copies to Architect/Engineer, Owner, and those affected by decisions made.

1.6 PRE-INSTALLATION MEETINGS

A. When required in individual specification sections, convene pre-installation meetings at Project site prior to commencing work of specific section.

B. Require attendance of parties directly affecting, or affected by, Work of specific section.

C. Notify Architect/Engineer five days in advance of meeting date.

D. Prepare agenda and preside at meeting:
1. Review conditions of installation, preparation and installation procedures.
2. Review coordination with related work.
3. Review salient points of related Specification Sections.
4. Verify that the Shop Drawings being used are stamped ‘No Exceptions Taken’ or ‘Exceptions As Noted’.

E. Record minutes and distribute copies within three days after meeting to participants, with two copies to Architect/Engineer, Owner, and those affected by decisions made.

PART 2 PRODUCTS

Not Used.

PART 3 EXECUTION

3.1 CUTTING AND PATCHING

A. Employ original installer or manufacturer's approved installer to perform cutting and patching.

B. Submit written request in advance of cutting or altering elements affecting:
   1. Structural integrity of element.
   2. Integrity of weather-exposed or moisture-resistant elements.
   3. Efficiency, maintenance, or safety of element.
   4. Visual qualities of sight exposed elements.
   5. Work of Owner or separate contractor.

C. Execute cutting, fitting, and patching to complete Work, and to:
   1. Fit the several parts together, to integrate with other Work.
   2. Uncover Work to install or correct ill-timed Work.
   3. Remove and replace defective and non-conforming Work.
   4. Remove samples of installed Work for testing.
   5. Provide openings in elements of Work for penetrations of mechanical and electrical Work.

D. Execute work by methods to avoid damage to other Work, and to provide proper surfaces to receive patching and finishing.

E. Cut masonry and concrete materials using masonry saw or core drill.

F. Restore Work with new products in accordance with requirements of Contract Documents.

G. Fit Work tight to pipes, sleeves, ducts, conduit, and other penetrations through surfaces.

H. Maintain integrity of wall, ceiling, or floor construction; completely seal voids.

I. At penetrations of fire rated walls, partitions, ceiling, or floor construction, completely seal voids with fire rated material to full thickness of penetrated element.

J. Refinish surfaces to match adjacent finishes. For continuous surfaces, refinish to nearest intersection; for assembly, refinish entire unit.

K. Identify hazardous substances or conditions exposed during the Work to Architect/Engineer for decision or remedy.

3.2 SPECIAL PROCEDURES

A. Materials: As specified in product sections; match existing with new products and salvaged products for patching and extending work.

B. Employ original installer or manufacturer's approved installer to perform alteration work.

C. Cut, move, or remove items as necessary for access to alterations and renovation Work. Replace and restore at completion.

D. Remove unsuitable material not marked for salvage, including rotted wood, corroded metals, and deteriorated masonry and concrete. Replace materials as specified for finished Work.

E. Remove debris and abandoned items from area and from concealed spaces.

F. Prepare surface and remove surface finishes to permit installation of new work and finishes.

G. Close openings in exterior surfaces to protect existing work from weather and extremes of temperature and humidity.

H. Remove, cut, and patch Work in manner to minimize damage and to permit restoring products and finishes to original or specified condition.

I. Refinish existing visible surfaces to remain in renovated rooms and spaces, to specified condition for each material, with neat transition to adjacent finishes.

J. Where new Work abuts or aligns with existing, provide smooth and even transition. Patch Work to match existing adjacent Work in texture and appearance.

K. When finished surfaces are cut so that smooth transition with new Work is not possible, terminate existing surface along straight line at natural line of division and submit recommendation to Architect/Engineer for review.

L. Where change of plane of 1/4 inch or more occurs, submit recommendation for providing smooth transition; to Architect/Engineer for review.

M. Patch or replace portions of existing surfaces that are damaged, lifted, discolored, or showing other imperfections from the removal of any existing hardware or other construction activity.

N. Finish surfaces as specified in individual product sections.

O. The Contractor shall safely clean all existing floors and other surfaces of asphaltic, glue or other construction materials.

END OF SECTION

SECTION 01 33 00

SUBMITTAL PROCEDURES

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Submittal procedures.

B. Construction progress schedules.

C. Proposed products list.

D. Product data.

E. Shop drawings.

F. Samples.

G. Design data.

H. Test reports.

I. Certificates.

J. Manufacturer's instructions.

K. Manufacturer's field reports.

L. Construction photographs.

1.2 SUBMITTAL PROCEDURES

A. After careful review by the Contractor’s Project Superintendent and Project Engineer, and verification that the submittal is substantially correct and complete, transmit each submittal with Architect/Engineer accepted form.

B. Sequentially number transmittal forms starting with the relevant Specification Section. Mark revised submittals with the original Specification Section number and sequential alphabetic suffix. Ex: 08 41 13 – 1, A.

C. Identify Project, Contractor, subcontractor and supplier, pertinent drawing and detail number, and specification section number, appropriate to submittal.

D. Apply Contractor's stamp, signed or initialed certifying that review, approval, verification of products required, field dimensions, adjacent construction Work, and coordination of information is in accordance with requirements of the Work and Contract Documents.

E. Schedule submittals to expedite Project, and deliver to Architect/Engineer at business address or weekly meetings. Coordinate submission of related items so that full systems or integrally related systems are available for coordinated review.

F. For each submittal for review, allow 5 days excluding delivery time to and from Contractor. Submittals will be returned to the Contractor at the weekly meetings unless the Contractor requests and bears the cost of alternate delivery methods.

G. Identify variations from Contract Documents and product or system limitations that may be detrimental to successful performance of completed Work.

H. Allow space on submittals for Contractor and Architect/Engineer review stamps.

I. When revised for resubmission, identify changes made since previous submission.

J. Distribute copies of reviewed submittals as appropriate. Instruct parties to promptly report inability to comply with requirements.

K. Submittals not requested will not be recognized or processed.

1.3 CONSTRUCTION PROGRESS SCHEDULES

A. Submit initial schedules within 7 days after date established in Notice to Proceed. After review, resubmit required revised data within ten days.

B. Submit revised Progress Schedules with each Application for Payment.

C. Distribute copies of reviewed schedules to Project site file, subcontractors, suppliers, and other concerned parties.

D. Instruct recipients to promptly report, in writing, problems anticipated by projections indicated in schedules.

E. Show complete sequence of construction by activity, identifying Work of separate stages and other logically grouped activities. Indicate early and late start, early and late finish, float dates, and duration.

F. Indicate estimated percentage of completion for each item of Work at each submission.

G. Submit separate schedule of submittal dates for shop drawings, product data, and samples, and dates reviewed submittals will be required from Architect/Engineer. Indicate decision dates for selection of finishes.

H. Indicate delivery dates for Owner furnished products and products identified under Allowances.

I. Revisions To Schedules:
   1. Indicate progress of each activity to date of submittal, and projected completion date of each activity.
   2. Identify activities modified since previous submittal, major changes in scope, and other identifiable changes.

3. Prepare narrative report to define problem areas, anticipated delays, and impact on Schedule. Report corrective action taken, or proposed, and its effect including effect of changes on schedules of separate contractors.

1.4 PROPOSED PRODUCTS LIST

A. Within 10 days after date of Notice to Proceed, submit list of major products proposed for use, with name of manufacturer, trade name, and model number of each product.

B. For products specified only by reference standards, give manufacturer, trade name, model or catalog designation, and reference standards.

1.5 PRODUCT DATA

A. Product Data: Submit to Architect/Engineer for review for limited purpose of checking for conformance with information given and design concept expressed in Contract Documents.

B. Submit number of copies Contractor requires, plus three copies Architect/Engineer will retain.

C. Mark each copy to identify applicable products, models, options, and other data. Supplement manufacturers' standard data to provide information specific to this Project.

D. Indicate product utility and electrical characteristics, utility connection requirements, and location of utility outlets for service for functional equipment and appliances.

E. After review, produce copies and distribute in accordance with SUBMITTAL PROCEDURES article and for record documents described in Section 01 “EXECUTION”.

1.6 SHOP DRAWINGS

A. Shop Drawings: Submit to Architect/Engineer for review for limited purpose of checking for conformance with information given and design concept expressed in Contract Documents.

B. Submit PDF format electronic files with Contractor’s electronic stamp and signature indicating the Contractor’s review and acceptance of conformance with information given and design concept expressed in Contract Documents

C. After review, produce copies and distribute in accordance with SUBMITTAL PROCEDURES article and for record documents described in Section 01 “EXECUTION”.

D. Maintain one printed copy each of stamped and signed submittal at the Project Site at all times.

1.7 SAMPLES

A. Samples: Submit to Architect/Engineer for review for limited purpose of checking for conformance with information given and design concept expressed in Contract Documents.

B. Samples For Selection as Specified in Product Sections:
   1. Submit to Architect/Engineer for aesthetic, color, or finish selection.
   2. Submit samples of finishes from full range of manufacturers' standard colors, in custom colors selected, textures, and patterns for Architect/Engineer selection.

C. Submit samples to illustrate functional and aesthetic characteristics of Products, with integral parts and attachment devices. Coordinate sample submittals for interfacing work.

D. Include identification on each sample, with full Project information.

E. Submit number of samples specified in individual specification sections, two minimum; Architect/Engineer will retain one sample.

F. Reviewed samples, which may be used in the Work, are indicated in individual specification sections.

G. Samples will not be used for testing purposes unless specifically stated in specification section.

1.8 DESIGN DATA

A. Submit for Architect/Engineer's knowledge as contract administrator or for Owner.

B. Submit for information for limited purpose of assessing conformance with information given and design concept expressed in Contract Documents.

1.9 TEST REPORTS

A. Submit for Architect/Engineer's knowledge as contract administrator or for Owner.

B. Submit test reports for information for limited purpose of assessing conformance with information given and design concept expressed in Contract Documents.

1.10 CERTIFICATES

A. When specified in individual specification sections, submit certification by manufacturer, installation/application subcontractor, or Contractor to Architect/Engineer, in quantities specified for Product Data.

B. Indicate material or product conforms to or exceeds specified requirements. Submit supporting reference data, affidavits, and certifications as appropriate.

C. Certificates may be recent or previous test results on material or Product, but must be acceptable to Architect/Engineer.

1.11 MANUFACTURER'S INSTRUCTIONS

A. When specified in individual specification sections, submit printed instructions for delivery, storage, assembly, installation, start-up, adjusting, and finishing, to Architect/Engineer for delivery to Owner in quantities specified for Product Data.

B. Indicate special procedures, perimeter conditions requiring special attention, and special environmental criteria required for application or installation.

1.12 MANUFACTURER'S FIELD REPORTS

A. Submit reports for Architect/Engineer's benefit as contract administrator or for Owner.

B. Submit report in duplicate within 30 days of observation to Architect/Engineer for information.

C. Submit for information for limited purpose of assessing conformance with information given and design concept expressed in Contract Documents.

1.13 CONSTRUCTION PHOTOGRAPHS

A. Provide photographs of the existing buildings and adjacent site areas as evidence of existing project conditions prior to the start of work produced by digital camera and in file format acceptable to the Owner and Architect/Engineer.

B. Take photographs from all directions to document all existing building and site components.

C. Identify each image with indication of name of Project, orientation of view and date.

PART 2 PRODUCTS

Not Used.

PART 3 EXECUTION

Not Used.

END OF SECTION

SECTION 01 40 00

QUALITY REQUIREMENTS

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Quality control and control of installation.

B. Tolerances

C. References.

D. Testing and inspection services.

E. Manufacturers' field services.

F. Examination.

G. Preparation.

1.2 QUALITY CONTROL AND CONTROL OF INSTALLATION

A. Monitor quality control over suppliers, manufacturers, products, services, site conditions, and workmanship, to produce Work of specified quality.

B. Comply with manufacturers' instructions, including each step in sequence.

C. When manufacturers' instructions conflict with Contract Documents, request clarification from the Architect/Engineer before proceeding.

D. Comply with specified standards as minimum quality for the Work except where more stringent tolerances, codes, or specified requirements indicate higher standards or more precise workmanship.

E. Perform Work by persons qualified to produce required and specified quality.

F. Verify field measurements are as indicated on Shop Drawings or as instructed by manufacturer.

G. Secure products in place with positive anchorage devices designed and sized to withstand stresses, vibration, physical distortion, or disfigurement.

1.3 TOLERANCES

A. Monitor fabrication and installation tolerance control of products to produce acceptable Work. Do not permit tolerances to accumulate.

B. Comply with manufacturers' tolerances. When manufacturers' tolerances conflict with Contract Documents, request clarification from Architect/Engineer before proceeding.

C. Adjust products to appropriate dimensions; position before securing products in place.

1.4 REFERENCES

A. For products or workmanship specified by association, trade, or other consensus standards, complies with requirements of standard, except when more rigid requirements are specified or are required by applicable codes.

B. Conform to reference standard by date of issue current on date of Contract Documents, except where specific date is established by code.

C. Obtain copies of standards where required by product specification sections.

D. When specified reference standards conflict with Contract Documents, request clarification from Architect/Engineer before proceeding.

E. Neither contractual relationships, duties, nor responsibilities of parties in Contract nor those of Architect/Engineer shall be altered from Contract Documents by mention or inference otherwise in reference documents.

1.5 MOCK-UP REQUIREMENTS

(Not Used)

1.6 TESTING AND INSPECTION SERVICES

A. Owner will employ and pay for specified services of an independent firm to perform testing and inspection. The independent firm will perform tests, inspections and other services specified in individual specification sections and as required by Architect/Engineer or Owner.
   1. Laboratory: Authorized to operate at Project location in State of Colorado.
   2. Laboratory Staff: Maintain full time registered Engineer on staff to review services.
   3. Testing Equipment: Calibrated at reasonable intervals with devices of accuracy traceable to National Bureau of Standards or accepted values of natural physical constants.

B. Testing, inspections and source quality control may occur on or off project site. Perform off-site testing as required by Architect/Engineer or Owner.

C. Reports will be submitted by independent firm to Architect/Engineer and Contractor, in duplicate, indicating observations and results of tests and indicating compliance or non-compliance with Contract Documents.

D. Cooperate with independent firm; furnish samples of materials, design mix, equipment, tools, storage, safe access, and assistance by incidental labor as requested.
   1. Notify Architect/Engineer and independent firm 48 hours prior to expected time for operations requiring services.
   2. Make arrangements with independent firm and pay for additional samples and tests required for Contractor's use.

E. Testing and employment of testing agency or laboratory shall not relieve Contractor of obligation to perform Work in accordance with requirements of Contract Documents.

F. Re-testing or re-inspection required because of non-conformance to specified requirements shall be performed by same independent firm on instructions by Architect/Engineer. Payment for re-testing or re-inspection will be charged to Contractor by deducting testing charges from Contract Sum/Price.

G. Agency Responsibilities:
1. Test samples of mixes submitted by Contractor.
2. Provide qualified personnel at site. Cooperate with Architect/Engineer and Contractor in performance of services.
3. Perform specified sampling and testing of products in accordance with specified standards.
4. Ascertain compliance of materials and mixes with requirements of Contract Documents.
5. Promptly notify Architect/Engineer and Contractor of observed irregularities or non-conformance of Work or products.
6. Perform additional tests required by Architect/Engineer.
7. Attend preconstruction meetings and progress meetings.

H. Agency Reports: After each test, promptly submit two copies of report to Architect/Engineer and to Contractor. When requested by Architect/Engineer, provide interpretation of test results. Include the following:
1. Date issued.
2. Project title and number.
3. Name of inspector.
4. Date and time of sampling or inspection.
5. Identification of product and specifications section.
6. Location in Project.
7. Type of inspection or test.
8. Date of test.
9. Results of tests.
10. Conformance with Contract Documents.

I. Limits On Testing Authority:
1. Agency or laboratory may not release, revoke, alter, or enlarge on requirements of Contract Documents.
2. Agency or laboratory may not approve or accept any portion of the Work.
3. Agency or laboratory may not assume duties of Contractor.
4. Agency or laboratory has no authority to stop the Work.

1.7 MANUFACTURERS' FIELD SERVICES

A. When specified in individual specification sections, require material or product suppliers or manufacturers to provide qualified staff personnel to observe site conditions, conditions of surfaces and installation, quality of workmanship, as applicable, and to initiate instructions when necessary.

B. Submit qualifications of observer to Architect/Engineer 30 days in advance of required observations. Observer subject to approval of Architect/Engineer and Owner.

C. Report observations and site decisions or instructions given to applicators or installers that are supplemental or contrary to manufacturers' written instructions.

D. Refer to Section 01 33 00 - SUBMITTAL PROCEDURES, 1.12 MANUFACTURERS' FIELD REPORTS article.

PART 2 PRODUCTS

Not Used.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify existing site conditions and substrate surfaces are acceptable for subsequent Work. Beginning new Work means acceptance of existing conditions.

B. Verify existing substrate is capable of structural support or attachment of new Work being applied or attached.

C. Examine and verify specific conditions described in individual specification sections.

D. Verify utility services are available, of correct characteristics, and in correct locations.

3.2 PREPARATION

A. Clean substrate surfaces prior to applying next material or substance.

B. Seal cracks or openings of substrate prior to applying next material or substance.

C. Apply manufacturer required or recommended substrate primer, sealer, or conditioner prior to applying new material or substance in contact or bond.

END OF SECTION

SECTION 01 50 00

TEMPORARY FACILITIES AND CONTROLS

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Temporary Utilities:
   1. Temporary electricity.
   2. Temporary lighting for construction purposes.
   3. Telephone service.
   4. Temporary water service.
   5. Temporary sanitary facilities.

B. Construction Facilities:
   1. Field offices and sheds.
   2. Vehicular access.
   3. Parking.
   4. Progress cleaning and waste removal.

C. Temporary Controls:
   1. Barriers.
   2. Enclosures and fencing.
   3. Security.
   4. Water control.
   5. Dust control.
   6. Noise control.
   7. Pest control.
   8. Pollution control.
   9. Rodent control.
   10. Erosion control.

D. Removal of utilities, facilities, and controls.

1.2 TEMPORARY ELECTRICITY

A. Utilize Owner’s existing power services, Owner will be responsible for cost of energy used.

B. Provide flexible power cords as required for portable construction tools and equipment. The existing exterior power outlets may be used for construction purposes.

C. Permanent convenience receptacles inside the buildings may not be utilized during construction unless specifically designated by the Owner.

1.3 TEMPORARY LIGHTING FOR CONSTRUCTION PURPOSES

A. Provide and maintain incandescent lighting for construction operations, owner occupancy and building egress if needed to achieve minimum lighting level of 2 watt/sq ft.

B. Maintain lighting and provide routine repairs.

C. Permanent building lighting may be utilized during construction.

1.4 TELEPHONE SERVICE

A. Provide cellular phone service numbers for on-site personnel. Cellular phone service numbers for personnel who are not on-site each day of the work are not acceptable.

1.5 TEMPORARY WATER SERVICE

A. Provide for suitable quality water service as needed to maintain specified conditions for construction operations. Water is available from the Owner's source. Excessive or wasteful water use will result in separate metering and reimbursement to the Owner for cost of water used.

B. Extend branch piping with outlets located so water is available by hoses with threaded connections. Provide temporary pipe insulation to prevent freezing.

1.6 TEMPORARY SANITARY FACILITIES

A. Provide and maintain required facilities and enclosures. Existing facility use is not permitted. Provide facilities at time of project mobilization.

B. At end of construction, return existing facilities used for construction operations to same or better condition as original condition.

1.7 FIELD OFFICES AND SHEDS

A. Designated areas of site may be used for field offices and for storage:
1. As negotiated with Owner Representative.

B. Project meetings may be held at the Campus Facilities Offices.

C. Storage Areas And Sheds: Size to storage requirements for products of individual Sections, allowing for access and orderly provision for maintenance and for inspection of products to requirements of Section 01 – "PRODUCT REQUIREMENTS".

D. Removal: At completion of Work remove buildings, foundations, utility services, and debris. Restore areas.

1.8 VEHICULAR ACCESS

A. NO vehicle of any type or size, including motorized carts, shall ever be permitted on the Art/Music green-roof plaza, hard or planted services.

B. Use roads and access points as approved by the Owner Representative.

C. Provide unimpeded access for emergency vehicles. Maintain 25 feet wide driveways with turning space between and around combustible materials.

D. Provide and maintain access to fire hydrants and control valves free of obstructions.

E. Only use designated existing on-site roads for construction traffic.

F. Concrete sidewalks, roads, pads or other surfaces shall be protected from construction and vehicle fluids of any kind.

G. Contractor shall repair or replace any area damaged, broken or stained by vehicle traffic and equipment placement (i.e. concrete, asphalt, ground, lawn or landscape areas and sprinkler systems).

1.9 PARKING

A. Locate as approved by the Owner Representative.

B. When site space is not adequate, provide additional off-site parking.

C. Only use of existing on-site streets and driveways designated for construction traffic is permitted. Tracked vehicles not allowed on paved areas.

D. Use of designated areas of existing parking facilities used by construction personnel is permitted only as approved by the Owner Representative.

E. Do not allow heavy vehicles or construction equipment in parking areas or on the building structure.

F. Permanent Pavements And Parking Facilities:
   1. Avoid traffic loading beyond paving design capacity. Tracked vehicles not allowed.

G. Maintenance:
   1. Maintain traffic and parking areas in sound condition free of materials, construction equipment, products, mud, snow, and ice.
   2. Maintain existing and permanent paved areas used for construction; promptly repair breaks, potholes, low areas, standing water, and other deficiencies, to maintain paving and drainage in original, or specified, condition.

H. Removal, Repair:
   1. Repair permanent facilities damaged by use, to specified condition.

1.10 PROGRESS CLEANING AND WASTE REMOVAL

A. Maintain areas free of waste materials, debris, and rubbish. Maintain site in clean and orderly condition.

B. Remove debris and rubbish from pipe chases, plenums, attics, crawl spaces, and other closed or remote spaces, prior to enclosing spaces.

C. Broom and vacuum clean interior areas subjected to construction dust or debris.

D. Collect and remove waste materials, debris, and rubbish from site weekly and dispose off-site.

E. Open free-fall chutes are not permitted. Terminate closed chutes into appropriate containers with lids.

1.11 BARRIERS

A. Provide barriers to prevent unauthorized entry to construction areas to allow for Owner's use of site, and to protect existing facilities and adjacent properties from damage from construction operations.

B. Provide protection for all existing plants to remain. Replace damaged plants.

C. Protect non-owned vehicular traffic, stored materials, site, and structures from damage.

1.12 ENCLOSURES AND FENCING

A. Construction: Commercial grade chain link fence.

B. Provide 6 feet high fence around active areas of excavation or construction activities, equip vehicular and pedestrian gates with locks.

1.13 SECURITY

A. Security Program:
   1. Protect Work from theft, vandalism, and unauthorized entry.

B. Entry Control:
   1. Restrict entrance of persons onto unsafe or in process entryways.
   2. Allow entrance only to authorized persons with proper identification.

C. Restrictions:
   1. Do no work on days indicated in Owner-Contractor Agreement.

1.14 WATER CONTROL

A. Maintain building envelope drainage. Maintain envelope free of water penetration.

1.15 DUST CONTROL

A. Execute Work by methods to minimize raising dust from construction operations.

B. Provide positive means to prevent air-borne dust from dispersing into atmosphere and/or the existing air handling equipment.

C. All building intake louvers within 50’ of construction activities shall be protected with temporary filters.

1.16 NOISE & CONTROL

A. Provide methods, means, and facilities to minimize noise from and noise produced by construction operations.

B. The Contractor shall coordinate all construction activities with the University staff and Project Manager to minimize the noise and noise distractions to the occupants of the building.

1.17 PEST CONTROL

A. Provide methods, means, and facilities to prevent pests and insects from damaging the Work.

1.18 POLLUTION CONTROL

A. Provide methods, means, and facilities to prevent contamination of soil, water, and atmosphere from discharge of noxious, toxic substances, and pollutants produced by construction operations.

B. Comply with pollution and environmental control requirements of authorities having jurisdiction.

C. The Contractor shall use pollution and odor reducing equipment.

1.19 RODENT CONTROL

A. Provide methods, means, and facilities to prevent rodents from accessing or invading premises.

1.20 EROSION CONTROL

A. Protect all adjacent, existing area drains from sediment, contaminants or other possible blockage materials.

B. Existing area drains are assumed to be in working condition prior to the start of construction or demolition. Any drain not functioning during or after construction shall be cleared at the Contractor’s expense.

1.21 REMOVAL OF UTILITIES, FACILITIES, AND CONTROLS

A. Remove temporary utilities, equipment, facilities, and materials, prior to Substantial Completion inspection.

B. Clean and repair damage caused by installation or use of temporary work.

C. Restore existing and permanent facilities used during construction to original condition. Restore permanent facilities used during construction to specified condition.

PART 2 PRODUCTS

Not Used.

PART 3 EXECUTION

Not Used.

END OF SECTION

SECTION 01 60 00

PRODUCT REQUIREMENTS

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Products.

B. Product delivery requirements.

C. Product storage and handling requirements.

D. Product options.

E. Product substitution procedures.

1.2 PRODUCTS

A. Furnish products of qualified manufacturers suitable for intended use. Furnish products of each type by single manufacturer unless specified otherwise.

B. Do not use materials and equipment removed from existing premises, except as specifically permitted by Contract Documents.

C. Furnish interchangeable components from same manufacturer for components being replaced.

D. The Contractor shall use “Low Odor” materials and products (i.e. solvents, coatings and cleaning solutions) when available as a manufacturer or product option.

1.3 PRODUCT DELIVERY REQUIREMENTS

A. NO product delivery shall be allowed across the Art/Music green-roof plaza, hard or planted surfaces.

B. Transport and handle products in accordance with manufacturer's instructions.

C. Promptly inspect shipments to ensure products comply with requirements, quantities are correct, and products are undamaged.

D. Provide equipment and personnel to handle products by methods to prevent soiling, disfigurement, or damage.

1.4 PRODUCT STORAGE AND HANDLING REQUIREMENTS

A. NO storage of any kind shall be allowed on the Art/Music green-roof plaza, hard or planted surfaces.

B. Store and protect products in accordance with manufacturers' instructions.

C. Store with seals and labels intact and legible.

D. Store sensitive products in weather tight, climate controlled, enclosures in an environment favorable to product.

E. For exterior storage of fabricated products, place on sloped supports above ground.

F. Provide bonded off-site storage and protection when site does not permit on-site storage or protection.

G. Cover products subject to deterioration with impervious sheet covering. Provide ventilation to prevent condensation and degradation of products.

H. Store loose granular materials on solid flat surfaces in well-drained area. Prevent mixing with foreign matter.

I. Provide equipment and personnel to store products by methods to prevent soiling, disfigurement, or damage.

J. Arrange storage of products to permit access for inspection. Periodically inspect to verify products are undamaged and are maintained in acceptable condition.

1.5 PRODUCT OPTIONS

A. Products Specified by Reference Standards or by Description Only: Any product meeting those standards or description.

B. Products Specified by Naming One or More Manufacturers: Products of one of manufacturers named and meeting specifications, no options or substitutions allowed.

C. Products Specified by Naming One or More Manufacturers with Provision for Substitutions: Submit request for substitution for any manufacturer not named in accordance with the following article.

PART 2 PRODUCTS

Not used.

PART 3 EXECUTION

Not Used.

END OF SECTION

SECTION 01 73 00

EXECUTION

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Closeout procedures.

B. Final cleaning.

C. Demonstration and instructions.

D. Protecting installed construction.

E. Project record documents.

F. Operation and maintenance data.

G. Manual for materials and finishes.

H. Manual for equipment and systems.

I. Product warranties and product bonds.

1.2 CLOSEOUT PROCEDURES

A. Submit written certification that Contract Documents have been reviewed, Work has been inspected, and that Work is complete in accordance with Contract Documents and ready for Architect/Engineer's review.

B. Provide submittals to Architect/Engineer required by authorities having jurisdiction.

C. Submit final Application for Payment identifying total adjusted Contract Sum, previous payments, and sum remaining due.

D. Owner will occupy all portions of buildings as specified in Section 01 10 00 “SUMMARY”.

1.3 FINAL CLEANING

A. Execute final cleaning prior to final project assessment for each individual building.

B. Clean interior and exterior glass, surfaces exposed to view; remove temporary labels, stains and foreign substances, polish transparent and glossy surfaces, vacuum adjacent interior carpeted and soft surfaces.

C. Clean equipment and fixtures to sanitary condition with cleaning materials appropriate to surface and material being cleaned.

D. Clean site; sweep paved areas, rake clean landscaped surfaces.

E. Remove waste and surplus materials, rubbish, and construction facilities from site.

F. If the Owner completes any cleaning required to be done by the Contractor the Owner shall recoup, from the Contractor, costs associated with the cleaning.

1.4 STARTING OF SYSTEMS

Not used.

1.5 DEMONSTRATION AND INSTRUCTIONS

A. Demonstrate operation and maintenance of products to Owner's personnel two weeks prior to date of Substantial Completion.

B. Utilize operation and maintenance manuals as basis for instruction. Review contents of manual with Owner's personnel in detail to explain all aspects of operation and maintenance.

C. Demonstrate trouble-shooting, servicing and maintenance, of each system at scheduled time, at designated location.

D. Prepare and insert additional data in operations and maintenance manuals when need for additional data becomes apparent during instruction.

1.6 TESTING, ADJUSTING AND BALANCING

Not used.

1.7 PROTECTING INSTALLED CONSTRUCTION

A. Protect installed Work and provide special protection where specified in individual specification sections.

B. Provide temporary and removable protection for installed products. Control activity in immediate work area to prevent damage.

C. Provide protective coverings at walls, projections, jambs, sills, and soffits of openings.

D. Protect finished floors, stairs, and other surfaces from traffic, dirt, wear, damage, or movement of heavy objects, by protecting with durable sheet materials.

E. Prohibit traffic from landscaped areas.

1.8 PROJECT RECORD DOCUMENTS

A. Maintain on site one set of the following record documents; record actual revisions to the Work:
   1. Drawings.
   2. Specifications.
   3. Addenda.
   4. Change Orders and other modifications to the Contract.
   5. Reviewed Shop Drawings, Product Data, and Samples.

6. Manufacturer's instruction for assembly, installation, and adjusting.

B. Ensure entries are complete and accurate, enabling future reference by Owner.

C. Store record documents separate from documents used for construction.

D. Record information concurrent with construction progress, not less than weekly.

E. Specifications: Legibly mark and record at each product section description of actual products installed, including the following:
1. Manufacturer's name and product model and number.
2. Product substitutions or alternates utilized.
3. Changes made by Addenda and modifications.

F. Record Drawings and Shop Drawings: Legibly mark each item to record actual construction including:
1. Field changes of dimension and detail.
2. Details not on original Contract drawings.

G. Submit documents to Architect/Engineer with claim for final Application for Payment.

1.9 OPERATION AND MAINTENANCE DATA

A. Submit data bound in 8-1/2 x 11 inch (A4) text pages, three D side ring binders with durable plastic covers.

B. Prepare binder cover with printed title "OPERATION AND MAINTENANCE INSTRUCTIONS", title of project, and subject matter of binder when multiple binders are required.

C. Internally subdivide binder contents with permanent page dividers, logically organized as described below; with tab titling clearly printed under reinforced laminated plastic tabs.

D. Record Drawings and Shop Drawings: Provide with reinforced punched binder tab. Bind in with text; fold larger drawings to size of text pages.

E. Contents: Prepare Table of Contents for each volume, with each product or system description identified, typed on white paper, in three parts as follows:
1. Part 1: Directory, listing names, addresses, and telephone numbers of Architect/Engineer, Contractor, Subcontractors, and major equipment suppliers.
2. Part 2: Operation and maintenance instructions, arranged by system and subdivided by specification section. For each category, identify names, addresses, and telephone numbers of Subcontractors and suppliers. Identify the following:
   a. Significant design criteria.
   b. Maintenance instructions for equipment and systems.
   c. Maintenance instructions for finishes, including recommended cleaning methods and materials, and special precautions identifying detrimental agents.

3. Part 3: Project documents and certificates, including the following:
   a. Shop drawings and product data.
   b. Certificates.

c. Originals of warranties and bonds.

1.10 MANUAL FOR MATERIALS AND FINISHES

A. Submit two copies of preliminary draft or proposed formats and outlines of contents before start of Work. Architect/Engineer will review draft and return one copy with comments.

B. Submit one copy of completed volumes 15 days prior to final inspection. Draft copy be reviewed and returned after final inspection, with Architect/Engineer comments. Revise content of document sets as required prior to final submission.

C. Submit two sets of revised final volumes in final form within 10 days after final inspection.

D. Building Products, Applied Materials, and Finishes: Include product data, with catalog number, size, composition, and color and texture designations. Include information for re-ordering custom manufactured products.

E. Instructions for Care and Maintenance: Include manufacturer's recommendations for cleaning agents and methods, precautions against detrimental agents and methods, and recommended schedule for cleaning and maintenance.

F. Moisture Protection and Weather Exposed Products: Include product data listing applicable reference standards, chemical composition, and details of installation. Include recommendations for inspections, maintenance, and repair.

G. Additional Requirements: As specified in individual product specification sections.

H. Include listing in Table of Contents for design data, with tabbed flysheet and space for insertion of data.

1.11 MANUAL FOR EQUIPMENT AND SYSTEMS

A. Submit two copies of preliminary draft or proposed formats and outlines of contents before start of Work. Architect/Engineer will review draft and return one copy with comments.

B. Submit one copy of completed volumes 15 days prior to final inspection. Draft copy be reviewed and returned after final inspection, with Architect/Engineer comments. Revise content of document sets as required prior to final submission.

C. Submit two sets of revised final volumes in final form within 10 days after final inspection.

D. Each Item of Equipment and Each System: Include description of unit or system, and component parts. Identify function, normal operating characteristics, and limiting conditions. Include performance curves, with engineering data and tests, and complete nomenclature and model number of replaceable parts.

E. Maintenance Requirements: Include routine procedures and guide for preventative maintenance and troubleshooting; disassembly, repair, and reassembly instructions.

F. Include manufacturer's printed operation and maintenance instructions.

G. Additional Requirements: As specified in individual product specification sections.

H. Include listing in Table of Contents for design data, with tabbed dividers and space for insertion of data.

1.12 SPARE PARTS AND MAINTENANCE PRODUCTS

A. Reference individual Product Sections.

1.13 PRODUCT WARRANTIES AND PRODUCT BONDS

A. Obtain warranties and bonds executed in duplicate by responsible subcontractors, suppliers, and manufacturers, within ten days after completion of applicable item of work.

B. Execute and assemble transferable warranty documents and bonds from subcontractors, suppliers, and manufacturers.

C. Verify documents are in proper form, contain full information, and are notarized.

D. Co-execute submittals when required.

E. Include Table of Contents and assemble in three D side ring binder with durable plastic cover.

F. Submit prior to final Application for Payment.

G. Time Of Submittals:
1. Make submittals within ten days after Date of Substantial Completion, prior to final Application for Payment.
2. For items of Work for which acceptance is delayed beyond Date of Substantial Completion, submit within ten days after acceptance, listing date of acceptance as beginning of warranty or bond period.

1.14 MAINTENANCE SERVICE

A. Reference individual Product Sections.

PART 2 PRODUCTS

Not Used.

PART 3 EXECUTION

Not Used.

END OF SECTION

SECTION 02 41 19

SELECTIVE DEMOLITION

PART 1 GENERAL

A. WORK INCLUDED: Work of this Section generally includes the demolition and removal of certain items within, or selective portions of, existing buildings or structures in order to accommodate new or retrofit construction.

B. RELATED DOCUMENTS:

1. Drawings, General and Supplementary Conditions, and applicable provisions of Division 1 Sections apply to this Section.

2. Refer to demolition notes on the Drawings for additional information concerning selective demolition. In the event of conflict between the Drawing notes and the Specification, the more stringent requirement shall govern.

1.2 REFERENCES:

A. REFERENCE STANDARD: Comply with the applicable requirements of ANSI A10.6-1990, *Safety Requirements for Demolition.*

B. INFORMATION FURNISHED BY OTHERS: Neither the Owner nor the Architect will be responsible for interpretations or conclusions made by the Contractor from existing drawing, reports, surveys and other information prepared for the Owner by other professionals. Verify existing conditions recorded by such documents.

1.3 QUALITY ASSURANCE:

A. QUALIFICATIONS: Use workers experienced in the selective demolition of existing structures and finishes. Where materials are indicated to be salvaged or reused in subsequent work, use workers experienced in the trade originally installing the material or who will be re-installing the material in the subsequent work.

B. PRE-BID CONFERENCE: All Bidders are required to attend a pre-bid conference and walk-through at the project site to verify conditions at jobsite. Refer to jobsite conditions listed in the Section.

C. ORDINANCES AND STANDARDS: Perform the Work in accordance with requirements of applicable laws, codes, and ordinances.

1.4 JOBSITE CONDITIONS:

A. CONDITIONS AT SITE: The Owner assumes no responsibility for actual conditions of structures and other improvements to be demolished. Conditions existing at the time of the pre-bid conference will be maintained by the Owner insofar as practicable.

B. VERIFICATION OF JOBSITE CONDITIONS: Visit the site and become thoroughly informed of the character and types of improvements to be removed, Commencement of work on site constitutes acceptance by the Contractor of existing jobsite conditions.

C. SALVAGE:

1. Remove items of salvage value to the Contractor which are not indicated to remain the property of the Owner from the property as the Work progresses. Storage or sale of the removed items on site will not be permitted.

2. Store salvaged items indicated to remain the property of the Owner or to be reused in subsequent work in a safe place on the site as directed by the Architect.

D. EXPLOSIVES: Use of explosives will not be permitted.

E. PROTECTION OF PERSONS AND PROPERTY:

1. Use of “ride on”, “driven”, “walk behind”, “self propelled” or otherwise human occupied or controlled vehicles is prohibited on the Art/Music green-roof structure, hard or planted surfaces.

2. Ensure safe passage of persons around area of demolition. Conduct operations to prevent injury to adjacent buildings, structures, other facilities, improvements and utilities designated to remain, and persons.

3. Provide interior and exterior temporary shoring, bracing, or support as required to prevent movement, settlement or collapse of structures to be demolished, or of adjacent facilities and pavement indicated to remain.

4. Provide enclosed chutes for removal of rubbish from upper levels of structures.

5. Provide sidewalk sheds as required by local building codes for protection of persons on adjacent public sidewalks.

6. Comply with all applicable regulations of the Occupational Health and Safety Administration (OSHA) concerning the safety of the workers and visitors to the site.

F. DAMAGES: Promptly report damages caused to adjacent facilities and improvements by demolition operations to the Owner and Architect. Repair damage at no additional cost to the owner.

G. UTILITY SERVICES:

1. Utility locations are not indicated on the Drawings. It shall be the responsibility of the Contractor to make an accurate survey of existing conditions and verify locations with utility companies prior to commencing demolition work.

2. Maintain existing utilities serving adjacent occupied facilities and protect against damage during demolition operations.

3. Notify proper utility agencies/Owner to confirm or arrange for shut-off of affected utilities. Disconnect and seal indicated utilities before starting demolition operations.

4. In case of damage to utility lines caused by the execution of this Work, the Contractor shall immediately notify the appropriate utility agency/Owner, and shall further be responsible to repair said damage according to the requirement the utility agency/Owner, at no additional cost to the Owner.

PART 2 PRODUCTS

(Not Used)

PART 3 EXECUTION

3.1 EXAMINATION:

A. VERIFICATION OF CONDITIONS: Initial examination shall be done with the Owner and Architect present. Examine areas and conditions under which the work of this Section will be performed. Do not proceed with the work until unsatisfactory conditions have been corrected. Commencement of work implies acceptance of all areas and conditions.

3.2 PREPARATION:

A. EXISTING MATERIALS OR FINISHES TO REMAIN: Where Drawings indicate that existing materials and finishes are to remain, protect such materials and finishes from damage during the course of this Work. Should existing materials or finishes be damaged, patch, repair, and refinish as required to restore to original, like-new condition as determined by the Architect.

1. All materials and finishes to remain that show evidence of removal of adjacent materials, hardware, systems or equipment shall be patched and repaired.

B. PROTECTION OF ACCESS WAYS: Provide plywood, hardboard, or other suitable protection of flooring in all areas of construction, including pathways to building egress. Provide wood blocking or other appropriate protection of walls, corners. And openings. Keep doors to spaces where Work is occurring closed at all times and operational as described by the drawings. Provide appropriate protection of building envelope areas and thresholds.

C. DUST PROTECTION: Erect temporary, tight-fitting, dustproof filters at all adjacent air intake louvers in soffits and exterior walls in areas of the work prior to commencement of demolition. Erect temporary, tight-fitting, dustproof partitions to protect adjacent interior areas from the Work prior to commencement of demolition. Dustproof filters and partitions shall remain in place until completion of all demolition work.

3.3 DEMOLITION

A. POLLUTION CONTROLS: Use water sprinkling, temporary enclosures, and other suitable methods to limit dust and dirt rising and scattering in air to lowest practical level. Comply with governing regulations pertaining to environmental protection. Provide and pay for all necessary connections to the Owner’s provided and designated water source(s).

B. GENERAL PROCEDURES:

1. Include all demolition work shown on the Drawings and demolition required for installation of the Work. All removal shall be done in a workmanlike manner and in such a fashion so that adjoining surfaces will not be damaged.
2. Remove structural framing members and lower to ground by hoists, derricks, or other suitable methods.
3. Locate demolition equipment throughout structure and remove materials so as to not impose excessive loads to supporting walls, floors or framing.

4. Assume responsibility for replacement of all items and repair of any existing finishes damaged during demolition.

C. CLEANING: Clean adjacent structures and improvements of dust, dirt, and debris caused by demolition operations, as directed by Architect or governing authorities. Return adjacent areas to conditions existing prior to start of work.

3.4 DISPOSAL OF DEMOLISHED MATERIALS:

A. GENERAL: Remove debris, rubbish, and other materials resulting from demolition operations from site. Transport materials removed from demolished structure and legally dispose of offsite.

B. BURNING: On-site burning of debris and materials removed from demolished structures will not be permitted.

END OF SECTION

SECTION 03 30 00

CAST-IN-PLACE CONCRETE

PART 1 - GENERAL

1.1. SUMMARY

A. This section specifies cast-in-place concrete, including formwork, reinforcement, concrete materials, mixture design, placement procedures, and finishes, for the following:
   1. Grade beams and pile caps.
   2. Columns
   3. Slabs-on-grade.
   4. Concrete toppings.

B. Related Sections include the following:
   1. Division 31 Section “Drilled Micropiles.”

1.2. DEFINITIONS

A. Cementitious Materials: Portland cement alone or in combination with one or more of the following: Blended hydraulic cement, fly ash and other pozzolana, ground granulated blast-furnace slag, and silica fume; subject to compliance with requirements.

1.3. 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.
   2. Submit substantiating data for each concrete mix design contemplated for use to the Architect/Engineer not less than four (4) weeks prior to the first concrete placement. Data for each mix shall, as a minimum, include the following:
      a. Mix identification designation (unique for each mix submitted).
      b. Statement of intended use for mix.
      c. Mixture proportions and descriptions.
      d. Wed and dry unit weight.
      e. Water/cementitious materials ratio.
      f. Total air content.
      g. Design slump.
      h. Intended method of placement in field.
      i. Required average strength qualification data per ACI 301 3.9.1. and 3.9.2.
      j. Average strength qualification data per trial mix data or field test data per ACI 301 3.9.3.

   3. Shrinkage testing per ASTM C157.

   4. Submit test data showing concrete mixes which come in contact with soils are as durable against sulfate attack as a Type-V cement mix.

C. Steel Reinforcement Shop Drawings: Placing drawings that detail fabrication, bending, and placement. Include bar sizes, lengths, materials, grades, bar schedules, stirrup spacing, bent bar diagrams, bar arrangement, splices and laps, mechanical connections, tie spacing, hoop

spacing, and supports for concrete reinforcement.

1. Show all reinforcing, top and bottom profile of concrete element, supports below, and concrete walls, grade beams, etc. framing into the element.
2. Provide one continuous elevation at ¼-inch scale for all grade beams or walls in a common line. Show packets and openings in shear walls, structural slabs, grade beams, elevation at top of grade beams walls, sections through all grade beams and pilasters, and place sequence of reinforcing for items with more than one reinforcing layer.
3. Show locations of approved construction joints, splices of reinforcing, type of splice used and splice location, grade of all reinforcement used, and specifically identify all ASTM A706 and epoxy-coated reinforcing.

D. Submit Data and installation instructions for void forms: Provide Manufacturer's data on factory-made void pieces. Submit evidence void is of proper size and extent after concrete is placed. Submit evidence void form material has degraded as specified herein.

E. Material Test Reports: For the following, from a qualified testing agency, indicating compliance with requirements:

1. Alkali-Aggregate Reactivity of Aggregates. Submit test reports indicating that fine and coarse aggregates are not "potentially reactive" based on the ASTM C295 or ASTM C1260 (or ASTM C1293) testing limits set forth in Section 5.1 of *"Guide Specification for Concrete Subject to Alkali-Silica Reactions" (2007 Portland Cement Association)*. Alternately, submit ASTM C1567 test reports indicating that the combination of mix ingredients reduces the expansion due to alkali aggregate reactivity such that the mix complies with Section 5.2 of "Guide Specification for Concrete Subject to Alkali-Silica Reactions" (2007 Portland Cement Association). All tests for submitted reports shall have been performed within one (1) year of the submittal date.

F. Material Certificates: For each of the following, signed by manufacturers:

1. Cementitious materials.
2. Admixtures.
3. Form materials and form-release agents.
4. Steel reinforcement and accessories.
5. Fiber reinforcement.
6. Curing compounds.
7. Bonding agents.
8. Repair materials.

G. Placement Notification: Advance notification of concrete placement; submit notification at least 24 hours in advance.

H. Certification of chloride screen effectiveness for penetrating sealers.

I. Proposed location of saw cut joints not indicated on the Contract Drawings.

J. Curing compound data demonstrating specified moisture loss performance.

1.4. QUALITY ASSURANCE

A. Installer Qualifications: A qualified installer who employs on Project personnel qualified as ACI-certified Flatwork Technician and Finisher and a supervisor who is an ACI-certified Concrete Flatwork Technician.

B. Manufacturer Qualifications: A firm experienced in manufacturing ready-mixed concrete products and that complies with ASTM C94/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, acceptable to authorities having jurisdiction, qualified according to ASTM C 1077 and ASTM E 329 for testing indicated, as documented according to ASTM E 548.
   1. Personnel conducting field tests shall be qualified as ACI Concrete Field Testing Technician, Grade 1, according to ACI CP-D1 or an equivalent certification program.
   2. Personnel performing laboratory tests shall be ACI-certified Concrete Strength Testing Technician and Concrete Laboratory Testing Technician, Grade 1. Testing Agency Laboratory Supervisor shall be an ACI-certified Concrete Laboratory Testing Technician, Grade 11.
   3. Concrete reinforcing steel shall be inspected by personnel experienced in concrete construction and acceptable to the Architect/Engineer. Personnel currently certified as an ACI Concrete Construction Inspector will be accepted.

D. Source Limitations: Obtain each type of class of cementitious material of the same brand from the same manufacturer's plant, obtain aggregate from one source, and obtain admixtures through one (1) source from a single manufacturer.

E. Welding: Qualify procedures and personnel according to AWS D1.4, "Structural Welding Code-Reinforcing Steel."

F. Formwork: Design and engineering of formwork shall be the responsibility of the Contractor. Design of formwork and preparation of formwork drawings shall be under the supervision of a professional engineer registered in the state of the Project.

G. ACI Publications: Comply with the following, unless modified by requirements in the Contract Document:
   1. ACI 301 Latest Edition, "Specifications for Structural Concrete," Sections 1 through 5.
   2. ACI 117 Latest Edition, "Specifications for Tolerances for Concrete Construction and Materials."

H. Preinstallation Conference: Conduct conference at Project site to comply with requirements in Division 01 Section "Project Management and Coordination."
   1. Before submitting design mixtures, review concrete design mixture and examine procedures for ensuring quality of concrete materials. Require representatives of each entity directly concerned with cast-in-place concrete to attend, including the following:
      a. Contractor's superintendent.
      b. Independent testing agency responsible for concrete design mixtures.
      c. Ready-mix concrete manufacturer.
      d. Concrete subcontractor.
      e. Owner's testing/Inspection agency.
      f. Structural 1, B-B or better, mill-oiled and edge-sealed.
      g. B-B (concrete Form), Class 1 or better; mil-oiled and edge-sealed.

   2. Review special inspection and testing and inspecting agency procedures for field quality control, concrete finishes and finishing,, cold- and hot-weather concreting procedures, curing procedures, construction contraction and isolation joints, and joint-filler strips, semi-rigid joint fillers, forms and form removal limitations, shoring and reshoring procedures, vapor-retarder installation, anchor rod and anchorage device installation tolerances, steel reinforcement installation, floor and slab flatness and levelness measurement, concrete repair procedures, and concrete protection.
   3. Minutes of the meeting shall be recorded, typewritten, and printed by the Contractor and distributed by him to all parties concerned within five (5) days of the meeting. One copy of the minutes shall also be transmitted to the following for information purposes:

Owner's Representative – Consultant Engineer.

a. The minutes shall include a statement by the concrete contractor indicating that the proposed mix design, and placing, finishing and curing procedures can produce the concrete quality required by these specifications.

I. Record of Work: Maintain a record listing the time and date of placement of all concrete for the structure. Retain batch tickets for all concrete. Such record shall be kept until completion of the Project and shall be available to the Architect for examination at any time.

J. Pre-placement Inspection: Formwork installation, reinforcing steel placement, and installation of all items to be embedded or cast into concrete shall be verified by the Contractor prior to placement.

1.5. DELIVERY, STORAGE, AND HANDLING

A. Steel Reinforcement: Deliver, store, and handle steel reinforcement to prevent bending and damage. Avoid damaging coatings on steel reinforcement.

PART 2 - PRODUCTS

2.1. MANUFACTURERS

A. In other Part 2 articles where titles below introduce lists, the following requirements apply to product selection:

1. Available Products: subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, products specified.

2.2. FORM-FACING MATERIALS

A. Smooth-Formed Finished Concrete: Form-facing panels that will provide continuous, true, and smooth concrete surfaces. Furnish in largest practicable sizes to minimize the number of joints.

1. Plywood, metal, or other approved panel materials.
2. Exterior-grade plywood panels, suitable for concrete forms, complying with DOC PS 1, and as follows:
   a. High-density overlay, Class 1 or better.
   b. Medium-density overlay, Class 1 or better; mill-released agent-treated and edge-sealed.

B. Rough-Formed Finished Concrete: Plywood, lumber, metal, or another approved material. Provide lumber dressed on at least two (20 edges and on one (1) side for a tight fit.

C. Forms for Cylindrical Columns, Pedestals, and Supports: Metal, glass-fiber-reinforced plastic, paper, or fiber tubes that will produce surfaces with gradual or abrupt irregularities not exceeding specified formwork surface class. Provide units with sufficient wall thickness to resist plastic concrete loads without detrimental deformation.

D. Void Forms: Biodegradable paper surface, treated for moisture resistance, structurally sufficient to support weight of plastic concrete and other superimposed loads. Provide factory-made sections with curved, closed faces around drilled micropiles. Curved face radius shall tightly match drilled micropile radius with no gaps. Stay-in-place void forms shall degrade within three (3) months so the void form cannot impart upward load on the structure when the soil heaves.

E. Chamber Strips: Wood, metal, PVC, or rubber strips, ¾ by ¾-inch, minimum.

F. 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.
   1. Formulate form-release agent with rust inhibitor for steel form-facing materials.

G. Form Ties: Factory-fabricated, removable or snap-off metal or glass-fiber-reinforced plastic 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 1½-inch to the plane of the exposed concrete surface.
   2. Furnish ties that, when removed, will leave holes no larger than 1 inch in diameter in the concrete surface.
   3. Furnish ties with integral water-barrier plates to walls indicated to receive dampproofing or waterproofing.

2.3. STEEL REINFORCEMENT

A. Reinforcing Bars: ASTM A 615, Grade 60, deformed.

B. Low-Alloy-Steel Reinforcing Bars: Where welding of reinforcement or field bending is noted on the drawings ASTM A 706, deformed.

C. Plain-Steel Welded Wire Reinforcement: ASTM A 185, plain, fabricated from as-drawn steel wire into flat sheets.

2.4. REINFORCEMENT ACCESSORIES

A. Epoxy Repair Coating: Liquid, two-part, epoxy repair coating; compatible with epoxy coating on reinforcement and complying with ASTM A 775/A 775M.

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.

2.5. CONCRETE MATERIALS

A. Cementitious Material: Use the following cementitious materials, of the same type, brand, and source, throughout Project. Alternate cementitious materials, when proposed to control alkali-silica reactions and tested as part of a representative complete concrete mix in accordance with ASTM C1567, may be used subject to approval:
   1. Portland cement: ASTM C 150, Type I/II, gray unless otherwise noted. Supplement with the following:
      a. Fly Ash: ASTM C 618, Class F.

B. Normal-Weight Aggregates: ASTM C 33, Class 4S coarse aggregate or better, graded. All coarse and fine aggregates shall be tested per ASTM C 295 or ASTM C1260 (or ASTM C 1293) in accordance with Section 5.1 of *"Guide specification for Concrete Subject to Alkali-Silica Reactions" (2007 Portland Cement Association)*. Provide aggregates from a single source.

C. Water: ASTM C 94 and potable.

2.6. ADMIXTURES

A. Air-Entraining Admixture: ASTM C 260.

B. 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. Water-Reducing Admixture: ASTM C 494, Type A.
   2. Retarding Admixture: ATM C 494, Type B.
   3. Water-Reducing and Retarding Admixture: ASTM C 494, Type D.
   4. High-Range, Water-Reducing Admixture: ASTM C 494, Type F.
   5. High-Range, Water-Reducing and Retarding Admixture: ASTM C 494, Type G.
   6. Plasticizing and Retarding Admixture: ASTM C 1017, Type II.
   7. Non-Chloride, Non-Corrosive Accelerating Admixture: The admixture shall conform to ASTM C494, Type C or E, and not contain more chloride ions than are present in municipal drinking water. The admixture manufacturer must have long-term, non-corrosive test data from an independent testing laboratory (of at least a year's duration) using an acceptable accelerated corrosion test method, such as that using electrical potential measures.
   8. Mid-Range water-reducing admixture shall be EUCON X15 or EUCON MR by the Euclid Chemical Company; DARACEM or Mira Series by W.R. Grace, or POZZOLITH997 or Rheobuild 3000 by Master Builders and shall conform to ASTM C494 Type A.

C. Non-Set-Accelerating corrosion-Inhibiting Admixture: Commercially formulated, non-set-accelerating, anodic inhibitor or mixed cathodic and anodic inhibitor; capable of forming a protective barrier and minimizing chloride reactions with steel reinforcement in concrete.
   1. Products:
      a. Axim Concrete Technologies: Catexol 1000CI.
      b. Boral Material Technologies, Inc.; Boral BCN2.
      c. Grace Construction Products, W.R. Grace & Co.; DCI-S.
      d. Master Builders, Inc.; Rheocrete 222+.
      e. Sike Corporation; FerroGard-901.

2.7. FLOOR AND SLAB TREATMENTS

A. Penetrating Liquid Floor Treatment: Clear, chemically reactive, waterborne solution of inorganic silicate or siliconate materials and proprietary components; odorless; colorless; that penetrates, hardens, and densifies concrete surface.
   1. Non-Vehicular Surfaces: Material suitable for application on horizontal surfaces not subjected to vehicular traffic shall be not less than 40 percent silane, or 9 percent poly-siloxane, or shall be 20 percent siloxane. Provide certification of 90-percent chloride screen effectiveness when tested in accordance with the procedure in NCHRP Report No. 244, "Southern Climate Exposure" at Manufacturer's recommended rate of application.

2.8. CURING MATERIALS

A. Evaporation retarder: Waterborne, monomolecular film forming, manufactured for application to fresh concrete.
   1. Available Products:
      a. Axim Concrete Technologies; Cimfilm.
      b. Burke by Edoco; BurkeFilm.

c. ChemMasters; Spray-Film.
d. Conspec Marketing & Manufacturing Co., Inc., a Dayton Superior Company; Aquafilm.
e. Dayton Superior Corporation; Sure Film.
f. Euclid Chemical Company (The); Eucobar.
g. Kaufman Products, Inc.; Vapor Aid.
h. Lambert Corporation; Lambco Skin.
i. L&M Construction Chemicals, Inc.; E-Con.
j. MBT Protection and Repair, Div. of ChemRex; Confilm.
k. Meadows, W.R., Inc.; Sealtight Evapre.
l. Metalcrete Industries; Waterhold.
m. Nox-Crete Products Group, Kinsman Corporation; Monofilm.
n. Sika Corporation, Inc.; SikaFilm.
o. Symons Corporation, a Dayton Superior Company; Finishing Aid
p. Unitex; Pro-Film.
q. US Mix Products Company; US Spec Monofilm ER.
r. Vexcon Chemicals, Inc.; Certi-Vex EnvioAssist.

B. Absorptive Cover: AASHTO M 182, Class 2, burlap cloth made from jute or kenaf, weighing approximately 9 oz. / sq. yd. when dry.

C. Moisture-Retaining Cover: ASTM C 171, polyethylene film or white burlap-polyethylene sheet.

D. Water: Potable.

E. Clear, Solvent-Borne, Membrane-Forming Curing and Sealing Compound: ASTM C 1315, Type 1, Class A. Have test data from an independent laboratory indicating a maximum moisture loss of 0.30 kg/m^2 at 72 hours when tested in accordance with ASTM C156.

F. Clear, Waterborne, Membrane-Forming Curing and Sealing Compound: ASTM C 1315, Type 1, Class A. Have test data from an independent laboratory indicating a maximum moisture loss of 0.30 kg/m^2 at 72 hours when tested in accordance with ASTM C156.

2.9. RELATED MATERIALS

A. Expansion- and Isolation-Joint-Filler Strips: ASTM D 1751, asphalt-saturated cellulosic fiber.

B. Bonding Agent: ASTM C 1059, Type II, non-redispersible, acrylic emulsion or styrene butadiene.

C. Dovetail Anchor Slots: Hot-dip galvanized steel sheet, not less than 0.0336-inch thick, with bent tab anchors. Temporarily fill or cover face opening of slots to prevent intrusion of concrete or debris.

2.10. REPAIR MATERIALS

A. Repair Underlayment: Cement-based, polymer-modified, self-leveling product that can be applied in thicknesses from 1/8-inch and that can be feathered at edges to match adjacent floor elevations.
1. Cement Binder: ASTM C 150, Portland cement or hydraulic or blended hydraulic cement as defined in ASTM C 219.
2. Primer: Product of underlayment manufacturer recommended for substrate, conditions, and application.
3. Aggregate: Well-graded, washed gravel, 1/8- to ¼-inch or coarse sand as recommended by underlayment manufacturer.

4. Compressive Strength: Not less than 4100 psi at 28 days when tested according to ASTM C 109/C 109M.

B. Repair Overlayment: Cement-based, polymer-modified, self-leveling product that can be applied in thicknesses from 1/8-inch that can be feathered at edges to match adjacent floor elevations.
   1. Cement Binder: ASTM C 150, Portland cement or hydraulic or blended hydraulic cement as defined in ASTM C 219.
   2. Primer: Product of topping manufacturer recommended for substrate, conditions, and application.
   3. Aggregate: Well-graded, washed gravel, 1/8- to ¼-inch or coarse sand as recommended by topping manufacturer.
   4. Compressive Strength: Not less than 5000 psi at 28 days when tested according to ASTM C 109/C 109M.

2.11. CONCRETE MIXTURES, GENERAL

A. Prepare design mixtures for each type and strength of concrete, proportioned on the bases of laboratory trial mixture or field test data, or both, according to ACI 301.
   1. Use a qualified testing agency for preparing and reporting proposed mixture designs based on laboratory trial mixtures.

B. Cementitious Materials: Limit percentage by weight of cementitious materials other than Portland Cement in concrete as follows:
   1. Fly Ash: 25 percent.

C. Limit water-soluble, chloride-ion content in hardened concrete to 0.15 for reinforced concrete exposed to chlorides in service; 0.30 for other reinforced concrete, and 1.00 for reinforced concrete that will be dry and protected from moisture in service percent by weight 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 water-reducing admixture in pumped concrete, concrete for heavy-use industrial slabs and parking structure slabs, concrete required to be watertight, and concrete with a water-cementitious materials ratio below 0.50.
   4. Use corrosion-inhibiting admixture in concrete mixtures where indicated. Provide two (2) gallons per cubic yard of concrete.

E. Performance and Design Requirements
   1. Shrinkage: Shrinkage strain, determined and reported in accordance with ASTM C157 as amended and modified herein, shall not exceed the values below for each class of concrete listed.
      a. Amendments and Modifications to ASTM C157:
         1) Storage: After the initial 24-hour comparator reading, the specimens are placed back in the lime-saturated water until the age of seven (7) days. At this time, another comparator reading is taken. This reading is used as the base reading, which is used to calculate percent shrinkage. The specimens are then stored in a 50% humidity room at 73 degrees.
         2) Test reports: Report gage length (average of 3) after 4, 7, 14, 28, and 56 days. In addition to the information required by ASTM C157 Section 11, shrinkage test reports shall include the gage lengths (initial length measurements) used to determine the reported shrinkage strains.

b. 28-Day Shrinkage Strain: Shrinkage strains, determined as above after 28 days of storage, shall not exceed the following:
   1) Concrete for slabs on metal deck: 0.046%.
   2) Concrete for structural slabs: 0.054%.

2.12. CONCRETE MIXTURES FOR BUILDING ELEMENTS

A. Proportion structural normal weight concrete mixture as noted on the drawings, unless aggregates are "potentially reactive" with alkalis based on the ASTM C295 or ASTM C1260 (or ASTM C1293) testing limits of Section 5.1 of *"Guide Specification for Concrete Subject to Alkali-Silica Reactions" (2007 Portland Cement Association)*. When aggregates are "potentially reactive," compliance with Section 5.2 of *"Guide Specification for Concrete Subject to Alkali-Silica Reactions" (2007 Portland Cement Association)* must be established through ASTM C1567 testing for proposed alternate concrete mixture. Submit test reports in accordance with Part I of this specification.

2.13. FABRICATING REINFORCEMENT

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

2.14. CONCRETE MIXING

A. Ready-Mixed Concrete: Measure, batch, mix, deliver concrete according to ASTM C 94/C 94 M and ASTM C 1116, and furnish batch ticket information.

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. Concrete adjacent to elevators shall be installed within the tolerances required by the elevator manufacturer.

C. Limit concrete surface irregularities, designated by ACI 347R as abrupt or gradual, as follows:
   1. Class A, 1/8-inch for smooth-formed finished surfaces.
   2. Class B, ¼-inch for rough-formed finished surfaces.
   3. The permissible irregularity is a cumulative value due to all sources of error including, but not limited to, layout plumbness, member sizes, formwork offsets, joints, and member levelness. The permissible irregularity shall also apply between adjacent concrete surfaces on opposite sides of a construction joint, expansion joint, or shrinkage pour strip.

D. Construct forms tight enough to prevent loss of concrete mortar.

E. Fabricate forms for each 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 framework 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 corners and edges of permanently exposed concrete.

I. Form opening, 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.

M. Protect void form materials from moisture at all times before concrete placement.

N. All formwork surfaces that will provide the finish surface of exposed concrete must be accepted by the Architect before depositing concrete.

O. Void spaces: Provide void spaces of full size and extent shown on the drawings. Specified void form may be used at the Contractor's option. Seal joints between adjacent pieces of void form and between void form and drilled piers. Prevent concrete from entering void space. Void form installation shall conform to Manufacturer's recommendations.

3.02. REMOVING AND REUSING FORMS

A. General: Formwork for sides of beams, walls, columns, and similar parts of the Work that does not support weight of concrete may be removed after cumulatively curing at not less than 50 degrees (F.) for 24 hours after placing concrete, if concrete is hard enough not to be damaged by form-removal operations and curing and protection operations are maintained.

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 close joints. Align and secure joints to avoid offsets. Do not use patched forms for exposed concrete surfaces, unless approved by Architect.

3.03. 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 concrete cover. Do not tack weld crossing reinforcing bars.

D. Size, length, number and placing of supports shall be sufficient to hold reinforcing in the proper position within specified tolerances during construction traffic and concrete placement.

E. On vertical formwork, use approved bar chairs or spacers as required to maintain proper concrete cover and bar position. Do not staple or use any other metallic fastener to secure bolsters, chairs, etc., to formwork for concrete surfaces exposed to the exterior.
   1. Weld reinforcing bars according to AWS D1.4, where indicated.

F. Set wire ties with ends directed into concrete, not toward exposed concrete surfaces.

G. 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.

3.04. 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. Please joints perpendicular to main reinforcement. Continue reinforcement across construction joints, unless otherwise indicated.
   2. Locate joints for grade beams and slabs in the middle third of spans.

3.05. 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. Before test sampling and placing concrete, water may be added at Project site, subject to limitations of ACI 301.
   1. Do not add water to concrete after adding high-range water-reducing admixtures to the mixture.

C. Deposit concrete continuously in one (1) 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 six (6) inches into preceding layer. Do not insert vibrators into slower 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 of reinforcement and other embedded items without causing mixture constituents to segregate.

D. 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.

3.06. FINISHING FORMED SURFACES

A. Rough-Formed Finish: As-cast concrete texture imparted by form-facing material with tie holes and defects repaired and patched. Remove fins and other projects that exceed specified limits on formed-surface irregularities.
   1. Apply to concrete surfaces not exposed to public view.

B. Smooth-Formed Finish: As-cast concrete texture imparted by form-facing material, arranged in an orderly and symmetrical manner with a minimum of seams. Repair and patch the holes and defects. Removed fins and other projections that exceed specified limits on formed-surface irregularities.
   1. Apply to concrete surfaces exposed to public view.

C. 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.

3.07. FINISHING FLOORS AND SLABS

A. General: Comply with ACI 302.1R recommendations for screeding, restraightening, and finishing operations for concrete surfaces. Do not wet concrete surfaces.

B. Scratch Finish: While still plastic, texture concrete surface that has been screeded and bull-floated or darbied. Use stiff brushes, brooms, or rakes to produce a profile amplitude of ¼-inch in one (1) direction.
   1. Apply scratch finish to surfaces indicated and to receive mortar-setting beds for bonded cementitious floor finishes.

C. 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 restraightening until surface is left with a uniform, smooth, granular texture.
   1. Apply float finish to surfaces to receive trowel finish.

D. 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 is uniform in texture and appearance. Grind-smooth any surface defects that would telegraph through applied coatings or floor coverings.
   1. Apply a trowel finish to surfaces exposed to view or to be covered with resilient flooring, carpet, ceramic or porcelain tile set over a cleavage membrane, paint, or another thin-film-finish coating system.
   2. Finish surfaces to the following tolerances, according to ASTM E 1155, for a randomly trafficked floor surface.
      a. 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 structural slabs-on-grade.
      b. Specified overall values of flatness, F(F) 30; with minimum local values of flatness, F(F) 24 for slabs on metal deck.

E. Trowel and Fine-Broom Finish: Apply a first trowel finish to surfaces indicated where ceramic or porcelain tile is to be installed by either thickset or thin-set method. While concrete is still plastic, slightly scarify surface with a fine broom.
   1. Comply with flatness and levelness tolerances for trowel finished floor surfaces.

F. Broom Finish: Apply broom finish to exterior concrete platforms, steps, and ramps, and elsewhere as indicated.
   1. Immediately after float finishing, slightly roughen trafficked surface by brooming with fiber-bristle broom perpendicular to main traffic route. Coordinate required final finish with Architect before application.

3.08. MISCELLANEOUS CONCRETE ITEMS

A. Filling In: Fill in holes and opening left in concrete structures, unless otherwise indicated, after work of other trades is in place. 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.

C. Equipment Bases and Foundations: Provide machine and equi9pment bases and foundations as shown on Drawings. Set anchor bolts for machines and equipment at correct elevations, complying with diagrams or templates from manufacturer furnishing machines and equipment.

3.9. CONCRETE PROTECTING AND CURING

A. General: Protect freshly placed concrete from premature drying and excessive cold or not temperatures. Comply with ACI 306.1 for cold-weather protection and ACI 301 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 0.2 lb./sq. ft. x h before and during finishing operations. Apply according 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.

D. Unformed Surfaces: Begin curing process 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 (7) 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. Moisture-Retaining-Cover Curing: Cover concrete surfaces with moisture-retaining cover for curing concrete, placed in widest practicable width, with sides and ends lapped at least 12 inches, and sealed by waterproof tape or adhesive. Cure for not less than seven (7) days. Immediately repair any holes or tears during curing period using cover material and waterproof tape.
      a. Moisture cure or use moisture-retaining covers to cure concrete surfaces to receive floor coverings.
      b. Moisture cure or use moisture-retaining covers to cure concrete surfaces to receive penetrating liquid floor treatments.
      c. Cure concrete surfaces to receive floor coverings with either a moisture-retaining cover or a curing compound that the manufacturer certifies will not interfere with bonding of floor covering used on Project.

   3. Curing Compound: Apply uniformly in continuous operation by power spray or roller according to manufacturer's written instructions. Recoat areas subjected to heavy rainfall within three (3) hours after initial application. Maintain continuity of coating and repair damage during curing period.
      a. After curing period has elapsed, removed curing compound without damaging concrete surfaces by method recommended by during compound.

4. Curding and Sealing Compound: Apply uniformly to floors and slabs indicated in a continuous operation by power spray or roller according to manufacturer's written instructions. Recoat areas subjected to heavy rainfall within three (3) hours after initial application. Repeat process 24 hours later and apply a second coat. Maintain continuity of coating and repair damage during curing period.

3.10. CONCRETE SURFACE REPAIRS

A. Defective Concrete: Repair and patch defective areas when approved by Architect. Remove and replace concrete that cannot be repaired or patched to Architect's approval.

B. Patching Mortar: Mix dry-pack patching mortar, consisting of one (1) part Portland Cement to two and one-half (2½) parts fine aggregate passing a No. 16 sieve, using only enough water for handling and placing.

C. 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 and that are unacceptable to the Architect. Allow Architect/Engineer to observe formed concrete surfaces immediately upon removal of forms and prior to repair of surface defects. Defects in structural concrete shall be brought to the attention of the architect/Engineer. Repair tie holes and surface defects immediately after such observation. Where the concrete surface will be textured by sandblasting or bush-hammering, repair surface defects before texturing.
   1. Immediately after form removal, cut out honeycombs, rock pockets, and voids more than ½-inch in any dimension in solid concrete, but not less than 1 inch in depth. Make edges of cuts perpendicular to concrete surface. Clean, dampen with water, and brush-coat holes and voids with bonding agent. Fill and compact with patching mortar before bonding agent has dried. Fill form-tie voids with patching mortar or cone plugs secured in place with bonding agent.
   2. Repair defects on surfaces exposed to view by blending white Portland Cement and standard Portland Cement so that, when dry, patching mortar will match surrounding color. Patch test area at inconspicuous locations to verify mixture and color match before proceeding with patching. Compact mortar in place and strike off slightly higher than surrounding surface.
   3. Repair defects on concealed formed surfaces that affect concrete's durability and structural performance as determined by Architect.

D. 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. Submit proposed repair for acceptance prior to beginning this work.
   1. Repair finished surfaces containing defects that are unacceptable to the Architect. Surface defects include spalls, popouts, honeycombs, rockpockets, 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 for 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. Submit proposed repair for acceptance prior to beginning this work.
   4. Correct other low areas scheduled to receive floor coverings with a repair underlayment. Prepare, mix, and apply repair underlayment and primer according to manufacturer's written instructions to produce a smoother, uniform, plane, and level surface. Feather edges to match adjacent floor elevations.
   5. Correct other low areas scheduled to remain exposed with a repair topping. Cut out low

areas to ensure a minimum repair topping depth of ¼-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.

6. Repair defective areas, except random cracks and single holes that are 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 a ¾-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.
7. Repair random cracks and single holes that are 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.

E. Perform structural repairs of concrete, subject to Architect's approval, using epoxy adhesive and patching mortar.

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

3.11. FIELD QUALITY CONTROL

A. Testing and Inspecting: Owner will engage a special inspector and qualified testing and inspecting agency to perform field tests and inspections and to prepare test reports.

B. Inspections:
1. Steel reinforcement placement, embedments, and mechanical connectors.
2. Inspect reinforcing steel and embedments prior to placing concrete as follows:
   a. Inspect all reinforcing, verifying type of reinforcing, bar sizes, spacings, number of bars, concrete cover to bars, bar locations, splices including splice location and lap splice length or mechanical connector, in place condition of coated bars, and method of support of reinforcing.
   b. Inspect embedded bolts, plates, and steel shapes. Verify that size and number of bolts or anchors/rebar, embedment, anchorage, use of specified template and general embedment locations are as specified. Welds to embedments shall be tested as specified in Section 051200.
   c. Welding of reinforcing steel, where permitted, shall be inspected as specified in Section 051200.
   d. Inspect partially embedded reinforcement, which is field bent, or field straightened. Verify that procedures specified in ACI- 301-99 Section 3.3.2.8 – "Field Bending or Straightening" are followed. Inspect all field bent bars not bent in accordance with ACI 301 using visual and magnetic particle methods after bending is complete.
   e. Test rebar anchored into hardened concrete as specified in section 051200 for adhesive anchors.

3. Mechanical Connectors: Perform all special inspections as defined in the code approval report for mechanical connectors. As a minimum, the following are required:
   a. Continuously observe the installation of the first two splices for each type of mechanical connector. Verify all aspects of installation are in accordance with Manufacturer's instructions and code approval report.
   b. Visually inspect 100% of completed connections to verify installation is in accordance with Manufacturer's instructions and ICC test report.

4. Steel reinforcement welding.
5. Headed bolts and studs.
6. Verification of use of required design mixture.
7. Concrete placement, including conveying and depositing. Inspect the first concrete placement of stemwalls/gradebeams, structural slab-on-grade, and slab-on-metal deck. Inspect each truck for correct mix design, addition of water to each truck and sub sequent mixing, cleanliness of forms, concrete vibration, concrete finishing, and concrete curing.
8. Curing procedures and maintenance of curing temperature.
9. Verification of concrete strength before removal of shores and forms from beams and slabs.
10. Temperature of In-Place Concrete: Owner's Testing Agency shall measure and report maximum/minimum temperature of in-place concrete during curing period when concreting in cold weather.
11. Observe all openings cut through existing structure and inspect extracted core(s) to verify no reinforcing or post-tensioning tendons were cut.
12. Observe all removal of existing topping slabs and chipping of existing concrete. Confirm existing reinforcing and remaining concrete is not damaged during process.

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 at least one (1) composite sample for each 100 cu. yd. requirement.
    a. When frequency of testing will provide fewer than five (5) compressive-strength tests for each concrete mixture, testing shall be conducted from at least five randomly selected batches or from each batch if fewer than five (5) are used.

2. Slump: ASTM C 143/C 1453M; one (1) test at point of placement for each composite sample, but not less than one (10 test for each day's pour of each concrete mixture. Perform additional tests when concrete consistency appears to change.
3. Air Content: ASTM C 231, pressure method, for normal-weight concrete; one test for each composite sample at joint of placement, but not less than one (1) test for each day's pour of each concrete mixture.
    a. Where concrete will be exposed to deicing salts, air content tests will be made on samples from the first three (3) batches in the placement and until three (3) consecutive batches have air contents within the range specified, at which time every fifth (5^{th}) batch will be tested. This test frequency will be maintained until a batch is not within the range specified, at which time testing of each batch will be resumed until three (3) consecutive batches have air contents within the range specified. These air content tests may be taken on composite samples or on samples from the batch an any time after the discharge of two (2) cubic feet of concrete.

4. Concrete Temperature: ASTM C 1064/C 1064M; one (1) test hourly, when air temperature is 40 degrees (F.) and below; and when 80 degrees (F.) and above, and one (1) test for each composite sample.
5. Unit Weight: ASTM C 567, fresh unit weight of structural lightweight concrete; one (1) test for each composite sample, but not less than one (1) test for each day's pour of each concrete mixture.
6. Compression Test Specimens: ASTM C 31/C 31M.
    a. Cast and laboratory cure four (4) standard cylinder specimens for each composite sample.

7. Compressive-Strength Tests: ASTM C 39/C 39M; test one (1) cylinder at seven (7) days; and one (1) set of two (2) specimens at 28 days. Hold one (10 cylinder and test at 56 days, if 28-day strength is not achieved.

a. Cast and laboratory cure four (4) standard cylinder specimens for each composite sample.

8. Strength of each concrete mixture will be satisfactory if every average of any three (3) consecutive compressive-strength tests equals or exceeds specified compressive strength and no compressive-strength test value falls below specified compressive strength by more than 500 psi.
9. Test results shall be reported in writing to Architect, concrete manufacturer, Building Official 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, concrete supplier & mix number. Also, include amount of water added at site prior to sampling, ambient air temperature, and concrete wet unit weight. Include time concrete was batched and time when placement was finished.
10. Nondestructive Testing: Impact hammer, sonoscope, 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 test 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 b y cored cylinders complying ASTM C 42/C 42M or by other methods as directed by Architect.
12. Additional testing and inspecting, at Contractor's expense, will be performed to determine compliance of replace 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 E 1155 within 48 hours of finishing.

END OF SECTION

SECTION 05 12 00

STRUCTURAL STEEL FRAMING

PART 1 GENERAL

1.1 SUMMARY

A. This Section includes the following:
   1. Structural steel.
   2. Grout.

B. Related Sections include the following:
   1. Division 01 Section "Quality Requirements" for independent testing agency Procedures and administrative requirements.
   2. Division 09 painting Sections for surface preparation and priming requirements.

1.2 DEFINITIONS

A. Structural Steel: Elements of structural-steel frame, as classified by AISC's "Code of Standard Practice for Steel Buildings and Bridges," that support design loads.

B. Architecturally Exposed Structural Steel: Structural steel designated as "architecturally exposed structural steel" or "AESS" in the Contract Documents. See Section 10, Architecturally Exposed Structural Steel, in AISC's "Code of Standard Practice for Steel Buildings and Bridges".

1.3 PERFORMANCE REQUIREMENTS

A. Connections
   1. Provide connections as shown or noted on drawings. The design of connections not shown or noted shall be provided by the Structural Engineer-of-Record upon request.
   2. Alternate connections designed by the Contractor's Engineer may be submitted with one set of stamped calculations for record. Alternate connection concepts shall be preapproved during bidding. All alternate connections shall be designed for the value noted on plan. The Contractor shall compensate the Structural Engineer-of-Record for time spent reviewing alternate connection designs and revising Contract Documents.

1.4 SUBMITTALS

A. Product Data: For each type of product indicated.

B. Shop Drawings: Show fabrication of structural-steel components.
   1. Include details of cuts, connections, splices, camber, holes, and other pertinent data.
   2. Include embedment drawings.
   3. Indicate welds by standard AWS symbols, distinguishing between shop and field welds, and show size, length, and type of each weld.
   4. Indicate type, size, and length of bolts, distinguishing between shop and field bolts. Identify pretensioned and slip-critical high-strength bolted connections.
   5. Provide one electronic copy and one physical copy to Structural Engineer of Record. Physical copy shall be 18"x24" minimum. Comments and/or corrections will be transferred to the electronic copy and returned via email.

C. Erection Drawings:
   1. Submit erection drawings defining location of each assembly or piece within the structure. Provide sufficient details to describe all field welding. Clearly identify all high strength bolts not required to be tensioned (“snug tight” as defined by AISC). If drawings are submitted in multiple packages, each submittal shall be complete with all erection drawings, details and piece drawings. Subsequent submittals of erection drawings which modify or add to earlier versions will be clearly marked.
   2. Submit setting drawings for bolts and plates installed by others.
   3. Reproduction of the Contract Documents is not permitted.

D. Welding certificates.

E. Qualification Data: For Installer and fabricator.

F. Mill Test Reports: If requested, submit signed by manufacturers certifying that the products comply with requirements.

1.5 QUALITY ASSURANCE

A. Fabricator Qualifications: A qualified fabricator who participates in the AISC Quality Certification Program and is designated an AISC-Certified Plant, Category STD.
   1. Alternately, a steel fabricator not participating in the AISC Quality Certification Program must comply with all aspects of the AISC certification.

B. Welding: Qualify procedures and personnel according to AWS D1.1, "Structural Welding Code--Steel."

C. Fabrication and erection shall comply with applicable provisions of the following specifications and documents
   1. AISC's "Code of Standard Practice for Steel Buildings and Bridges." ”Latest Edition”, as amended below.
      a. Section 3.1: Revise the second paragraph to read: “The Contract Documents shall clearly show the work that is to be performed and shall give the following information with sufficient dimensions to accurately convey the quantity and nature of the structural steel to be fabricated”.
      b. Section 3.2: Replace the entire section with the following: “Requirements for structural steel including dimensions, arrangement, and details shall be shown in the overall contract document package. Fabricator shall be responsible for incorporating all such information from structural, architectural, mechanical, electrical drawings, as well as those of other disciplines”.
      c. Section 3.5: Delete all text after the first sentence.
      d. Section 3.6: Page 19, Replace the text of the entire section with the following: “When the fast-track project delivery system is selected, release of structural drawings shall constitute release for construction only, if specifically noted on the drawing. Drawings that indicate “not for construction” shall not be used for detailing”
      e. Section 4.2: Page 21, 2nd Paragraph; Eliminate the following: “When requested to do so by the Owner’s Designated Representative for Design”
      f. Section 4.4: Page 23; Revise 2nd sentence to read the following: “These drawings shall be returned in accordance with the schedule defined in Division 1 of the project specification. In the absence of this requirement, the Owner’s Designated Representative for Design shall return submittals within 14 days of receipt from the Owner’s

Designated Representative for Design for Construction".

g. Section 6.4.4: Page 33; Revise statement "For the purpose of inspection, camber shall be measured in the fabricator's shop in the unstressed condition", to read "camber specified on the drawings is intended to be camber at the time of erection with decking placed prior to placing concrete. Owner's Designated Representative for Construction shall submit methods for controlling deflections on beams with inadequate camber prior to placing concrete on deck".

h. Section 6.5.3: Page 38; Revise definition to read "two mils".

i. Section 7.10.3, Page 47 - Refer to the design criteria in the general notes on the drawings for definition of the complete lateral load resisting system for the steel frame. The Contractor shall notify the Erector in accordance with Section 7.10 of the AISC Code of Standard Practice for Steel Buildings and Bridges of all bracing requirements beyond those required to support the bare steel frame.

2. AISC's "Specification for Structural Steel Buildings".
3. AISC's "Specification for the Design of Steel Hollow Structural Sections."
4. RCSC's "Specification for Structural Joints Using ASTM A 325 or A 490 Bolts."

D. Preinstallation Conference: Conduct conference at Project site to comply with requirements in Division 01 Section "Project Management and Coordination."

1.6 DELIVERY, STORAGE, AND HANDLING

A. Store materials to permit easy access for inspection and identification. Keep steel members off ground and spaced by using pallets, dunnage, or other supports and spacers. Protect steel members and packaged materials from erosion and deterioration.

1. Store fasteners in a protected place. Clean and relubricate bolts and nuts that become dry or rusty before use.
2. Do not store materials on structure in a manner that might cause distortion, damage, or overload to members or supporting structures. Repair or replace damaged materials or structures as directed.

1.7 COORDINATION

A. Furnish anchorage items to be embedded in or attached to other construction without delaying the Work. Provide setting diagrams, sheet metal templates, instructions, and directions for installation.

PART 2 PRODUCTS

2.1 STRUCTURAL-STEEL MATERIALS

A. Recycled Content of Steel Products: Provide products with an average recycled content of steel products so postconsumer recycled content plus one-half of preconsumer recycled content is not less than 25 percent.

B. Channels and Angles-Shapes: ASTM A 36.

C. Plate and Bar: ASTM A 36**,** unless noted otherwise.

D. Cold-Formed Hollow Structural Sections: ASTM A 500, Grade B, structural tubing.

E. Steel Pipe: ASTM A 53/A 53M, Type E or S, Grade B.
1. Weight Class: As noted.
2. Finish: Black, except where indicated to be galvanized.

F. Welding Electrodes: Comply with AWS requirements, 70 Series

2.2 BOLTS, CONNECTIONS, AND ANCHORS

A. Use Tension control bolts whenever possible.

B. High-Strength Bolts, Nuts, and Washers: ASTM A 325, Type 1, heavy hex steel structural bolts; ASTM A 563 heavy hex carbon-steel nuts; and ASTM F 436 hardened carbon-steel washers.
1. Finish: Hot-dipped galvanized.

C. Tension-Control, High-Strength Bolt-Nut-Washer Assemblies: ASTM F 1852, Type 1, heavy hex or round head steel structural bolts with splined ends; ASTM A 563 heavy hex carbon-steel nuts; and ASTM F 436 hardened carbon-steel washers.
1. Finish: Hot-dipped galvanized.

D. Shear Connectors: ASTM A 108, Grades 1015 through 1020, headed-stud type, cold-finished carbon steel; AWS D1.1, Type B.

E. Threaded Rods: ASTM A 36.
1. Nuts: ASTM A 563 heavy hex carbon steel.
2. Washers: ASTM A 36 carbon steel.
3. Finish: Hot-dipped galvanized.

F. Rebar: Rebar used for welding shall meet the requirements of ASTM A-706. Rebar bends shall meet the minimum bend diameters listed in the ACI 318, latest edition.

G. Expansion Anchors: Wedge type with current ICC approval and published ICC Research Report. Completed with required nuts, washers, and Manufacturer’s installation instructions. Size and Manufacturer as indicated on drawings.
1. Exterior or Exposed Use: In exposed or potentially wet environments, and for attachment of exterior cladding materials, provide galvanized or stainless steel anchors. Galvanized anchors shall conform to ASTM A133. Stainless steel anchors shall be Series 300 stainless steel bolts with Series 300 or Type 18-8 stainless steel nuts and washers.

2.3 PRIMER

A. Primer: Fabricator's standard lead- and chromate-free, nonasphaltic, rust-inhibiting primer.

B. Galvanizing Repair Paint: MPI#18, MPI#19, or SSPC-Paint 20.

C. Where steel is to be field painted, provide shop coat of paint compatible with paint finish system specified in Division 09.

2.4 GROUT

A. Nonmetallic, Shrinkage-Resistant Grout: ASTM C 1107, factory-packaged, nonmetallic aggregate grout, noncorrosive, nonstaining, mixed with water to consistency suitable for application and a 30-minute working time. 6000 psi.

2.5 FABRICATION

A. Structural Steel: Fabricate and assemble in shop to greatest extent possible. Fabricate according to AISC's "Code of Standard Practice for Steel Buildings and Bridges" and AISC's "Specification for Structural Steel Buildings."
   1. Camber structural-steel members where indicated.
   2. Identify high-strength structural steel according to ASTM A 6/ A 6M and maintain markings until structural steel has been erected.
   3. Mark and match-mark materials for field assembly.

B. Thermal Cutting: Perform thermal cutting by machine to greatest extent possible.
   1. Plane thermally cut edges to be welded to comply with requirements in AWS D1.1.
   2. Beam Copes and Weld Access Holes: Thermally cut surfaces in material exceeding 1-1/2” thickness in rolled and built up shapes shall be ground to bright metal in accordance with Section J.18 of the AISC specification.

C. Bolt Holes: Cut, drill, or punch standard bolt holes perpendicular to metal surfaces.

D. Finishing: Accurately finish ends of columns and other members transmitting bearing loads.

E. Cleaning: Clean and prepare steel surfaces that are to remain unpainted according to SSPCSP 3, "Power Tool Cleaning."

F. Holes: Provide holes required for securing other work to structural steel and for passage of other work through steel framing members.
   1. Cut, drill, or punch holes perpendicular to steel surfaces. Do not thermally cut bolt holes or enlarge holes by burning.
   2. Base-Plate Holes: Cut, drill, mechanically thermal cut, or punch holes perpendicular to steel surfaces.

G. Splices: Splicing of members to obtain the required lengths will not be permitted without prior acceptance of the Structural Engineer-of-Record unless shown on the drawings.

H. Substitutions: Where exact sizes and weights called for are not readily available, secure the Structural Engineer-of-Record’s acceptance of suitable sizes in time to prevent delay due to such substitutions.

2.6 SHOP CONNECTIONS

A. High-Strength Bolts: Shop install high-strength bolts according to RCSC's "Specification for Structural Joints Using ASTM A 325 or A 490 Bolts" for type of bolt and type of joint specified.
   1. Joint Type: As noted on drawings.

B. Weld Connections: Comply with AWS D1.1 for welding procedure specifications, tolerances, appearance, and quality of welds and for methods used in correcting welding work.

2.7 SHOP PRIMING

A. Shop prime steel surfaces except the following:
   1. Surfaces embedded in concrete or mortar. Extend priming of partially embedded members to a depth of 2 inches.
   2. Surfaces to be field welded.
   3. Surfaces to be high-strength bolted with slip-critical connections.
   4. Surfaces to receive sprayed fire-resistive materials.
   5. Galvanized surfaces.

B. Surface Preparation: Clean surfaces to be painted. Remove loose rust and mill scale and spatter, slag, or flux deposits. Prepare surfaces according to the following specifications and standards:
   1. SSPC-SP 3, "Power Tool Cleaning."

C. Priming: Immediately after surface preparation, apply primer according to manufacturer's written instructions and at rate recommended by SSPC to provide a dry film thickness of not less than 1.5 mils. Use priming methods that result in full coverage of joints, corners, edges, and exposed surfaces.
   1. Stripe paint corners, crevices, bolts, welds, and sharp edges.
   2. Apply two coats of shop paint to inaccessible surfaces after assembly or erection. Change color of second coat to distinguish it from first.

D. Painting: Apply a 1-coat, nonasphaltic primer complying with SSPC-PS Guide 7.00, "Painting System Guide 7.00: Guide for Selecting One-Coat Shop Painting Systems," to provide a dry film thickness of not less than 1.5 mils.

2.8 GALVANIZING

A. Hot-Dip Galvanized Finish: Apply zinc coating by the hot-dip process to structural steel according to ASTM A 123.
   1. Fill vent holes and grind smooth after galvanizing.
   2. Galvanize lintels and shelf angles attached to structural-steel frame and located in exterior walls.

2.9 SOURCE QUALITY CONTROL

A. Owner will engage an independent testing and inspecting agency to perform shop tests and inspections and prepare test reports.
   1. Provide testing agency with access to places where structural-steel work is being fabricated or produced to perform tests and inspections.

B. Correct deficiencies in Work that test reports and inspections indicate does not comply with the Contract Documents.

C. Bolted Connections: Shop-bolted connections will be tested and inspected according

to RCSC's "Specification for Structural Joints Using ASTM A 325 or A 490 Bolts."

D. Welded Connections: In addition to 100%visual inspection, shop-welded connections will be tested and inspected according to AWS D1.1 and the following inspection percentages and procedures, at testing agency's option:
   1. All full or partial penetration groove welded connections and splices: 100% ultrasonic.
   2. All other welds: 10% magnetic particle.

E. In addition to visual inspection, embedded plates and assemblies manufactured by the Steel Fabricator, shall be tested and inspected according to requirements in AWS D1.1 for stud welding and as follows:
   1. Assemblies supporting structural elements: 100%.

F. Shop inspection by the Testing Agency for all columns and 20% of beams and girders shall include examination of steel for straightness and alignment, conformance to length and camber tolerances, fissures, mill scale and other defects and deformities, as described in ASTM A6 and examination of aforementioned fabricated pieces for conformity with approved shop drawings. Testing of welding will be performed as required.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify elevations of concrete- and masonry-bearing surfaces and locations of anchor rods, bearing plates, and other embedments, with steel erector present, for compliance with requirements.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Provide temporary shores, guys, braces, and other supports during erection to keep structural steel secure, plumb, and in alignment against temporary construction loads and loads equal in intensity to design loads. Remove temporary supports when permanent structural steel, connections, and bracing are in place, unless otherwise indicated.
   1. Do not remove temporary shoring supporting composite deck construction until cast-inplace concrete has attained its design compressive strength.
   2. Contractor shall coordinate installation of all non-structural steel items which will load the non-self supporting structural steel frame. The structural steel frame temporary supports shall resist all loads from these non-structural steel items.
   3. Field Modification: Obtain written acceptance from the Structural Engineer-of-Record before the use of flame cutting for field modification or refabrication of structural steel. The Structural Steel Fabricator shall be responsible for errors in fabrication and for correct fit in the field.

B. Support of Other Work: No permanent loading other than the weight of supported metal deck and concrete slabs shall be imposed on composite beams and girders without prior approval by the Structural Engineer-of-Record until the concrete in such slabs has achieved 75 percent of its design strength. Contractor shall submit calculations prepared by an Engineer registered in the state of Colorado verifying the adequacy of the non-composite members to support the anticipated loading prior to developing composite strength. All costs associated with the accommodation of such loading, including review of submittals and modification of structural members and/or details, shall be borne by the Contractor.

3.3 ERECTION

A. Set structural steel accurately in locations and to elevations indicated and according to AISC's "Code of Standard Practice for Steel Buildings and Bridges" and "Specification for Structural Steel Buildings".

B. Base and Bearing Plates: Clean concrete- and masonry-bearing surfaces of bond-reducing materials, and roughen surfaces prior to setting base and bearing plates. Clean bottom surface of base and bearing plates.
   1. Set base and bearing plates for structural members on wedges, shims, or setting nuts as required.
   2. Weld plate washers to top of base plate.
   3. Snug-tighten anchor rods after supported members have been positioned and plumbed. Do not remove wedges or shims but, if protruding, cut off flush with edge of base or bearing plate before packing with grout.
   4. Promptly pack grout solidly between bearing surfaces and base or bearing plates so no voids remain. Neatly finish exposed surfaces; protect grout and allow to cure. Comply with manufacturer's written installation instructions for

shrinkage-resistant grouts. Clean and moisten surfaces to be grouted. Remove all free water immediately prior to placing grout. Mix and install grout in accordance with Manufacturer's instructions. Completely fill all spaces to be grouted. After grout has acquired its initial set, trim to lower edge of bearing plate and remove excess material. Consolidate exposed edges to a dense uniform surface.

C. Maintain erection tolerances of structural steel and architecturally exposed structural steel within AISC's "Code of Standard Practice for Steel Buildings and Bridges." Except as follows:
   1. Cambered Steel Beams: Fabrication camber shall be adjusted to compensate for conditions of shipping, handling and erection. Maximum deviation of vertical camber at mid span of beam after erection, prior to placing deck +1/2"; -0" maximum.
   2. Leveling and Plumbing: Base leveling and plumbing on a mean temperature of 70 degrees F. Compensate for difference in temperature at time of erection.

D. Align and adjust various members forming part of complete frame or structure before permanently fastening. Before assembly, clean bearing surfaces and other surfaces that will be in permanent contact with members. Perform necessary adjustments to compensate for discrepancies in elevations and alignment.
   1. Level and plumb individual members of structure.
   2. Make allowances for difference between temperature at time of erection and mean Temperature when structure is completed and in service.

E. Splice members only where indicated.

F. Do not use thermal cutting during erection unless approved by Architect. Finish thermally cut sections within smoothness limits in AWS D1.1.

G. Do not enlarge unfair holes in members by burning or using drift pins. Ream holes that must be enlarged to admit bolts.

H. Compression Splices: Fasten splices in compression after bearing surfaces have been brought into contact. Clean bearing surfaces before assembling. Close all gaps 1/32" wide or greater by driving non-tapered mild steel shims full depth of the bearing surface along the full length of the gap.

3.4 FIELD CONNECTIONS

A. High-Strength Bolts: Install high-strength bolts according to RCSC's "Specification for Structural Joints Using ASTM A 325 or A 490 Bolts" for type of bolt and type of joint specified.
   1. Joint Type: As noted on the drawings.

B. Weld Connections: Comply with AWS D1.1 for welding procedure specifications, tolerances, appearance, and quality of welds and for methods used in correcting welding work.
   1. Comply with AISC's "Code of Standard Practice for Steel Buildings and Bridges" and "Specification for Structural Steel Buildings" for bearing, adequacy of temporary connections, alignment, and removal of paint on surfaces adjacent to field welds.
   2. Assemble and weld built-up sections by methods that will maintain true alignment of axes without exceeding tolerances of AISC's "Code of Standard Practice for Steel Buildings and Bridges" for mill material.

C. Drilled-In Inserts: Install in accordance with Manufacturer's recommendations in accurately drilled holes of required diameter and depth. Where adhesive inserts are used, thoroughly clean hole of all debris and drill dust by wire brushing and compressed air prior to installation of insert and adhesive system. Do not drill holes in concrete or masonry until material has achieved full design strength.

3.5 FIELD QUALITY CONTROL

A. Bolted Connections: Shop-bolted connections will be tested and inspected according to RCSC's "Specification for Structural Joints Using ASTM A 325 or A 490 Bolts."
   1. Visually inspect all bolted connections to ascertain that all bolts, nuts and required washers have been installed and are of proper type and that all faying surfaces have been brought into snug contact. Verify the specified surface preparation of the faying surface has been correctly prepared.

B. Welded Connections: Field inspection of welding by the Structural Engineer of Record shall be such as to assure that the work conforms to specified requirements, and will include:
   1. Ascertainment that electrodes used for manual shielded metal-arc welding and the electrodes and flux used for submerged are welding conform to the requirements herein.
   2. Ascertainment that the welding is performed only by welding operators and welders who are properly certified.
   3. Ascertainment that the fit-up, joint preparation, size, contour, extent of reinforcement, and length and location of welds conform to specified requirements and the Contract Drawings, and that no specified welds are omitted or unspecified welds added without approval of the Structural Engineer-of-Record.

C. The Owner's Testing Agency shall test field welds as follows:
   1. All welds: 100% visual.
   2. If defective welds are discovered, the remaining uninspected welds shall receive such ultrasonic or magnetic particle inspection as may be required by the Structural Engineer of Record. All cost of additional inspection required by this paragraph shall be borne by the Contractor.

D. The welding inspector will have the authority to reject weldments. Such rejection may be based on visual inspection where in his opinion the weldment would not pass a more detailed investigation.

E. Correct deficiencies in Work that test reports and inspections indicate does not comply with the Contract Documents.

F. Drilled-in Anchors and Drilled-in Rebar:
   1. Self-Expanding Anchors: The Structural Engineer of Record shall inspect self-expanding Drilled-in Anchors shown on the structural drawings as follows:
      a. All anchors shall be visually inspected after installation to ensure that they have been installed perpendicular to the receiving surface and to proper depth.

G. Verification of Erection Tolerances:
   1. The contractor shall survey the structure after erection and prior to placing deck.
      a. Submit report to the Architect and Owner within 24 hours after recording the data. Report shall identify all deviations of member locations and/or elevations in excess of allowable tolerance specified.

3.6 REPAIRS AND PROTECTION

A. Repair damaged galvanized coatings on galvanized items with galvanized repair paint according to ASTM A 780 and manufacturer's written instructions.

B. Touchup Painting: After installation, promptly clean, prepare, and prime or reprime field connections, rust spots, and abraded surfaces of prime-painted joists and accessories, bearing plates, and abutting structural steel.
   1. Clean and prepare surfaces by SSPC-SP 2 hand-tool cleaning or SSPC-SP 3 power-tool cleaning.
   2. Apply a compatible primer of same type as shop primer used on adjacent surfaces.

C. Touchup Painting: Cleaning and touchup painting are specified in Division 09 painting Sections.

END OF SECTION

SECTION 05 50 00

METAL FABRICATIONS

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Steel tube railings and posts.
   2. Stainless Steel tube hand railings and mounting brackets.

B. Related Sections:
   1. Division 06 Section "Rough Carpentry" for wood blocking for anchoring railings or flashings.
   2. Division 09 Section "Non-Structural Metal Framing" for metal backing for anchoring railings.

1.2 PERFORMANCE REQUIREMENTS

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.
   2. Aluminum: The lesser of minimum yield strength divided by 1.65 or minimum ultimate tensile strength divided by 1.95.

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.

D. Control of Corrosion: Prevent galvanic action and other forms of corrosion by insulating metals and other materials from direct contact with incompatible materials.

E. Thermal Movements: Allow for thermal movements from ambient and surface temperature changes acting on exterior metal fabrications by preventing buckling, opening of joints, overstressing of components, failure of connections, and other detrimental effects.
   1. Temperature Change: 120 deg F, ambient; 180 deg F, material surfaces.

1.3 SUBMITTALS

A. Product Data: For the following:
   1. Manufacturer's product lines of mechanically connected railings.
   2. Railing brackets.
   3. Grout, anchoring cement, and paint products.

B. Shop Drawings: Include plans, elevations, sections, details, and attachments to other work.

C. Samples: For each type of exposed finish required.

1. Sections of each distinctly different linear railing member.
2. Fittings and brackets.

D. Welding certificates.

E. Product Test Reports: Based on evaluation of comprehensive tests performed by a qualified testing agency, according to ASTM E 894 and ASTM E 935.

F. Delegated-Design Submittal: For pipe and tube railings indicated to comply with performance requirements and design criteria, including analysis data signed and sealed by the qualified professional engineer responsible for their preparation.

G. Provide one electronic copy and one physical copy to Structural Engineer of Record. Physical copy shall be 18”x24” minimum. Comments and/or corrections will be transferred to the electronic copy and returned via email.

1.4 QUALITY ASSURANCE

A. Source Limitations: Obtain each type of railing from single source from single manufacturer.

B. Welding Qualifications: Qualify procedures and personnel according to the following:
1. AWS D1.1/D1.1M, "Structural Welding Code - Steel."

1.5 PROJECT CONDITIONS

A. Field Measurements: Verify actual locations of walls and other construction contiguous with metal fabrications by field measurements before fabrication.

1.6 COORDINATION AND SCHEDULING

A. Coordinate selection of shop primers with topcoats to be applied over them. Comply with paint and coating manufacturers' written recommendations to ensure that shop primers and topcoats are compatible with one another.

B. Coordinate installation of anchorages for railings. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors, that are to be embedded in concrete or masonry. Deliver such items to Project site in time for installation.

C. Schedule installation so wall attachments are made only to completed walls. Do not support railings temporarily by any means that do not satisfy structural performance requirements.

PART 2 PRODUCTS

2.1 METALS, GENERAL

A. Metal Surfaces, General: Provide materials with smooth, flat surfaces unless otherwise indicated. For metal fabrications exposed to view in the completed Work, provide materials without seam marks, roller marks, rolled trade names, or blemishes.

B. Brackets, Flanges, and Anchors: Cast or formed metal of same type of material and finish as supported rails unless otherwise indicated.

2.2 STEEL AND IRON

A. Recycled Content of Steel Products: Provide products with average recycled content of steel products so postconsumer recycled content plus one-half of preconsumer recycled content is not less than 25 percent.

B. Steel Plates, Shapes, and Bars: ASTM A 36.

C. Stainless-Steel Sheet, Strip, and Plate: ASTM A 240 or ASTM A 666, Type 304.

D. Stainless-Steel Bars and Shapes: ASTM A 276, Type 304.

E. Steel Tubing: ASTM A 500, cold-formed steel tubing.

F. Steel Pipe: ASTM A 53, standard weight (Schedule 40) unless otherwise indicated.

2.3 FASTENERS

A. General: Unless otherwise indicated, provide Type 304 stainless-steel fasteners for exterior use and zinc-plated fasteners with coating complying with ASTM B 633 or ASTM F 1941, Class Fe/Zn 5, at exterior walls. Select fasteners for type, grade, and class required.
   1. Provide stainless-steel fasteners for fastening aluminum.

B. Steel Bolts and Nuts: Regular hexagon-head bolts, ASTM A 307, Grade A; with hex nuts, ASTM A 563; and, where indicated, flat washers.

C. Anchor Bolts: ASTM F 1554, Grade 36, of dimensions indicated; with nuts, ASTM A 563; and, where indicated, flat washers.
   1. Hot-dip galvanize or provide mechanically deposited, zinc coating where item being fastened is indicated to be galvanized.

D. Anchors, General: Anchors capable of sustaining, without failure, a load equal to six times the load imposed when installed in unit masonry and four times the load imposed when installed in concrete, as determined by testing according to ASTM E 488, conducted by a qualified independent testing agency.

E. Cast-in-Place Anchors in Concrete: Either threaded type or wedge type unless otherwise indicated; galvanized ferrous castings, either ASTM A 47/A 47M malleable iron or ASTM A 27/A 27M cast steel. Provide bolts, washers, and shims as needed, all hot-dip galvanized per ASTM F 2329.

F. Post-Installed Anchors: Torque-controlled expansion anchors or chemical anchors.
   1. Material for Interior Locations: Carbon-steel components zinc plated to comply with ASTM B 633 or ASTM F 1941, Class Fe/Zn 5, unless otherwise indicated.
   2. Material for Exterior Locations and Where Stainless Steel is Indicated: Alloy Group 1 or Group 2 stainless-steel bolts, ASTM F 593, and nuts, ASTM F 594.

2.4 MISCELLANEOUS MATERIALS

A. Welding Rods and Bare Electrodes: Select according to AWS specifications for metal alloy welded.
   1. For stainless steel railings, provide type and alloy as recommended by producer of metal to be welded and as required for color match, strength, and compatibility in fabricated items.

B. Etching Cleaner for Galvanized Metal: Complying with MPI#25.

C. Galvanizing Repair Paint: High-zinc-dust-content paint complying with SSPC-Paint 20 and compatible with paints specified to be used over it.

D. Anchoring Cement: Factory-packaged, nonshrink, nonstaining, hydraulic-controlled expansion cement formulation for mixing with water at Project site to create pourable anchoring, patching, and grouting compound.
   1. Water-Resistant Product: At exterior locations provide formulation that is resistant to erosion from water exposure without needing protection by a sealer or waterproof coating and that is recommended by manufacturer for exterior use.

2.5 FABRICATION

A. General: Fabricate railings to comply with requirements indicated for design, dimensions, member sizes and spacing, details, finish, and anchorage, but not less than that required to support structural loads.

B. Assemble railings in the shop to greatest extent possible to minimize field splicing and assembly. Disassemble units only as necessary for shipping and handling limitations. Clearly mark units for reassembly and coordinated installation. Use connections that maintain structural value of joined pieces.

C. Cut, drill, and punch metals cleanly and accurately. Remove burrs and ease edges to a radius of approximately 1/32 inch unless otherwise indicated. Remove sharp or rough areas on exposed surfaces.

D. Form work true to line and level with accurate angles and surfaces.

E. Cut, reinforce, drill, and tap as indicated to receive finish hardware, screws, and similar items.

F. Connections: Fabricate railings with welded connections unless otherwise indicated.

G. Welded Connections: Cope components at connections to provide close fit, or use fittings designed for this purpose. Weld all around at connections, including at fittings.
   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 flux immediately.
   4. At exposed connections, finish exposed surfaces smooth and blended so no roughness shows after finishing and welded surface matches contours of adjoining surfaces.

H. Non-welded Connections: Connect members with concealed mechanical fasteners and fittings. Fabricate members and fittings to produce flush, smooth, rigid, hairline joint.
   1. Fabricate splice joints for field connection using an epoxy structural adhesive if this is manufacturer's standard splicing method.

I. Bend members in jigs to produce uniform curvature for each configuration required; maintain cross section of member throughout entire bend without buckling, twisting, cracking, or otherwise deforming exposed surfaces of components.

J. Close exposed ends of railing members with prefabricated end fittings.

K. Provide wall returns at ends of wall-mounted handrails unless otherwise indicated. Close ends of returns unless clearance between end of rail and wall is 1/4 inch or less.

L. Brackets, Flanges, Fittings, and Anchors: Provide wall brackets, flanges, miscellaneous fittings, and anchors to interconnect railing members to other work unless otherwise indicated.
   1. At brackets and fittings fastened hollow wall partitions, provide crush resistant fillers, or other means to transfer loads through wall finishes to structural supports and prevent bracket or fitting rotation and crushing of substrate.

M. Provide inserts and other anchorage devices for connecting railings to concrete or masonry work. Fabricate anchorage devices capable of withstanding loads imposed by railing. Coordinate anchorage devices with supporting structure.

2.6 MISCELLANEOUS FRAMING AND SUPPORTS

A. General: Provide steel framing and supports not specified in other Sections as needed to complete the Work.

B. Fabricate units from steel shapes, plates, and bars of welded construction unless otherwise indicated. Fabricate to sizes, shapes, and profiles indicated and as necessary to receive adjacent construction.
   1. Fabricate units from slotted channel framing where indicated.
   2. Furnish inserts for units installed after concrete is placed.

C. Galvanize miscellaneous framing and supports where indicated.

2.7 SAFETY FLOORING

A. MANUFACTURERS:
   1. BASIS OF DESIGN; SlipNOT® Safety Flooring, Division of W.S. Molnar Company, 2545 Beaufait Street, Detroit, Michigan 48207. Toll Free (888)/(800) 754-7668. Phone (313) 923-0400. Fax (313) 923-4555. Web Site www.slipnot.com. E-Mail info@slipnot.com.
   2. Approved substitutions.

B. Grating Stair Treads
   1. 11 ½” depth
   2. Bearing Bars; 1 1/2” x 1/4” @ 7/16” O.C.
   3. Cross Bars; ¼” swaged lock construction.
   4. End Plates; 3” deep integral and fully welded. Factory drilled and slotted for attachment to stringers.
   5. Nosing, 1 ¼” x 1 ¼” x 1/8” checker plate
   6. Material; Aluminum Alloy 5052 H32, mill finish.
   7. Aluminum Slip Resistant coating;
      a. 100% coverage of all walking surfaces.
      b. “Medium finish”, 0.020” – 0.025” average peak to valley depth.
      c. Minimum bond strength of 2,000 PSI.

C. Grating Landings
   1. Bearing Bars; 1 3/4” x 1/4” @ 7/16” O.C.
   2. Cross Bars; ¼” swaged lock construction.
   3. End Plates; 1 1/2” deep integral and fully welded.
   4. Material; Aluminum Alloy 5052 H32, mill finish.
   5. Aluminum Slip Resistant coating;
      a. 100% coverage of all walking surfaces.

b. “Medium finish”, 0.020” – 0.025” average peak to valley depth.
c. Minimum bond strength of 2,000 PSI.

2.8 ALUMINUM PERFORATED SHEET

A. PANEL TYPE 1 & STAIR RISERS:
1. Aluminum alloy, 3003-H14.
2. 1/8” (.125”) thick
3. ½” diameter holes.
4. Hole centers, .6875”
5. Hole Pattern, Staggered
6. Mill finish.
7. Margins Parallel to Length, minimum safe both sides
8. Straight Rows, Parallel to Length.
9. End pattern, unfinished.

B. PANEL TYPE 2:
1. Aluminum alloy, 3003-H14.
2. 1/8” (.125”) thick
3. 3/4” diameter holes.
4. Hole centers, 1”
5. Hole Pattern, Staggered
6. Mill finish.
7. Margins Parallel to Length, minimum safe both sides
8. Straight Rows, Parallel to Length.
9. End pattern, unfinished.

2.9 LOOSE BEARING LEVELING PLATES

A. Provide loose bearing and leveling plates for steel items bearing on masonry or concrete construction. Drill plates to receive anchor bolts and for grouting.

B. Galvanize plates.

2.10 STEEL WELD PLATES AND ANGLES

A. Provide steel weld plates and angles not specified in other Sections, for items supported from concrete construction as needed to complete the Work. Provide each unit with no fewer than two integrally welded steel strap anchors for embedding in concrete.

2.11 FINISHES, GENERAL

A. Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.

B. Protect mechanical finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.

C. Appearance of Finished Work: Variations in appearance of abutting or adjacent pieces are acceptable if they are within one-half of the range of approved Samples. Noticeable variations in the same piece are not acceptable. Variations in appearance of other components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

D. Provide exposed fasteners with finish matching appearance, including color and texture, of railings.

2.12 STEEL AND IRON FINISHES

D. Galvanizing: Hot-dip galvanize items as indicated to comply with ASTM A 153/A 153M for steel and iron hardware and with ASTM A 123/A 123M for other steel and iron products.

PART 3 EXECUTION

3.1 INSTALLATION, GENERAL

A. Fit exposed connections together to form tight, hairline joints.

B. Perform cutting, drilling, and fitting required for installing railings. Set railings accurately in location, alignment, and elevation; measured from established lines and levels and free of rack.
   1. Do not weld, cut, or abrade surfaces of railing components that have been coated or finished after fabrication and that are intended for field connection by mechanical or other means without further cutting or fitting.
   2. Align rails so variations from level for horizontal members and variations from parallel with rake of steps and ramps for sloping members do not exceed 1/4 inch in 12 feet.

C. Adjust railings before anchoring to ensure matching alignment at abutting joints.

D. Fastening to In-Place Construction: Use anchorage devices and fasteners where necessary for securing railings and for properly transferring loads to in-place construction.

3.2 RAILING CONNECTIONS

A. Nonwelded Connections: Use mechanical or adhesive joints for permanently connecting railing components. Seal recessed holes of exposed locking screws using plastic cement filler colored to match finish of railings.

B. Welded Connections: Use fully welded joints for permanently connecting railing components. Comply with requirements for welded connections in "Fabrication" Article whether welding is performed in the shop or in the field.

C. Expansion Joints: Install expansion joints at locations indicated but not farther apart than required to accommodate thermal movement. Provide slip-joint internal sleeve extending 2 inches beyond joint on either side, fasten internal sleeve securely to one side, and locate joint within 6 inches of post.

3.3 ATTACHING RAILINGS

A. Attach railings to wall with wall brackets. Provide brackets with 1-1/2-inch clearance from inside face of handrail and finished wall surface. Locate brackets as indicated or, if not indicated, at spacing required to support structural loads.
   1. Use type of bracket with predrilled hole for exposed bolt anchorage.
   2. Locate brackets as indicated or, if not indicated, at spacing required to support structural loads.

B. Secure wall brackets and railing end flanges to building construction as follows:
   1. For steel-framed walls, use hanger or lag bolts set into existing wall framing member. Use toggle bolts installed through flanges of steel framing or through concealed steel reinforcements.

3.4 ADJUSTING AND CLEANING

A. Clean stainless steel by washing thoroughly with clean water and soap and rinsing with clean water.

B. Galvanized Surfaces: Clean field welds, bolted connections, and abraded areas and repair galvanizing to comply with ASTM A 780.

3.5 PROTECTION

A. Protect finishes of railings from damage during construction period with temporary protective Coverings approved by railing

END OF SECTION

07 42 13

METAL ROOF PANELS AND CLADDING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. This Section includes

1. Factory-formed: exposed-fastener, metal wall panels.

2. Finish must conform to the "Metal Construction Association Certified Premium Painted™" designation

1.3 RELATED SECTIONS

A. Division 07 Section “Sheet Metal Flashing and Trim”

B. Division 08 Section “Custom Skylights”

1.4 PERFORMANCE REQUIREMENTS

A. General: Provide metal wall panel assemblies that comply with performance requirements specified as determined by testing manufacturers' standard assemblies similar to those indicated for this Project, by a qualified testing and inspecting agency.

B. System shall meet performance criteria as installed. Either test data or signed and sealed engineering calculations shall document the performance of the panel system to meet design loads required.

C. Maximum Deflection under Design Loads:

1. 1/240 of span.

1.5 SUBMITTALS

A. Product Data: Manufacturer's current product specifications and installation instructions.

B. Shop Drawings: Include small-scale elevations, as required. Show details of trim and flashing conditions, fastening and anchorage methods, weatherproofing techniques, terminations, and penetrations.

C. Samples:

1. Selection Samples: Submit actual metal chips with full range of colors available for Architect's selection.

2. Verification Samples: Submit two samples of each type of metal panel required, not less than 12 inches (305mm), and illustrating finished panel profile.

D. Product Test Reports: Submit copies of test reports or load tables verifying performance capability of panel system:

1. Metal Wall Panels: Include reports for UL 790/ASTM E 108, PA 100-95 (R&D Only), UL 1897, UL 2218, ICBO AC166 Penetration, Florida Building Code Approval.

2. Fastener test and pull-out calculations

3. Load tables

4. Maintenance Data

1.6 QUALITY ASSURANCE

A. Installer: Company specializing in the type of work required for this project, with not less than 2 years of documented experience.

B. Pre-Installation meeting: Convene meeting not less than one week prior to beginning installation between general contractor, installing contractor, owner's representative and manufacturer.

1.7 DELIVERY, STORAGE & HANDLING

A. Do not deliver materials of this section to project site until suitable facilities for storage and protection are available.

B. Protect materials from damage during transit and at project site. Store under cover, but sloped to provide positive drainage. Do not expose materials with strippable protective film to direct sunlight or extreme heat.

C. Do not allow storage of other materials or allow staging of other work on installed metal panel system.

D. Upon receipt of delivery of metal panel system, and prior to signing the delivery ticket, the installer is to examine each shipment for damage and for completion of the consignment.

1.8 WARRANTY

A. Special Warranty on Finishes: Manufacturer's standard form in which manufacturer agrees to repair finish or replace sheet metal roofing that shows evidence of deterioration of factory-applied finishes within specified warranty period.

B. Special Installer's Warranty: Specified form in which Wall Installer agrees to repair or replace components of custom-fabricated sheet metal wall that fail in materials or

workmanship within 5 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Manufacturer's Qualifications: All panels are to be factory formed and packaged per job requirements.

1. Manufacturer shall have a minimum of ten (10) years experience in the factory fabrication of metal wall panels.

2. Manufacturer must be certified to ISO 9001:2008 with design.

B. Specification is based upon the products of Flatiron Steel. Acceptable manufacturers;
1. Flexopsan Inc.
2. Approved substitution.

C. Substitution requests must meet specifications and must be submitted per Section 01 requirements.

D. Secondary framing members as required for load criteria and wind requirements.

2.2 CONCEALED-FASTENER, METAL WALL SHINGLES

A. Material:
1. Unpainted Acrylic-Coated Galvalume Steel:
    a. Steel Thickness:
        1) 24 gauge.
        2) 7/8” corrugated.
        3) 2.67” $\pm$ rib spacing.

B. Accessories:
1. Metal Components:
    a. Provide accessories and other items essential to a complete roof panel installation including trim, flashing, fascia, metal closures, caps, gutters, downspouts, soffits and similar metal components.
    b. Metal components to be fabricated from same gauge and finish as metal panels, unless otherwise noted.
2. Flashing: Flashing shall have the same gauge and finish as the exterior panel, unless otherwise noted.
3. Fasteners:
    a. Exposed fasteners shall be hex head self-drilling screws with bonded washers and color finished to match panels. Screws may be either plated carbon steel or stainless steel as noted on the drawings.
    b. Exposed stainless steel rivets shall match color finish of panel.
4. Closure Strips: Polyethylene to match configuration of the covering.
5. Sealants:
    a. Exposed Sealants: Shall be one component silicone based as recommended by panel manufacturer: field applied.
    b. Concealed Sealants: Non-curing, non-skinning butyl, polyisobutylene or polybutane tape as recommended by panel manufacturer; field applied.

C. Fabrication:
   1. Form and fabricate components of the system to the profiles and patterns as determined by Architect.
   2. Metal panels shall be factory formed on a stationary industrial type rolling mill.
   3. Panel Orientation: Panels with custom metallic finishes are directional and shall be erected so as to produce a consistent visual effect.
   4. Length: Unless otherwise shown on Drawings or specified herein, panels shall be full length. Fabricate flashings in 10 ft (3 m) lengths.
      a. Panel Length: Factory formed standard lengths.

2.3 UNDERLAYMENT

A. Basis of Specification: Grace-Ultra, self adhering membrane composed of a high density, cross laminated polyethylene film coated on one side with a layer of butyl rubber adhesive.

   1. Thickness: 30 mil

   2. Permeance (max): .05 perms

   3. Concrete primer: Manufacturer's standard.

2.4 FABRICATION

A. Panels:

   1. Panels to be Factory fabricated in a controlled environment.

   2. Panels to be tension leveled during roll forming process.

   3. Panels to be produced in longest lengths possible, except when modular units are utilized.

B. Form all components true to shape, accurate in size, square and free from distortion or defects. Cut panels to precise lengths indicated on approved shop drawings or as required by field conditions.

C. Accessories: Factory fabricates trim and flashing components in standard 12-foot lengths.

   1. Form panel lines, breaks, and angles to be sharp and true, with surfaces free from warp and buckle.

   2. Fabricate wall panels as required to maintain fabrication tolerances and to withstand design loads.

D. Fabricate metal wall panels in a manner that eliminates condensation on interior side of panel and with joints between panels designed to form weathertight seals.

E. Protect mechanical and painted finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.

F. Panels, fabrication and installation shall meet the requirements of the Metal Construction Association Preformed Metal Wall Guidelines

PART 3 - EXECUTION

3.1 PREPARATION

A. Field Measurements

1. Field measurements should be taken by the installer for verification of dimensional correctness in relationship to original plans, prior to providing manufacturer with a bill of material.

B. Delivery, Storage and Handling

1. Do not deliver materials of this section to project site until suitable facilities for storage and protection are available.

2. Protect materials from damage during transit and at project site. Store under cover, but sloped to provide positive drainage. Do not expose materials with strippable protective film to direct sunlight or extreme heat.

3. Do not allow storage of other materials or allow staging of other work on installed metal panel system.

4. Upon receipt of delivery of metal panel system, and prior to signing the delivery ticket, the installer is to examine each shipment or damage and for completion of the consignment.

C. Sequencing and Scheduling

1. Installer shall coordinate with general contractor as to scheduled delivery time after receipt of field verified bill of material by manufacturer as it relates to actual project scheduling.

3.2 METAL WALL PANEL INSTALLATION, GENERAL

A. General: Install metal wall panels in orientation, sizes, and locations indicated on Drawings. Install panels perpendicular to girts and subgirts, unless otherwise indicated. Anchor metal wall panels and other components of the Work securely in place, with provisions for thermal and structural movement.

1. Field cutting of metal wall panels by torch is not permitted.

2. Rigidly fasten metal wall panels and allow for thermal expansion and contraction as required by the panel manufacturer. Pre-drill panels as required.

3. Install screw fasteners.

4. Locate panel splices over, but not attached to, structural supports. Stagger panel splices and end laps to avoid a four-panel lap splice condition.

5. Apply elastomeric sealant continuously between metal base channel (sill angle) and concrete, and elsewhere as indicated or, if not indicated, as necessary for waterproofing and material compatibility.

6. Provide weatherproof seals for pipe and conduit penetrating exterior walls.

B. Fasteners: Use fasteners of size and length as required for compatibility with substrate.

1. Aluminum Wall Panels: Use stainless-steel fasteners or metallic coated fasteners for surfaces exposed to the exterior and aluminum or galvanized steel fasteners for surfaces exposed to the interior.

2. Concealed fasteners shall have a high performance coating

3. Metal Protection: Where dissimilar metals will contact each other or corrosive substrates, protect against galvanic action by painting contact surfaces with bituminous coating, by applying rubberized-asphalt underlayment to each contact surface, or by other permanent separation as recommended by metal wall panel manufacturer.

4. Coat back side of aluminum wall panels with bituminous coating where wall panels will contact wood, ferrous metal, or cementitious construction.

C. Joint Sealers: Install gaskets, joint fillers, and sealants where indicated and where required for weatherproof performance of metal wall panel assemblies.

D. Provide water and underlayment barriers as noted within project documents.

3.3 ACCESSORY INSTALLATION

A. General: Install accessories with positive anchorage to building and weathertight mounting and provide for thermal expansion. Coordinate installation with flashings and other components.

1. Install components required for a complete sheet metal roofing assembly including trim, copings, ridge closures, seam covers, flashings, sealants, gaskets, fillers, closure strips, and similar items.

2. Comply with performance requirements, manufacturer's written installation instructions, and SMACNA's "Architectural Sheet Metal Manual" and NRCA Waterproofing Manual. Provide concealed fasteners where possible, and set units true to line and level as indicated. Install work with laps, joints, and seams that will be permanently watertight and weather resistant.

3. Panels, fabrication and installation shall meet the requirements of the Metal Construction Association Preformed Metal Wall Guidelines.

B. Coordinate with installation of:

1. Sheet Metal Flashing and Trim, as noted in Section 07

2. Custom Skylights, as noted in Division 08

3.4 CLEANING AND PROTECTION

A. Remove temporary protective coverings and strippable films, if any, as metal wall panels are installed. Maintain in a clean condition during construction.

B. Protection:

1. Provide as required completed work of this section will be without damager or deterioration at date of substantial completion.

C. Touch up minor abrasions with matching paint provided by panel manufacturer. Remove and replace panels that cannot be satisfactorily touched up. See Metal Construction Association Technical Bulletin #95-1051.

D. Sweep and remove chips, shavings and dust from roof on a daily basis during installation period. Leave installed work clean, free from grease, finger marks and stains. Remove all protective masking from material immediately after installation of product.

E. Upon completion of installation, remove scraps and debris from project site.

F. After metal wall panel installation, clear weep holes and drainage channels of obstructions, dirt and sealant.

END OF SECTION 07 42 13

SECTION 07 54 23

TPO THERMOPLASTIC SINGLE-PLY ROOFING

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Thermoplastic Single-Ply Roofing.

B. Roof Insulation.

C. Roof cover boards

1.2 RELATED SECTIONS

A. Section 06 10 00 - Rough Carpentry: Rough Carpentry: Roof blocking installation and requirements.

B. Section 07 62 00 - Sheet Metal Flashing and Trim: Sheet Metal Flashing and Trim: Metal flashing and counter flashing installation and requirements.

C. Section 22 30 00 - Plumbing Equipment: Plumbing Specialties: roof drains, scuppers, gutters and downspout installation and requirements.

1.3 REFERENCES

A. Factory Mutual (FM Global) - Approval Guide.
   1. Factory Mutual Standard 4470 - Approval Standard for Class 1 Roof Covers.

B. Underwriters Laboratories (UL) - Roofing Systems and Materials Guide (TGFU R1306).

C. American Society for Testing and Materials (ASTM) - Annual Book of ASTM Standards.
   1. ASTM C 728 - Standard Specification for Perlite Thermal Insulation Board.
   2. ASTM C 1289 - Standard Specification for Faced Rigid Cellular Polyisocyanurate Thermal Insulation Board.
   3. ASTM D 1079 - Standard Terminology Relating to Roofing, Waterproofing, and Bituminous Materials.
   4. ASTM D 4263 - Standard Test Method for Indicating Moisture in Concrete by the Plastic Sheet Method.
   5. ASTM D-751 - Standard Test Methods for Coated Fabrics.
   6. ASTM D-2137 - Standard Test Methods for Rubber Property-Brittleness Point of Flexible Polymers and Coated Fabrics.
   7. ASTM E-96 - Standard Test Methods for Water Vapor Transmission of Materials.
   8. ASTM D1204 - Standard Test Method for Linear Dimensional Changes of Nonrigid Thermoplastic Sheeting or Film at Elevated Temperature.
   9. ASTM D-471 - Standard Test Method for Rubber Property-Effect of Liquids.
   10. ASTM D-1149 - Standard Test Methods for Rubber Deterioration-Cracking in an Ozone Controlled Environment.
   11. ASTM E 903 - Standard Test Method for Solar Absorptance, Reflectance, and Transmission of Materials Using Integrating Spheres.
   12. ASTM G155 - Standard Practice For Operating Xenon Arc Light Apparatus For Exposure Of Non-Metallic Materials.

13. ASTM D573 - Standard Test Method for Rubber - Deterioration in an Air.

D. U.S. Green Building Council (USGBC).

E. Leadership in Energy and Environmental Design (LEED).

F. Factory Mutual (FM Global) - Approval Guide.

G. Underwriters Laboratories (UL) - Roofing Systems and Materials Guide (TGFU R1306).

H. ENERGYSTAR.

I. Sheet Metal and Air Conditioning Contractors National Association, Inc. (SMACNA) - Architectural Sheet Metal.

J. National Roofing Contractors Association (NRCA).

K. American Society of Civil Engineers (ASCE).
1. ASCE 7 - Minimum Design Loads for Buildings and Other Structures.

1.4 DEFINITIONS

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

1.5 PERFORMANCE REQUIREMENTS

A. Provide an installed roofing membrane and base flashing system that does not permit the passage of water, and will withstand the design pressures calculated in accordance with the most current revision of ASCE 7.

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

1.6 SUBMITTALS

A. Submit under provisions of Section 01 30 00 - Administrative Requirements.

B. Product Data sheets for each type of product indicated in this section.

C. Shop Drawings: Provide manufacturers standard details and approved shop drawings for the roof system specified.

D. Samples: Provide samples of insulations, fasteners, membrane materials and accessories for verification of quality.

1.7 QUALITY ASSURANCE

A. Manufacturer Qualifications: Manufacturer shall provide a roofing system that meets or exceeds all criteria listed in this section.

B. Installer Minimum Qualifications:
1. Installer shall be classified as an Authorized Contractor as defined and certified by Manufacturer.

C. Source Limitations: Components listed shall be provided by a single manufacturer or

approved by the primary roofing manufacturer.

D. Final Inspection: Manufacturer's representative shall provide a comprehensive final inspection after completion of the roof system. All application errors shall be addressed and final punch list completed.

1.8 PRE-INSTALLATION CONFERENCE

A. Prior to scheduled commencement of the roofing installation and associated work, conduct a meeting at the project site with the installer, architect, owner, Manufacturer representative and any other persons directly involved with the performance of the work. The installer shall record conference discussions to include decisions, agreements, and open issues and furnish copies of recorded discussions to each attending party. The primary purpose of the meeting is to review foreseeable methods and procedures related to roofing work.

1.9 REGULATORY REQUIREMENTS

A. Work shall be performed in a safe, professional manner, conforming to federal, state and local codes.

B. Exterior Fire Test Exposure: Provide a roofing system achieving a UL Class rating for roof slopes indicated.
   1. UL Class A rating.

C. Windstorm Classification: Provide a roofing system which will achieve the following Factory Mutual wind uplift rating, as listed in the current FM Approval Guide.
   1. Factory Mutual 1-120.

1.10 DELIVERY, STORAGE, AND HANDLING

A. Deliver roofing materials to the site in original containers, with factory seals intact. Products shall carry either a Manufacturer or BMCA label.

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

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

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

E. Store and dispose of solvent-based materials, and materials used with solvent-based materials, in accordance with requirements of local authorities having jurisdiction.

1.11 PROJECT CONDITIONS

A. Weather:
   1. Proceed with roofing only when existing and forecasted weather conditions permit.
   2. Ambient temperatures shall be above 45 degrees F (7.2 degrees C) when applying hot asphalt or water based adhesives.

1.12 WARRANTY

A. Provide manufacturer's standard Guarantee with single source coverage and no monetary limitation where the manufacturer agrees to repair or replace components in the roofing system, which cause a leak due to a failure in materials or workmanship.
   1. Duration: Thirty (30) years from the date of Substantial completion.

B. Provide roofing Installer's Warranty covering the Work of this section, where the Installer agrees to repair or replace components in the roofing system, which cause a leak due to a failure in materials or workmanship.
   1. Duration: Two (2) years from the date of Substantial completion.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Additional approved Manufacturers;

   1. Firestone Building Products Company
   2. Carlisle SynTec Systems
   3. GAF Commercial Roofing Products

B. Requests for substitutions will be considered in accordance with provisions of Section 01 60 00 - Product Requirements.

2.2 INSULATION

A. Rigid polyisocyanurate board, with fibrous glass facer conforming to or exceeding the requirements of ASTM C 1289 Type II, Class 1, Grade 2, with the following characteristics:
   1. Board Thickness: 4”
   2. Thermal Resistance (LTTR value): 23.6.

B. Rigid tapered polyisocyanurate board, with fibrous glass facer conforming to or exceeding the requirements of ASTM C 1289 Type II, Class 1, Grade 2 with the following characteristics:
   1. Board Thickness: 2-4”
   2. Thermal Resistance (LTTR value): Min. 5.7/inch.

C. Cover Board;

   1. Manufacturer’s standard High Denisty polyisocyanurate cover board, with a coated polymer-bonded glass fiber mat facers on both major surfaces of the core foam conforming to or exceeding the requirements of ASTM C 1289 / Class 4, Grade 1. Polyiso, with the following characteristics:
      a. Board Thickness: 1/2 inch (13mm).
      b. Minimum Compressive Strength: 80psi (551kPa).
      c. Thermal Resistance (LTTR value): Greater than 2.5.
   2. ASTM C 1177/C 1177M, glass mat, water resistant gypsum substrate, ½” thick

2.3 MEMBRANE MATERIALS

A. Polyester scrim reinforced thermoplastic polyolefin membrane with a nominal 0.060 inch (60 mil) thickness, for use as a single ply roofing membrane. UL Listed, FM Approved, CRRC rated and Title 24 compliant A full roll contains approximately 1000 sq.ft. of roofing material at 10 feet X 100 feet, weighing 322 lbs or 800 sq ft. of

roofing material at 8 feet x 100 feet, weighting 256.6 lbs. A half sheet roll contains approximately 500 sq.ft. of roofing material at 5 feet X 100 feet, weighing 162 lbs or 400 sq.ft of roofing material, weighting 128.8 lbs. TPO - 60 mil thermoplastic single-ply roofing membrane by MANUFACTURER

1. Color: White.

2.4 FLASHING MATERIALS

A. Manufacturer's standard, Polyester scrim reinforced, or unreinforced, thermoplastic polyolefin membrane with a minimum nominal 0.060 inch (60 mil) thickness, for use as a single ply roofing membrane. UL Listed, FM Approved, CRRC rated and Title 24 compliant. TPO - 60 mil thermoplastic single-ply roofing membrane by TPO Manufacturer.

1. Color: White.

2.5 ADHESIVES, SEALANTS AND PRIMERS

A. Manufacturer's standard Low VOC or Water Based products including;

1. Low VOC solvent-based Bonding Adhesive: Solvent based rubberized adhesive for use with TPO membranes, by TPO MANUFACTURER.

2. Water-based Bonding Adhesive: Solvent based adhesive for use with TPO membranes, by TPO MANUFACTURER.

3. One part butyl based high viscosity sealant suitable for sealing between flashing membrane and substrate surface behind exposed termination bars and for sealing between roofing membrane and drain flange.

4. Solvent based, trowel grade synthetic elastomeric sealant. Durable and UV resistant suitable for use where caulk is typically used.

5. Commercial grade roofing sealant suitable for sealing the upper lip of exposed termination bars and penetrations and around clamping rings and comes with a 20 yr ltd warranty against leaks caused by manufacturing defects.

6. One-part moisture cure, self-leveling sealant designed for use in pitch pans One-Part Pourable Sealer by MANUFACTURER

7. 100 percent solids epoxy based two-part sealant suitable for filling sealant pans at irregularly-shaped penetrations. Epoxy is part A. Polyamide is part B. Two-Part Pourable Sealant, by MANUFACTURER.

8. Insulation Adhesive: Manufacturer's 2-Part Roofing Adhesive.

2.6 ACCESSORIES

A. FLASHING ACCESSORIES

1. A smooth type, unreinforced thermoplastic polyolefin based membrane for use as an alternative flashing/reinforcing material for penetrations and corners. Required whenever preformed vent boots cannot be used.
2. An 8 inch (200mm) wide smooth type, polyester scrim reinforced thermoplastic polyolefin membrane strip for use as a cover strip over coated metal and stripping-in coated metal flanges and general repairs: 0.045 inches (45 mils) nominal thickness.
3. Extruded aluminum termination bar with angled lip caulk receiver and lower leg bulb stiffener. Pre-punched slotted holes at 6" on center or 8" on center.3/4 inch x 10 feet with 0.090 inch cross section.

4. A 6 inch (14 cm) wide, smooth type, polyester scrim reinforced thermoplastic polyolefin membrane strip with a factory laminated butyl tape. Designed for use as a cover strip over non-coated metal edges and flanges.
5. 0.045 inch (45 mil) reinforced TPO membrane with pressure sensitive adhesive, to be installed on horizontal surfaces using plates and fasteners as a base attachment in fully adhered systems.
6. Two-part assembly with a rigid extruded termination base plate, and a decorative snap-on fascia cover for single-ply roofs. The system shall have all concealed fasteners with no penetration on horizontal roof surface.
7. A two-part assembly with a rigid terminator base plate, and a decorative snap-on fascia cover for single-ply roofs with raised perimeter edges. The system shall have all concealed fasteners with no penetration on horizontal roof surface available in 10 foot lengths.
8. Decorative metal fascia with continuous galvanized steel spring cant to terminate single-ply roofing at perimeter. The system shall be watertight with concealed splice plates and no exposed fasteners.
9. Metal with 0.025 inch thick TPO based film as required for fabrication into metal gravel stop and drip edge profiles, metal base and curb flashings, sealant pans, and scupper sleeves. Standard sheet size 4 foot x 10 foot, sheet weight 50 lbs.
    a. Metal: 24 gauge aluminum.
    b. Available Stock Color: Sierra Tan.

B. WALL AND CURB ACCESSORIES
1. 55 mil TPO membrane and 24 gauge coated metal prefabricated into standard and custom size thru wall scuppers.
2. 0.045 inch or 0.060 inch thick reinforced TPO membrane fabricated corners.
3. 0.060 inch thick molded TPO membrane outside corners of base and curb flashing.
4. 0.055 inch molded TPO membrane inside corners of base and curb flashing.
5. 8 inch diameter, nominal .050 inch vacuum formed unreinforced TPO membrane for use in flashing outside corners of base and curb flashings.

C. PENETRATION ACCESSORIES
1. 0.075 inch thick molded TPO membrane sized to accommodate most common pipe and conduits, (1 inch to 6 inch diameter pipes), including square tube. Hot-air welded directly to TPO membrane, supplied with stainless steel clamping rings, TPO Preformed Vent Boots by MANUFACTURER.
2. 0.045 inch or 0.60 inch thick molded TPO membrane preformed boots are split to accommodate most common pipes and conduits and available in three standard sizes, TPO Split Pipe Boots, by MANUFACTURER.
3. 0.045 inch or 0.60 inch thick molded TPO membrane preformed square boots are split to accommodate most common square penetrations and conduits and available in three standard sizes, TPO Square Tube Wraps, by MANUFACTURER.
4. 0.070 thick molded penetration pocket to provide structure and foundation for the application of a pourable sealant for a variety of roof penetrations , weldable and 9 inch x 6 inch x 4 inch (l x w x h) . TPO Pourable Sealer Pocket by MANUFACTURER
5. 24 gauge steel with 0.025" thick TPO based film flanged drain, TPO Coated Metal Drain by MANUFACTURER.

D. FIELD OF ROOF ACCESSORIES
1. Pre-manufactured expansion joint covers used to bridge expansion joint openings in a roof structure. Fabricated to accommodate all roof to wall and

roof to roof applications, made of .060 inch reinforced TPO membrane, available in 5 standard sizes for expansion joint openings up to 8 inch wide. TPO Expansion Joint Covers, by MANUFACTURER.

2. 0.055 inch thick smooth type, unreinforced thermoplastic polyolefin membrane designed for use as a conforming membrane seal over T-joints in 60 and 80 mil membrane applications. T-Joint Patches, by MANUFACTURER.
3. 1/8" (3.18 mm) thick extruded and embossed TPO roll 30" x 50' (762 mm x 15.2 m), heat welds directly to roofing membrane. Unique herringbone traction surface. TPO Walkway Rolls, by MANUFACTURER.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify that the surfaces and site conditions are ready to receive work.

B. Verify that the deck is supported and secured.

C. Verify that the deck is clean and smooth, free of depressions, waves, or projections, and properly sloped to drains, valleys, eaves, scuppers or gutters.

D. Verify that the deck surfaces are dry and free of ice or snow.

E. Verify that all roof openings or penetrations through the roof are solidly set, and that all flashings are tapered.

3.2 SUBSTRATE PREPARATION

A. Steel Deck:
   1. Re-roofing over steel decks, surface corrosion shall be removed, and repairs to severely corroded areas made. Loose or inadequately secured decking shall be fastened, and irreparable or otherwise defective decking shall be replaced.

B. Structural Concrete Deck:
   1. Minimum deck thickness for structural concrete is 4 inches (102 mm).
   2. The roof deck shall be properly cured prior to application of the roofing system. Curing agents shall be checked for compatibility with roofing materials. Prior to the installation of the roof assemblies, evaluation of the surface moisture and deck's dryness by the use of ASTM D 4263 or hot bitumen test procedures shall be conducted.
   3. The deck shall be smooth, level and cannot be wet or frozen.
   4. Treat cracks greater than 1/8 inch (3 mm) in width in accordance with the deck manufacturer's recommendations.
   5. With retrofit roof applications, it is required that the deck be inspected for defects. Defects are to be corrected per the deck manufacturer's recommendations prior to the roofing application.

3.3 INSTALLATION - GENERAL

A. Install Manufacturer’s TPO roofing system according to all current application requirements in addition to those listed in this section.

B. Start the application of membrane plies at the low point of the roof or at the drains, so that the flow of water is over or parallel to, but never against the laps.

3.4 INSULATION - GENERAL

A. Do not apply roof insulation or roofing until all other work trades have completed jobs that require them to traverse the deck on foot or with equipment. A vapor retarder coated lightly with asphalt may be applied to protect the inside of the structure prior to the insulation and final roofing installation. Before the application of the insulation, any damage or deterioration to the vapor retarder shall be repaired.

B. Do not install wet, damaged or warped insulation boards.

C. Install insulation boards with staggered board joints in one direction (unless taping joint).

D. Install insulation boards snug. Gaps between board joints shall not exceed 1/4 inch (6 mm). All gaps in excess of 1/4 inch (6 mm) shall be filled with like insulation material.

E. Wood nailers shall be 3-1/2 inches (89 mm) minimum width or 1 inch (25 mm) wider than metal flange. They shall be of equal thickness as the insulation with a minimum 1 inch (25 mm) thickness. All nailers shall be securely fastened to the deck.

F. Do not kick insulation boards into place.

G. Miter and fill the edges of the insulation boards at ridges, valleys and other changes in plane to prevent open joints or irregular surfaces. Avoid breaking or crushing of the insulation at the corners.

H. Roof tape, if required over insulation joints, shall be laid evenly, smoothly and embedded in a uniform coating of hot steep asphalt with 4 inches (102 mm) end laps. Care shall be taken to assure smooth application of tape, and full embedment of the tape in the asphalt.

I. Do not install any more insulation than will be completely waterproofed each day.

3.5 INSULATION - BASE LAYER

A. The substrate shall be free of debris, dust, dirt, oil, grease, and standing water before applying the adhesive.

B. Install insulation layers applied with beads of Oly Bond 500 spaced 12 inches (305 mm) O.C. Approximate coverage rate is one (1) gallon per 100 square feet (0.42 l/sm), depending on the substrate. Allow the foam to rise 1/2 inch to 3/4 inch (13 mm to 19 mm). Press each board firmly into place. Stagger the joints of additional layers in relation to the insulation joints in the layer(s) below by a minimum of 6 inches (152 mm) to eliminate continuous vertical gaps.

3.6 INSULATION - SUBSEQUENT LAYERS

1. The substrate must be free of and debris, dust, dirt, oil, grease, and standing water before applying the adhesive.
2. If using foam adhesive in boxes, must be applied using the specially designed dispenser. Foam adhesive in cartridge format shall be applied using one of the specially designed dual cartridge dispensers.
3. Apply bands of LRF adhesive spaced 6" to 12" (152 mm to 305 mm) o.c. Allow the foam to rise 3/4" to 1" (19.1 mm to 25.4 mm). Install installation boards. Walk each board firmly into place. Stagger the joints of additional layers in relation to the insulation joints in the layer(s) below by a minimum of 6" (152 mm) to eliminate continuous vertical gaps. Repeat for each layer.
4. Do not install any more insulation than will be completely waterproofed each

day.

5. Apply heavily textured spatter pattern coat 1/4" to 1/2" (6.4 mm to 13 mm) nominal thickness in height. Place insulation boards immediately in place. Do NOT walk in place or compress for 5 to 10 minutes depending on ambient temperature. Refer to product application instructions for specific times.
6. Do not install any more insulation than will be completely waterproofed each day.

B. The substrate shall be free of debris, dust, dirt, oil, grease, and standing water before applying the adhesive.

C. Install insulation layers applied with beads of Oly Bond 500 spaced 12 inches (305 mm) O.C. Approximate coverage rate is one (1) gallon per 100 square feet (0.42l/sm), depending on the substrate. Allow the foam to rise 1/2 inch to 3/4 inch (13 mm to 19 mm). Press each board firmly into place. Stagger the joints of additional layers in relation to the insulation joints in the layer(s) below by a minimum of 6 inches (152 mm) to eliminate continuous vertical gaps.

D. Do not install any more insulation than will be completely waterproofed each day.

3.7 PROTECTION LAYER

A. Polymat protection layer shall be installed between the roofing membrane and the substrate.

B. Fire sheet 50 or 10 fiberglass sheet protection layer shall typically be installed when required by design professionals or code authority to address code or approval requirements or as a separator layer.

C. Install fiberglass sheet or polymat protection layer loose-applied over substrate surface so that wrinkles and buckles are not formed.

D. Overlap sheets a minimum of 6" for side and end laps.

3.8 VERSASHIELD SOLO

A. Install VersaShield Solo loose-applied over substrate surface so that wrinkles and buckles are not formed perpendicular to the direction of the TPO membrane.

B. Overlap membrane a minimum 2 inches (51mm) at the side laps and minimum of 4 inches (102mm) at the end laps.

C. Use corrosive resistant nails with 1 inch (25mm) diameter metal head or plastic caps to fasten in place.

D. Only use enough fasteners to hold in place until primary roof covering is in place.

E. Do not install more VersaShield Solo than can be covered in one day.

3.9 MEMBRANE APPLICATION

A. Fully Adhered (Adhesive):
1. Place membrane so that wrinkles and buckles are not formed. Any wrinkles or buckles must be removed from the sheet prior to permanent attachment. Roof membrane shall be fully adhered immediately after it is rolled out, followed by welding to adjacent sheets.
2. Overlap roof membrane a minimum of 3 inches (76mm) for side laps and 3 inches (76mm) for end laps.

3. Install membrane so that the side laps run across the roof slope lapped towards drainage points.
4. All exposed sheet corners shall be rounded a minimum of 1 inch.
5. Use full width rolls in the field and perimeter region of roof.
6. Use appropriate bonding adhesive for substrate surface, applied with a solvent-resistant roller, brush or squeegee.
7. All work surfaces should be clean, dry, and free of dirt, dust, debris, oils, loose and/or embedded gravel, un-adhered coatings, deteriorated membrane, and other contaminants that may result in a surface that is not sound or is uneven.
8. Apply LRF Adhesive directly to the substrate using a ribbon pattern. Space beads as required by job specification, typically 6" or 12" (152 mm or 305 mm) o.c.
9. MANUFACTURER LRF M Adhesive should be approximately 70 degreesF (22 degreesC) when being dispensed. As adhesive is applied, allow the adhesive to begin rising, then place membrane.
10. Roll in membrane using a 150 lb. membrane roller or equivalent
11. Apply bonding adhesive at 3 squares of finished, mated surface area per 5 gallons (Solvent Based) and 5 squares of finished, mated surface area per 5 gallons (Water Based). A greater quantity of bonding adhesive may be required based upon the substrate surface condition.
12. Apply bonding adhesive to the substrate surface only at 300 square feet per 5 gallons (Solvent Based) and 600 square feet per 5 gallons (Water Based). A greater quantity of bonding adhesive may be required based upon the substrate surface condition.
13. Prevent seam contamination by keeping the adhesive application a few inches back from the seam area.
14. Adhere approximately one half of the membrane sheet at a time. One half of the sheet's length shall be folded back in turn to allow for adhesive application. Lay membrane into adhesive once the bonding adhesive is tacky to the touch.
15. Roll membrane with a weighted roller to ensure complete bonding between adhesive and membrane.
16. Membrane laps shall be heat-welded together. All welds shall be continuous, without voids or partial welds. Welds shall be free of burns and scorch marks.
17. Weld shall be a minimum of 1 1/2 inches (39mm) in width for automatic machine welding and a minimum 2 inches (51mm) in width for hand welding.
18. All cut edges of reinforced membrane must be sealed with TPO Cut Edge Sealant.
19. Supplemental membrane attachment is required at the base of all walls and curbs, and where the angle of the substrate changes by more than five (5) degrees (1 inch in 12 inches). Roofing membrane shall be secured to the structural deck with appropriate Drill-Tec screws and plates spaced every 12 inches o.c. The screws and plates must be installed no less than 1/2 inch from the membrane edge. Alternatively, the roofing membrane may be turned up the vertical plane a minimum of 3 inches and secured with screws and termination bar Fastener spacing is the same as is used for in-lap attachment. The termination bar must be installed within 1 1/2 to 2 inches of the plane of the roof membrane, with a minimum of 1 inch of membrane extending above the termination bar.
20. Supplemental membrane attachment to the structural deck is required at all penetrations unless the insulation substrate is fully adhered to the deck. Roofing membrane shall be secured to the deck with appropriate Drill-Tec screws and plates.
21. Fasteners must be installed to achieve the proper embedment depth. Install fasteners without lean or tilt.
22. Install fasteners so that the plate or termination bar is drawn down tightly to

the membrane surface. Properly installed fasteners will not allow the plate or termination bar to move (underdriving), but will not cause wrinkling of the membrane (overdriving).

3.10 FLASHINGS

A. Flash all perimeter, curb, and penetration conditions with coated metal, membrane flashing, and flashing accessories as appropriate to the site condition.

B. All coated metal and membrane flashing corners shall be reinforced with preformed corners or non-reinforced membrane.

C. Hot-air weld all flashing membranes, accessories, and coated metal. A minimum 2 inch wide hand weld or minimum 1 1/2 inch automatic machine weld is required.

D. Non-coated metal edge details shall be installed in accordance with current Manufacturer construction details and requirements.

E. Provide coated metal edges where Twenty (20) year Manufacturer systems require there use. Bonding adhesive and/or cover tape is not acceptable.

F. All cut edges of reinforced membrane shall be sealed with TPO Cut Edge Sealant.

3.11 FLASHINGS

A. General:
   1. Flash all perimeter, curb, and penetration conditions with coated metal, membrane flashing, and flashing accessories as appropriate to the site condition.
   2. All coated metal and membrane flashing corners shall be reinforced with preformed corners or non-reinforced membrane.
   3. Hot-air weld all flashing membranes, accessories, and coated metal. A minimum 2 inch (51mm) wide (hand welder) weld is required.
   4. All cut edges of reinforced membrane must be sealed with TPO Cut Edge Sealant.

B. Un-reinforced Membrane Flashings:
   1. Un-reinforced membrane is used to field-fabricate penetration or reinforcement flashings in locations where preformed corners and pipe boots cannot be properly installed.
   2. Penetration flashings constructed of un-reinforced membrane are typically installed in two sections, a horizontal piece that extends onto the roofing membrane and a vertical piece that extends up the penetration. The two pieces are overlapped and hot-air welded together.
   3. The un-reinforced membrane flashing shall be adhered to the penetration surface. Apply bonding adhesive at a rate resulting in 60 square feet/gallon of finished roofing material for solvent-based bonding adhesives, and at a rate of 125 square feet/gallon of finished roofing material for water-borne bonding adhesive. Apply bonding adhesive to both the underside of the membrane and the substrate surface at 120 square feet per gallon (Solvent Based) and 250 square feet per gallon (Water Based). A greater quantity of bonding adhesive may be required based upon the substrate surface condition. The bonding adhesive must be allowed to dry until tacky to the touch before flashing membrane application.

C. Reinforced Membrane Flashings:
   1. The thickness of the flashing membrane shall be the same as the thickness of the roofing membrane.
   2. Membrane flashing may either be installed loose or fully adhered to the substrate surface in accordance with 'Construction Detail Requirements'.
   3. Where flashings are to be fully adhered, apply bonding adhesive at a rate resulting in 60 square feet/gallon of finished roofing material for solvent-based bonding adhesives, and at a rate of 125 square feet/gallon of finished roofing material for water-borne bonding adhesive. Apply bonding adhesive to both the underside of the membrane and the substrate surface at 120 square feet per gallon (Solvent Based) and 250 square feet per gallon (Water Based). A greater quantity of bonding adhesive may be required based upon the substrate surface condition. The bonding adhesive must be allowed to dry until tacky to the touch before flashing membrane application.
   4. Apply the adhesive only when outside temperature is above 40 degrees F. Recommended minimum application temperature is 50 degrees F to allow for easier adhesive application.
   5. The membrane flashing shall be carefully positioned prior to application to avoid wrinkles and buckles.

D. Self-Adhered Membrane Flashings:
   1. Install self-adhering membrane flashings according to all applicable MANUFACTURER construction details.
   2. Apply flashing membrane only when outside temperature is above 40 degrees F. Recommended minimum application temperature is 50 degrees F to allow for improved adhesive performance.
   3. The membrane flashing shall be carefully positioned prior to removal of release film to avoid wrinkles and buckles.
   4. Adhere flashing membrane to the walls by removing the release film. Broom or roll all walls. All seams shall be rolled-in with a silicone roller.

E. Roof Drains:
   1. Roof drains shall be fitted with compression type clamping rings and strainer baskets. Original-type cast iron and aluminum drains, as well as retrofit-type cast iron, aluminum or molded plastic drains are acceptable.
   2. Roof drains shall be provided with a minimum 36 inches (914mm) by 36 inches (914mm) sump. Slope of tapered insulation within the sump shall not exceed 4 inches (102mm) in 12 inches (305mm).
   3. Extend the roofing membrane over the drain opening. Locate the drain and cut a hole in the roofing membrane directly over the drain opening. Provide a 1/2 inch (13mm) of membrane flap extending past the drain flange into the drain opening. Punch holes through the roofing membrane at drain bolt locations.
   4. For cast iron and aluminum drains, the roofing membrane shall be set in a full bed of water block on the drain flange prior to securement with the compression clamping ring. Typical water block application is one 10.5 ounce (315g) cartridge per drain.
   5. Lap seams shall not be located within the sump area. Where lap seams will be located within the sump area, a separate roof membrane drain flashing a minimum of 12 inches (305mm) larger than the sump area shall be installed. The roof membrane shall be mechanically attached 12 inches (305mm) on center around the drain with screws and plates. The separate roof drain flashing shall be heat welded to the roof membrane beyond the screws and plates, extended over the drain flange, and secured as above.
   6. Tighten the drain compression ring in place.

F. Expansion Joints
   1. The membrane shall be mechanically fastened (or fully adhered based on system) along edge of expansion joint opening with appropriate Drill-Tec fasteners and plates within 1/4 to 1/2 inch of the membrane edge 12 inches o.c.
   2. When expansion joint is on curbs, the reinforced flashing must be bonded to curb face with Bonding Adhesive and membrane on top of curb face must be nailed 12 inches o.c. with deformed shank roofing nail with 3/8 inch diameter head.
   3. The expansion joint cover bellows shall be at least 1.5 times the expansion joint opening.
   4. Alternately, expansion joints may be field fabricated.

3.12 TRAFFIC PROTECTION

A. Install walkway pads/rolls at all roof access locations and other designated locations including roof-mounted equipment work locations and areas of repeated rooftop traffic.

B. Walkway pads shall be spaced 2 inches (51mm) apart to allow for drainage between the pads.

C. Fully adhere walkway pads/rolls to the roof membrane with solvent-based bonding adhesive, applied at the rate of 1 gal per 100 sf (0.42 l/sm) to both the walkway and roof membrane surfaces. Press walkway in position once adhesive is tacky to the touch.

D. Alternatively, walkway pads/rolls may be hot-air-welded to the roof membrane surface continuously around the perimeter of the pad/roll.

3.13 ROOF PROTECTION

A. Protect all partially and fully completed roofing work from other trades until completion.

B. Whenever possible, stage materials in such a manner that foot traffic is minimized over completed roof areas.

C. When it is not possible to stage materials away from locations where partial or complete installation has taken place, temporary walkways and platforms shall be installed in order to protect all completed roof areas from traffic and point loading during the application process.

D. Temporary tie-ins shall be installed at the end of each workday and removed prior to commencement of work the following day.

3.14 CLEAN-UP

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

B. Do not allow trash, waste, or debris to collect on the roof. These items shall be removed from the roof on a daily basis.

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

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

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

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

END OF SECTION

SECTION 076000

FLASHING AND SHEET METAL

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Fascia systems.

B. Coping systems.

C. Gutters and downspouts.

D. Reglet counter-flashing.

1.2 RELATED SECTIONS

A. Section 055000 - Metal Fabrications.

B. Section 061000 - Rough Carpentry: Installation of grounds, blocking and backing for sheet metal installation.

C. Section 071413 – Hot Fluid Applied Rubberized Asphalt Waterproofing.

D. Section 075100 - Built-up Asphalt Roofing

1.3 REFERENCES

A. ASTM A 526 - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) by the Hot-Dip Process, Commercial Quality.

B. ASTM A 527 - Specification for Steel Sheet, Zinc-Coated (Galvanized) by the Hot-Dip Process, Lock-Forming Quality.

C. ASTM B 209 - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate.

D. National Roofing Contractors Association (NRCA) - "Roofing and Waterproofing Manual", third edition.

E. Sheet Metal and Air Conditioning Contractor's National Association (SMACNA) - Architectural Sheet Metal Manual.

1.4 SUBMITTALS

A. Submit under provisions of Section 013000.

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

C. Shop Drawings:
   1. Indicate material profile, dimensions, jointing pattern, jointing details, fastening methods, flashing, termination, and installation details.
   2. Show the layout of wall sections, attachment, joint details, subgirt locations, trim flashing, accessories and air infiltration seals.

3. Show thickness of treated wood nailers and substrate.
4. Include building location, height and details of related work involved.

D. Design Data:
1. Submit manufacturer's certification that product supplied meets Factory Mutual Research Corporation's (FMRC) requirements for Roof Perimeter Flashing for use in Zone 1 and Zone 2 Windstorm Resistance Areas as defined in FME & R Loss Prevention Data Sheet 1-7 and 1-49 design recommendations, and meets the wind resistance requirements specified.
2. Certify that perimeter metal edge systems furnished meet the specified design pressures as tested using ANSI/SPRI ES-1-98 test method RE-2 or RE-3 test methodology.
3. Certify that membrane attachment by perimeter edge systems exceeds 100 lb/ft (149 kg/m) of force as tested by ANSI/SPRI ES-1-98 test method RE-1.

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

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

1.5 QUALITY ASSURANCE

A. Installer Qualifications: Companies specializing in sheet metal work with 5 years documented experience.

B. Mock-Up: Provide a mock-up for evaluation of surface preparation techniques and application workmanship.
1. Cornice Detail 2/A3.02, minimum 18” length.
2. Do not proceed with remaining work until workmanship, color, and sheen are approved by Architect.
3. Refinish mock-up area as required to produce acceptable work.

1.6 DELIVERY, STORAGE, AND HANDLING

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

B. Store and dispose of solvent-based materials, and materials used with solvent-based materials, in accordance with requirements of local authorities having jurisdiction.

C. Materials shall be delivered with identification labels, warnings and storage recommendations.

D. Materials shall be stored in a clean, dry location prior to installation to prevent any damage to the contents. Store materials off the ground and protect from damage and deterioration as required by the material manufacturer.

E. Handle materials to prevent damage to their surfaces, edges and ends of metal items. Damaged material shall be rejected and immediately removed from the site.

1.7 PROJECT CONDITIONS

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

1.8 WARRANTY

A. Warranty Certification: Installing contractor shall certify that sheet metal work has been installed per National Sheet Metal System's printed details and specifications.

B. Manufacturer warrants sheet metal fabrications are warranted to be free of defects in material and workmanship for a period of five (5) years from date of shipment.
   1. Product modification may be required to adapt to a project's geographic location, building height, or geometry. Product liability is limited to the repair or replacement of furnished materials, provided printed installation instructions have been followed.

C. Provide manufacturer's Twenty (20) year finish warranty for standard coil-coated Kynar 500 colors against peeling, chalking, fading, checking and crazing, commencing upon the date of substantial completion.

PART 2 PRODUCTS

2.1 FASCIA AND ROOF EDGE SYSTEMS

A. Provide fascia/flashing system which meets the criteria recommended by Factory Mutual Research Corporation's (FMRC) requirements for Roof Perimeter Flashing for use in Zone 1 and Zone 2 Windstorm Resistance Areas as defined in FME & R Loss Prevention Data Sheet 1-7 and 1-49.

B. Edge details shall meet the design requirements set forth by SPRI's (Single Ply Roofing Institute) - "Wind Design Guide for Use with Low Slope Roofing."
   1. Anticipated design pressures calculated for edge systems on the project shall match the adjacent membrane roofing.

C. Accessories:
   1. Fascia Extender with Splice Plates.
   2. Brick / Wall Cap.
   3. Drip Edge.
   4. Continuous Cleat/Hold-Down Clip
   5. Closure Cleat.
   6. Custom Fabrications as shown on details.

D. Corners, downspout scuppers, spillout scuppers, overflow scuppers, etc. shall be fabricated by manufacturer. Factory fabricated, mitered corners shall have 12" nominal (305 mm) leg lengths.
   1. Provide matching ledgecaps, downspouts, or other special fabrications as detailed.

E. Fascia Covers and Accessories to be Fabricated from:
   1. 22 ga. (0.759 mm) steel ASTM A 653/A 653M G90 hot-dipped galvanized steel, structural quality.

F. Waterdam Components:
   1. 20 ga. (0.912 mm) G-90 galvanized steel ASTM A 653/A 653M G90 hot-dipped galvanized steel, structural quality.

G. Standard Length of Product: 10 feet (3048 mm) with 4" wide concealed splice plates at joints.

H. Steel Finish:
   1. Prefinished steel with Kynar 500 /Hylar 5000 from specified manufacturer's standard color selection.

2.2 COPING SYSTEMS

A. Fabrication: Concealed fastener, free floating with concealed joint splice plates. Provide prefabricated mitered corners, transitions, end caps, and scuppers as indicated on the drawings.

B. Provide coping/flashing system which meets the criteria recommended by Factory Mutual Research Corporation's (FMRC) requirements for Roof Perimeter Flashing for use in Zone 1 and Zone 2 Windstorm Resistance Areas as defined in FME & R Loss Prevention Data Sheet 1-7 and 1-49.

C. Edge details shall meet the design requirements set forth by SPRI's (Single Ply Roofing Institute) - "Wind Design Guide for Use with Low Slope Roofing."
   1. Anticipated design pressures calculated for edge systems on the project shall match the adjacent membrane roofing.

D. Coping Profile:
   1. Formed Coping (Tapered) W/Continuous Hold-Down Cleat Front and Back.

E. Wind Uplift Rating: Provide coping systems to meet uplift rating required for wall thickness:
   1. 16 Inches Maximum Wall Thickness:
      a. 22 ga. (0.759 mm) Steel ASTM A 653/A 653M G-90 hot-dipped galvanized steel, structural quality: FM I-90.

F. Steel Finish:
   1. Prefinished steel with Kynar 500 /Hylar 5000 from specified manufacturer's standard color selection.

2.3 GUTTERS AND DOWNSPOUTS

A. Downspout/Scupper Profile: Material and finish to match gutter.
   1. Thru-Wall Scupper W/Collector Box.

B. Steel Finish:
   1. Prefinished steel with Kynar 500 / Hylar 5000 from specified manufacturer's standard color selection.

2.4 REGLET COUNTER FLASHING

A. Profile: As indicated on drawings.
   1. 1-Pc. Surface Mounted Counterflashing.
   2. Material and Finish:
      a. 24 ga. (0.607 mm) steel hot-dipped galvanized ASTM A 653/A 653M G90.

2.5 MATERIALS

A. Prefinished Zinc-Coated Steel: Hot-dip galvanized steel, commercial quality A1 S1 G90 extra smooth, primed on both sides and finished on 1 side with 70 percent KYNAR 500 ® based fluorocarbon coating of minimum 0.70 mils (1.8 mm) total dry film thickness.
   1. Strippable coating: Shop-applied liquid to front side of pre-finished metal to protect finish during fabrication, shipment, and field handling.

2.6 FINISH COLORS

A. Colors:
   1. Sierra Tan.

2.7 FABRICATION

A. General Metal Fabrication: Shop-fabricate work to the greatest extent possible. Comply with details indicated on Drawings, and with applicable requirements of SMACNA. Fabricate for waterproof and weather-resistant performance; with expansion provisions for running work, sufficient to permanently prevent leakage, damage, or deterioration of work. Form work to fit substrates. Comply with material manufacturer instructions and recommendations for forming material. Form exposed sheet metal work without excessive oil-canning, buckling, and tool marks, true to line and levels indicated, with exposed edges folded back to form hems

B. Seams: Fabricate non-moving seams in sheet metal with flat-lock seams. Form seams and solder tin edges to be seamed.

C. Expansion and Contraction:
   1. Provide for thermal expansion and contraction, and building movement in completed work, without over-stressing the material, breaking connections, or producing wrinkles and distortion in finished surfaces. Make watertight and weather-resistive.
   2. Where subject to thermal expansion and contraction, attach members with clips to permit movement without damage, or provide slotted or oversize holes with washers only, as acceptable to Architect.
   3. Make lock seam work flat and true to line, and sweat full of solder, except where installed to permit expansion and contraction.
      a. Lap flat lock seams and soldered lap seams according to pitch, but in no case less than 3 inches (76 mm). Make seams in direction of flow.

D. Sealant Joints: Where movable, non-expansion type joints are indicated, or required for proper performance of work, form metal to provide for proper installation of sealant per SMACNA standards.

E. Metal Separation: Separate metal from non-compatible metal or corrosive substrates by coating concealed surfaces at locations of contact with bituminous coating or other permanent separation as recommended by manufacturer.

F. Soldering:
   1. Clean material and tin prior to soldering. Solder with heavy coppers of blunt design, properly tinned before use.
   2. Solder slowly with well-heated coppers. Heat seams thoroughly and completely fill with solder.
   3. Make exposed joints on finish surfaces full flowing and smooth.
   4. Wash acid flux with soda solution after soldering, and remove soldering flux on exposed and painted surfaces.

G. Accessories:
   1. Miters, scuppers, and accessory items shall be furnished by manufacturer; color to match specified profile unless noted otherwise.
   2. Factory assemblies shall be furnished to maintain watertight integrity.
   3. Provide matching accessories such as extenders, brick/wall caps, gutters and downspouts, or other special fabrications from the manufacturer; color to match specified profile unless noted otherwise.

H. Fascia/coping/flashing sections furnished with strippable protective vinyl masking shall have film removed immediately before installation to prevent damage to the coating if left exposed to the ultra-violet rays of sunlight.

PART 3 EXECUTION

3.1 EXAMINATION

A. Do not begin installation until substrates have been properly prepared.

B. Prior to the installation of the fascia/coping/flashing, the installing contractor shall inspect the treated wood nailers to determine suitability for attachment of the fascia/coping/flashing system thereto.
   1. All horizontal wood nailers to receive the fascia/coping/flashing shall be pressure treated with salt preservatives. They must be installed horizontal, true and level, free of protruding knots, splinter or other irregularities.
   2. Nailers Attachment: Comply with Factory Mutual Loss Prevention Data Sheet 1-49 recommendations for the attachment of nailers and spacing of fasteners.

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

3.2 PREPARATION

A. Clean surfaces thoroughly prior to installation.

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

3.3 INSTALLATION

A. Install in accordance with manufacturer's instructions.

B. Except as otherwise indicated, comply with SMACNA recommendations.

C. Anchor units of Work securely in place by methods indicated, providing for thermal expansion of metal units. Conceal fasteners wherever possible, and set units true to line and level. Install work with laps, joints, and seams that will be permanently watertight and weather-resistive.

D. Strictly follow the material manufacturer's printed installation requirements. If parapet walls and perimeter nailers are to be covered with roofing membrane, follow the membrane manufacturer's installation requirements.

E. Completed work shall be true to line without buckling, creasing, warp or wind in finished surfaces. "Oil-canning" surfaces are not acceptable.

F. Isolate dissimilar metals, masonry or concrete from metals using bituminous paint, tape or slip-sheet. Use gasketed fasteners where required to prevent corrosive actions.

G. Allow sufficient clearances for expansion and contraction of linear metal components. Secure metal using continuous cleats, clips and fasteners as required by the system. No exposed face fastening shall be accepted.

3.4 PROTECTION

A. Protect installed products until completion of project.

B. Maintain prefinished surfaces in undamaged condition until date of substantial completion. Repair or replace damaged components, any touch-up to be indistinguishable from undamaged surface/finish.

END OF SECTION

SECTION 07 92 00

JOINT SEALERS

PART 1 - GENERAL

1.1 SUMMARY:

A. WORK INCLUDED:

1. Furnish and install all joint sealants, caulking, backer rods, fillers. Primers, and bond breaker tapes as shown on the Drawings and specified herein, or as required to seal exterior moving and non-moving joints, in order to prevent penetration of light, air, or moisture.

2. Work includes stripping, cleaning, and resealing existing exterior joints as indicated; and other exterior joints as indicated on the Drawings.

B. RELATED WORK: Carefully examine other Sections of these Specifications for work including or requiring sealants. Avoid omission or duplication of sealants. Assume responsibility for providing sealers at all locations not otherwise specified.

C. RELATED DOCUMENTS: Drawings, General and Supplementary Conditions, and applicable provisions of Division 1 Sections apply to this Section.

1.2 SUMITTALS:

A. SUBMITTAL PROCEDURES: Refer to Section 01 33 00.

B. PRODUCT DATA: Submit manufacturer's published data sheets, specifications, and installation instructions for each product specified herein.

C. SAMPLES: Submit color samples of each sealant type specified herein for selection by the Architect.

1.3 QUALITY ASSURANCE:

A. QUALIFICATIONS: Upon request by Architect, provide evidence that installers are experienced in materials and types of applications specified herein, and have a minimum of five (5) years previous experience in work of similar type and scope.

B. COMPATIBILITY: Prior to purchase and installation of products specified herein, verify compatibility with joint surfaces, other materials included in joint systems, and subsequent finishes. Provide only products which are known to be compatible with actual installation conditions, as determined by manufacturer's specifications or certification.

C. MOCK-UPS: Provide jobsite mock-ups of each major sealant type, installed in materials and joint types found in actual work. Obtain Architect's approval of mock-ups prior to proceeding with the work.

1.4 DELIVERY, STORAGE, AND HANDLING:

A. DELIVERY: Deliver materials in manufacturer's original, unopened containers or packaging material, with labels intact and legible.

B. STORAGE: Store materials in dry, protected areas, where temperature can be

maintained at or above 50°F until time of installation.

1.5 PROJECT CONDITIONS:

A. ENVIRONMENTAL REQUIREMENTS:
1. Apply joint sealers surfaces are dry and ambient air and surface temperature of joints in between 40°F and 100°F.
2. To the greatest extent possible, apply sealants when joints are at or near mid-point of thermal cycle width.

1.6 WARRANTY:

A. EXTENDED WARRANTY: In addition to guaranty requirements of the General Conditions, provide a written two-year warranty, signed by Contractor and sealant installer, guaranteeing all exterior joints to be water and air tight for a period of not less than two (2) years from date of Substantial Completion or acceptance of the Work by the Owner, whichever is sooner.

PART 2 - PRODUCTS

2.1 MATERIALS:

A. TYPE 1 SEALANT: (For joints in horizontal planes) Two-component, self-leveling urethane or polyurethane sealant complying with FS TT-S-00227E, Type 1, Class A, and ASTM C920, Type M, Grade P, Class 25, custom color as selected by the Architect. Acceptable products include:

1. Mameco “Vulkem 245”
2. Pecora “Unexpan 200”
3. Sika Corporation “Sikaflex-2c SL”
4. Sonneborn “Paving Joint Sealant”
5. Tremco “THC 900/901”

B. TYPE 2 SEALANT: (For joints in vertical planes) Two-component, non-sagging urethane or polyurethane sealant with a movement capability of 50% of the joint width in extension and 25% of the joint width in compression, complying with FS TT-S-00227E, Type II, Class A, and ASTM C920, Type M, Grade NS, Class 25, custom color as selected by the Architect. Acceptable products include:

1. Mameco “Vulkem 227”
2. Pecora “Dynatrol II
3. Sika Corporation “Sikaflex-2c NS”
4. Sonneborn “NP-2”
5. Tremco “Dynameric 511”

C. TYPE 3 SEALANT: (For fire-rated joints) One component, low-modulus silicone sealant complying with FS TT-S-01543A and FS TT-S-00230C, joint movement capabilities +100% extension and a -50% compression, tested for minimum 2 hour fire endurance in accordance with UL262 (ASTM E119), color as selected by the Architect. NOTE: This material is not intended for use as a through-stop fire-penetration sesalant. Acceptable products include:
   1. Dow-Corning 790
   2. Approved substitute

D. BACKER ROD – HORIZONTAL JOINTS: Resilient, closed cell, polyethylene foam rod designed for use with cold-applied sealants, diameter approximately 25-50% larger than joint width, as recommended by sealant manufacturer.

E. BACKER ROD – VERTICAL JOINTS: Flexible, compressible, non-gassing, open cell urethane foam rod designed for use with cold-applied sealants, diameter approximately 25-50% larger than joint width, as recommended by sealant manufacturer.

F. BOND-BREAKER TAPE: Pressure-sensitive polyethylene tape.

G. PRIMER: As recommended by sealant manufacturer for particular substrate.

PART 3 EXECUTION

3.1 EXAMINATION

A. VERIFICATION OF CONDITIONS: Examine areas and conditions under which the work of this Section will be performed. Do not proceed with the work until unsatisfactory conditions have been corrected. Commencement of work implies acceptance of all areas and conditions.

3.2 PREPARATION

A. JOINT PREPARATION: Joints must be structurally sound, clean, dry, and free from all loose aggregate, mortar, paint, rust grease, wax, or other foreign substances prior to priming or installing backer rods.

B. JOINT DIMENSIONS: Joint depth is recommended to be generally one-half the width of the joint, but not less than ¼" nor more than ½" deep for vertical joints, and at least ½" deep for horizontal joints. Install backer rods to control joint depth; if necessary, cut and remove expansion joint fillers to achieve minimum depth at horizontal joints.

C. PRIMING: 1. Prime sides of horizontal joints or other joints which will be subject to water immersion, as recommended by sealant manufacturer. Mask joints to prevent staining of adjacent or exposed finish materials. 2. Prime sides of vertical joints where recommended by sealant manufacturer for particular substrate. Mask joints to prevent staining of adjacent or exposed finish materials.

D. BOND BREAKER: Install polyethylene bond breaker tape at joints where required to prevent "three-point" bonding of wet sealants to back of joint.

E. MIXING: Mix multi-component sealants with low-speed electric drill and slotted

paddle in accordance with manufacturer's recommendations for ambient temperature and humidity conditions. Mix in quantities that can be readily used prior to initial curing.

3.3 INSTALLATION

A. BACKER ROD: Force rod into joint to desired depth using blunt probe or plain-faced roller, Install rod of diameter that will fit snugly in place without gross deformation; avoid longitudinal stretching. Do not use open cell foam on horizontal surfaces or in joints which will be subject to water immersion.

B. SEALANT TYPE 1: For large joints, sealant may be poured directly from the can; form a vee-shaped pouring spout to control flow. For smaller joints, allow sealant to flow from bulk-loading gun. Completely fill joints to within 1/16" of surface, allowing sealant to self-level. Avoid bridging of joint and formation of air pockets.

C. SEALANT TYPE 2: Apply with bulk gun, loaded at the site with freshly mixed sealant. Force sealant into joint from bottom to the exterior face by holding a properly sized nozzle against the bottom of the joint. Tool to slightly concave surface.

D. SEALANT TYPE 3: Install sealant to minimum depth of ½" over minimum 3" mineral wool backing, as required to provide 2-hr fire rated joint per UL 263 or ASTM E119. Where joint dimension will not permit installation of 3" mineral fiber backing, install sealant to minimum depth of 1-1/2" with conventional backer rod.

3.4 PROTECTION

A. CURING: Protect sealant from water immersion, traffic, or other mechanical damage until fully cured.

3.5 CLEANING:

A. ADJACENT SURFACES: Remove excess sealants from adjacent surfaces by cutting with sharp knife or razor after sealant has fully cured.

END OF SECTION

SECTION 08 80 00

GLAZING

PART 1 GENERAL

1.1 SUMMARY

A. Section includes glazing for the stair guardrail construction.

B. Related Sections:
   1. Division 05 Section “Metal Fabrications”
   2. Division 05 Section “Pipe and Tube Railings”

1.2 DEFINITIONS

A. Glass Manufacturers: Firms that produce primary glass, fabricated glass, or both, as defined in referenced glazing publications.

B. Glass Thickness: Indicated by thickness designations in millimeters according to ASTM C 1036.

1.3 PERFORMANCE REQUIREMENTS

A. General: Installed glazing systems shall withstand normal thermal movement and wind and impact loads (where applicable) without failure, including loss or glass breakage attributable to the following: defective manufacture, fabrication, or installation; deterioration of glazing materials; or other defects in construction.

B. Delegated Design: Design glass, including comprehensive engineering analysis according to ICC's 2006 International Building Code by a qualified professional engineer, using the following design criteria:
   1. Design Wind Pressures: Determine design wind pressures applicable to Project according to ASCE/SEI 7, based on heights above grade indicated on Drawings.
      a. Basic wind speed 90 MPH
      b. Exposure Category = C
   2. Vertical Glazing: For glass surfaces sloped 15 degrees or less from vertical, design glass to resist design wind pressure based on glass type factors for short-duration load.
   3. Maximum Lateral Deflection: For glass supported on all four edges, limit center-of-glass deflection at design wind pressure to not more than 1/50 times the short-side length or 1 inch, whichever is less.
   4. Differential Shading: Design glass to resist thermal stresses induced by differential shading within individual glass lites.

C. Thermal Movements: Allow for thermal movements from ambient and surface temperature changes acting on glass framing members and glazing components.
   1. Temperature Change: 120 deg F, ambient; 180 deg F, material surfaces.

1.4 SUBMITTALS

A. Product Data: For each glass product and glazing material indicated.

B. Glass Samples: For each type of glass product other than clear monolithic vision glass; 12 inches square.

C. Glazing Accessory Samples: 2 standoffs of specified finish and size.

D. Glazing Schedule: List glass types and thicknesses for each size opening and location. Use same designations indicated on Drawings.

E. Delegated-Design Submittal: For glass indicated to comply with performance requirements and design criteria, including analysis data signed and sealed by the qualified professional engineer responsible for their preparation.

F. Qualification Data: For installers.

G. Product Certificates: For glass and glazing products, from manufacturer.

H. Product Test Reports: Based on evaluation of comprehensive tests performed by a qualified testing agency, for laminated glass.

I. Warranties: Sample of special warranties.

1.5 QUALITY ASSURANCE

A. Manufacturer Qualifications for Laminated Glass: A qualified manufacturer who is approved by coated-glass manufacturer.

B. Installer Qualifications: A qualified installer who employs glass installers for this Project who are certified under the National Glass Association's Certified Glass Installer Program.

C. Glass Testing Agency Qualifications: A qualified independent testing agency accredited according to the NFRC CAP 1 Certification Agency Program.

D. Source Limitations for Glass: Obtain tinted float glass and laminated glass from single source from single manufacturer for each glass type.

E. Source Limitations for Glazing Accessories: Obtain from single source from single manufacturer for each product and installation method.

F. Glazing Publications: Comply with published recommendations of glass product manufacturers and organizations below, unless more stringent requirements are indicated. Refer to these publications for glazing terms not otherwise defined in this Section or in referenced standards.
   1. GANA Publications: GANA's "Laminated Glazing Reference Manual" and GANA's "Glazing Manual."

G. Safety Glazing Labeling: Where safety glazing labeling is indicated, permanently mark glazing with certification label of the SGCC or another certification agency acceptable to authorities having jurisdiction. Label shall indicate manufacturer's name, type of glass, thickness, and safety glazing standard with which glass complies.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Protect glazing materials according to manufacturer's written instructions. Prevent damage to glass and glazing materials from condensation, temperature changes, direct exposure to sun, or other causes.

1.7 PROJECT CONDITIONS

A. Environmental Limitations: Do not proceed with glazing when ambient and substrate temperature conditions are outside limits permitted by glazing material manufacturers.

1.8 WARRANTY

A. Manufacturer's Special Warranty for Coated-Glass Products: Manufacturer's standard form in which coated-glass manufacturer agrees to replace coated-glass units that deteriorate within specified warranty period. Deterioration of coated glass is defined as defects developed from normal use that are not attributed to glass breakage or to maintaining and cleaning coated glass contrary to manufacturer's written instructions. Defects include peeling, cracking, and other indications of deterioration in coating.
   1. Warranty Period: 10 years from date of Substantial Completion

B. Manufacturer's Special Warranty on Laminated Glass: Manufacturer's standard form in which laminated-glass manufacturer agrees to replace laminated-glass units that deteriorate within specified warranty period. Deterioration of laminated glass is defined as defects developed from normal use that are not attributed to glass breakage or to maintaining and cleaning laminated glass contrary to manufacturer's written instructions. Defects include edge separation, delamination materially obstructing vision through glass, and blemishes exceeding those allowed by referenced laminated-glass standard.
   1. Warranty Period: 10 years from date of Substantial Completion.

PART 2 PRODIUCTS

2.1 GLASS PRODUCTS, GENERAL

A. Thickness: Where glass thickness is indicated, it is a minimum. Provide glass lites in thicknesses as needed to comply with requirements indicated.
   1. Minimum Glass Thickness for Exterior Lites: Not less than 6.0 mm.
   2. Thickness of Tinted Glass: Provide same thickness for each tint color indicated throughout Project.

B. Strength: Where heat-strengthened glass is indicated, provide Kind HS heat-treated float glass or Kind FT heat-treated float glass. Where fully tempered glass is indicated, provide Kind FT heat-treated float glass.

C. Thermal and Optical Performance Properties: Provide glass with performance properties specified, as indicated in manufacturer's published test data, based on procedures indicated below:
   1. For monolithic-glass lites, properties are based on units with lites 6.0 mm thick.
   2. For laminated-glass lites, properties are based on products of construction indicated.

D. Visible Reflectance: Center-of-glazing values, according to NFRC 300.

2.2 GLASS PRODUCTS

A. Heat-Treated Float Glass: ASTM C 1048; Type I; Quality-Q3; Class I (clear) unless otherwise indicated; of kind and condition indicated.
   1. Fabrication Process: By horizontal (roller-hearth) process with roll-wave distortion parallel to bottom edge of glass as installed unless otherwise indicated.
   2. For uncoated glass, comply with requirements for Condition A.
   3. For coated vision glass, comply with requirements for Condition C (other coated glass).

2.3 LAMINATED GLASS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
   1. Guardian Industries Corp. www.sunguardglass.com.
   2. Oldcastle Glass: www.oldcastleglass.com.
   3. Saflex: www.saflex.com.
   4. Viracon: www.viracon.com.

B. Laminated Glass: ASTM C 1172, and complying with testing requirements in 16 CFR 1201 for Category II materials, and with other requirements specified. Use materials that have a proven record of no tendency to bubble, discolor, or lose physical and mechanical properties after fabrication and installation.
   1. Construction: Laminate glass with polyvinyl butyral interlayer or cast-in-place and cured-transparent-resin interlayer to comply with interlayer manufacturer's written recommendations.
   2. Interlayer Thickness: Provide thickness not less than that indicated and as needed to comply with requirements.
   3. Interlayer Color: Clear unless otherwise indicated.

C. Glass: Comply with applicable requirements in "Glass Products" Article as indicated by designations in "Laminated-Glass Types" Article.

2.4 COLOR LAMINATED GLASS

A. Basis of Design Products: “Colorlites Decorative Architectural Glass” as manufactured by Pulp Studio, www.pulpstudio.com, in sizes indicated on Drawings.

B. All glass quality to comply with detailed drawings for purpose of fabrication.

C. All glass quality to comply with ASTM C 1172 safety standards for laminated glass, produced with a formulated inter layer and substrate designed to laminate under heat and pressure between two pieces of clear glass.

2.5 MISCELLANEOUS GLAZING MATERIALS

A. General: Provide products of material, size, and shape complying with referenced glazing standard, requirements of manufacturers of glass and other glazing materials for application indicated, and with a proven record of compatibility with surfaces contacted in installation.

B. Cleaners, Primers, and Sealers: Types recommended by sealant or gasket manufacturer.

C. Point Supported Standoff Base and Cap:
   1. Basis of Design: Mfg. - CR Laurence, model – RS0B2135BS.
   2. 2” diameter, 1 3/4” long base.
   3. Finish; Brushed stainless steel.
   4. Stainless Steel mounting studs as required for attachment to steel tube rails.

2.6 FABRICATION OF GLAZING UNITS

A. Fabricate glazing units in sizes required to fit openings indicated for Project, with edge and face clearances, edge and surface conditions, and bite complying with written instructions of product manufacturer and referenced glazing publications, to comply with system performance requirements..

B. Grind smooth and polish all glass edges and corners.

2.7 LAMINATED-GLASS TYPES

A. Laminating Interlayer: “Vanceva Colored PVB” as manufactured by Saflex: www.saflex.com, or comparable products as manufactured by Pulp Studio: www.pulpstudio.com.

B. Glass Type G-1: Laminated, Insulating Glass with Tinted Interlayer.
   1. Outdoor Lite:
      a. 3-mm clear heat-strengthened glass.
      b. 0.60 mm polyvinylbutyrl interlayer, tinted. Color 0009 “Arctic Snow,” as manufactured by Vanceva, or comparable product “No. 6693” as manufactured by Pulp Studio.
      c. 3-mm clear heat-strengthened glass.
   2. Airspace: 13.2 mm, mill finish.
   3. Indoor Lite: 6-mm cleat heat strengthened float glass.
   4. Total Unit Thickness: 25.8 mm (1-1/16 inches).
   5. Scope: All skylight frames, sloped and vertical.

C. Glass Type G-2: Laminated Glass with two layers of Tinted Interlayer:
   1. 3-mm clear heat-strengthened glass.
   2. 0.60 mm polyvinylbutyrl interlayer, tinted. Color “True Blue”, No. 000D as manufactured by Vanceva, or as selected by Architect.
   3. 3-mm clear heat-strengthened glass.

PART 3 EXAMINATION

A. Examine framing with Installer present, for compliance with the following:
   1. Manufacturing and installation tolerances, including those for size, squareness, plumb and offsets at corners.
   2. Minimum required face and edge clearances.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Clean glazing framing members receiving glass immediately before glazing. Remove coatings not firmly bonded to substrates.

B. Examine glazing units to locate exterior and interior surfaces. Label or mark units as needed so that exterior and interior surfaces are readily identifiable. Do not use materials that will leave visible marks in the completed work.

3.3 GLAZING, GENERAL

A. Comply with combined written instructions of manufacturers of glass, and other glazing materials, unless more stringent requirements are indicated, including those in referenced glazing publications.

B. Protect glass edges from damage during handling and installation. Remove damaged glass from Project site and legally dispose of off Project site. Damaged glass is glass with edge damage or other imperfections that, when installed, could weaken glass and impair performance and appearance.

C. Do not exceed edge or point pressures stipulated by glass manufacturers for installing glass lites.

D. Set glass lites in each series with uniform pattern, draw, bow, and similar characteristics.

E. Set glass lites with proper orientation so that coatings face exterior or interior as specified.

3.4 CLEANING AND PROTECTION

A. Protect exterior glass from damage immediately after installation by attaching crossed streamers to framing held away from glass. Do not apply markers to glass surface. Remove nonpermanent labels and clean surfaces.

B. Protect glass from contact with contaminating substances resulting from construction operations. If, despite such protection, contaminating substances do come into contact with glass, remove substances immediately as recommended in writing by glass manufacturer.

C. Examine glass surfaces adjacent to or below exterior concrete and other masonry surfaces at frequent intervals during construction, but not less than once a month, for buildup of dirt, scum, alkaline deposits, or stains; remove as recommended in writing by glass manufacturer.

D. Remove and replace glass that is broken, chipped, cracked, or abraded or that is damaged from natural causes, accidents, and vandalism, during construction period.

A. Wash glass on both exposed surfaces in each area of Project not more than four days before date scheduled for inspections that establish date of Substantial Completion. Wash glass as recommended in writing by glass manufacturer.

END OF SECTION

SECTION 09 91 00

PAINTS

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Use products in this section to re-finish or touch-up exterior steel components.

B. Use products specified in this section to finish all surfaces exposed to view that require patch or repair, unless otherwise indicated, including but not limited to the following:
   1. Interior wall and ceiling surfaces.
   2. Interior wood doors and woodwork.
   3. Opening frames and trim and doors.
   4. Exterior railings.

C. Do not paint the following:
   1. Items specified or provided with factory finish.
   2. Stainless steel, anodized aluminum, bronze, terne, or lead.

D. Materials and products having factory-applied primer are not considered factory finished.

E. For colors, match color and sheen of existing finishes being patched or repaired.

1.2 RELATED SECTIONS

A. Section 05 - Metal Fabrications: Shop priming.

1.3 REFERENCES

A. ANSI Z535.1 - Safety Color Code.

B. ASTM D 16 - Standard Terminology Relating to Paint, Varnish, Lacquer, and Related Products.

C. ASTM D 3359 - Standard Test Methods for Measuring Adhesion by Tape Test.

1.4 DEFINITIONS

A. Conform to definitions of terms in ASTM D 16 in interpreting requirements of this specification section.

1.5 SUBMITTALS

A. Submit under provisions of Section 01 33 00 SUBMITTAL PROCEDURES.

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

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

1.6 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacture of coatings of quality

specified with minimum of 10 years experience.

B. Installer Qualifications: Company specializing in commercial painting and finishing with three years documented experience and approved by the coating manufacturer.

1.7 DELIVERY, STORAGE, AND HANDLING

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

B. Establish and maintain storage area conditions for products of this section in accordance with manufacturer's instructions until installation.

C. Store materials in a dry, warm, ventilated weather tight location.

D. Store and dispose of solvent-based materials, and materials used with solvent-based materials, in accordance with requirements of local authorities having jurisdiction.

1.8 PROJECT CONDITIONS

A. Maintain environmental conditions (temperature, humidity, and ventilation) within limits recommended by manufacturer before, during, and after application of coatings. Do not apply coatings under environmental conditions outside manufacturer's absolute limits.

B. During application of coating materials, post "WET PAINT" signs.

C. During application of solvent-based materials, post "NO SMOKING" signs.

1.9 COORDINATION

A. Coordinate Work with other operations and installation of finish materials to avoid damage to installed materials.

B. Do not apply coating materials until moisture-producing construction activities, dust-producing construction activities, and other construction activities which could impair performance or appearance of the coatings, have been completed.

1.10 EXTRA MATERIALS

A. Supply for each finish coating material, color, and finish specified one quart of coating material, in sealed 1 quart containers, marked with color and finish identification.

B. Custom Colors: Provide details of color formula and product availability for each finish specified.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Acceptable Manufacturers: Benjamin Moore, Diamond Vogel, Kwal-Howells, Pittsburgh Paints, Sherwin Williams, Duron Paints or Sophir-Morris.

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

C. Unless otherwise specified for an individual product or material, supply all products specified in this section from the same manufacturer.

2.2 MATERIALS

A. Paints and Coatings - General:
   1. Acceptable Products: As indicated in Schedule at the end of this Section.
   2. Unless otherwise indicated, provide factory-mixed coatings. When required, mix coatings to correct consistency in accordance with manufacturer's instructions before application. Do not dilute or thin coatings, except as instructed.
   3. Do not add additives, except as instructed or recommended by coating manufacturer.
   4. For opaque finishes, tint each coat, including primer coat and intermediate coats, one-half shade darker than succeeding coat, with final finish coat as base color.
   5. Supply each coating material in quantity required for this Section from a single production run.

B. Accessories: Provide as required or as identified in the coating manufacturer's application instructions. Accessories include but are not limited to thinners, sealers, primers, cleaning agents, etching agents, cleaning cloths, sanding materials, and clean-up materials.

PART 3 EXECUTION

3.1 EXAMINATION

A. Do not begin installation until substrates have been properly prepared.

B. Ensure that surfaces to receive coatings are dry immediately prior to application.

C. Ensure that moisture-retaining substrates to receive coatings have moisture content within tolerances allowed by coating manufacturer, using moisture measurement techniques recommended by coating manufacturer.

D. Examine surfaces to receive coatings for surface imperfections and contaminants that could impair performance or appearance of coatings, including but not limited to, loose primer, rust, scale, oil, grease, mildew, algae, or fungus, stains or marks, cracks, indentations, or abrasions.

E. Correct conditions that could impair performance or appearance of coatings in accordance with specified surface preparation procedures before proceeding with coating application.

3.2 PREPARATION

A. Clean surfaces thoroughly prior to coating application.

B. Do not start work until surfaces to be finished are in proper condition to produce finished surfaces of uniform, satisfactory appearance.

C. Stains and Marks: Remove completely, if possible, using materials and methods recommended by coating manufacturer; cover stains and marks which cannot be completely removed with isolating primer or sealer recommended by coating manufacturer to prevent bleed-through.

D. Remove Mildew, Algae, and Fungus using materials and methods recommended by coating manufacturer.

E. Remove dust and loose particulate matter from surfaces to receive coatings immediately prior to coating application.

F. Remove or protect adjacent hardware, electrical equipment plates, mechanical grilles and louvers, lighting fixture trim, and other items not indicated to receive coatings.

G. Move or protect equipment and fixtures adjacent to surfaces indicated to receive coatings to allow application of coatings.

H. Protect adjacent surfaces not indicated to receive coatings.

I. Prepare surfaces in accordance with manufacturer's instructions for specified coatings and indicated materials, using only methods and materials recommended by coating manufacturer, and as follows:

J. Existing Coatings:
   1. Remove surface irregularities by scraping or sanding to produce uniform substrate for coating application; apply one coat primer of type recommended by coating manufacturer for maximum coating adhesion.
   2. If presence of lead in existing coatings is suspected, cease surface preparation of existing coating and notify Architect immediately.

K. Ferrous Metals, Unprimed: Remove rust or scale, if present, by wire brush cleaning, power tool cleaning, or sandblast cleaning; remove grease, oil, and other contaminants which could impair coating performance or appearance by solvent cleaning, with phosphoric-acid solution cleaning of welds, bolts and nuts; spot-prime repaired welds with specified primer.

L. Ferrous Metals, Shop-Primed: Remove loose primer and rust, if present, by scraping and sanding, feathering edges of cleaned areas to produce uniform flat surface; solvent-clean surfaces and spot-prime bare metal with specified primer, feathering edges to produce uniform flat surface.

M. Galvanized Steel (not passivated): Clean with a water-based industrial strength cleaner, followed by a clean water rinse; or wipe down surfaces using clean, lint-free cloths saturated with xylene or lacquer thinner; followed by wiping the surface dry using clean, lint-free cloths.

N. Passivated Galvanized Steel: Clean with a water-based industrial strength cleaner, and/or "Brush Blast" in accordance with SSPC-SP7. After the surface has been prepared, apply recommended primer to a small area. Allow primer to cure for 7 days, and test adhesion using the "cross-hatch adhesion tape test" method in accordance with ASTM D 3359. If the adhesion of the primer is positive, proceed with a recommended coating system for galvanized metal.

O. Wood:
   1. Seal knots, pitch streaks, and sap areas with sealer:
      a. For interior use White Pigmented Shellac.
      b. For exterior use Ready-Mixed Aluminum.
   2. Fill nail recesses with putty or a glazing compound.
   3. Fill interior ceiling and wall cracks with spackling compound.
   4. Let fillers dry, then sand surfaces smooth.
   5. Fill cracks or joints in or between wood, metal, masonry, glass, ceramic, plaster and plastics with a quality acrylic or siliconized acrylic latex caulk.

P. Doors: Prior to finishing, apply additional primer or sealer coat to door tops and bottoms.

Q. Gypsum Board: Repair cracks, holes, indentations, and other surface defects using joint compound to produce surface flush with adjacent undamaged surface; sand to produce uniform flat surface when dry.

3.3 APPLICATION

A. Apply each coat to uniform coating thickness in accordance with manufacturer's instructions, not exceeding manufacturer's specified maximum spread rate for indicated surface; thins,

brush marks, roller marks, orange-peel, or other application imperfections are not permitted.

B. Allow manufacturer's specified drying time, and ensure correct coating adhesion, for each coat before applying next coat.

C. Inspect each coat before applying next coat; touch-up surface imperfections with coating material, feathering, and sanding if required; touch-up areas to achieve flat, uniform surface without surface defects visible from 5 feet (1.5 m).

D. Do not apply succeeding coat until Architect has approved previous coat; only Architect-approved coats will be considered in determining number of coats applied.

E. Remove dust and other foreign materials from substrate immediately prior to applying each coat.

F. Where coating application abuts other materials or other coating color, terminate coating with a clean sharp termination line without coating overlap.

G. Where color changes occur between adjoining spaces, through framed openings that are of same color as adjoining surfaces, change color at outside stop corner nearest to face of closed door.

H. Re-prepare and re-coat unsatisfactory finishes; refinish entire area to corners or other natural terminations.

3.4 MECHANICAL AND ELECTRICAL EQUIPMENT

A. Wood Equipment Panels: Apply primer coat to panel back before mounting; finish in accordance with requirements for interior wood, flat finish, including edges, before mounting equipment.

B. HVAC Louvers and Grilles: Finish in accordance with requirements for shop-primed ferrous metal items, including dampers visible behind units, color matching adjacent surfaces unless otherwise indicated.

C. HVAC Ductwork: Finish interior surfaces visible through grilles and louvers with one coat acrylic flat wall paint, color black.

D. Convector and Baseboard Heating Cabinets: Finish in accordance with requirements for shop-primed ferrous metal items, including dampers visible behind units, color matching adjacent surfaces unless otherwise indicated; finish interior surfaces visible through grilles and louvers with one coat alkyd flat paint, color black.

E. Piping, Ductwork, and Conduit Exposed to View in Finished Spaces: Finish in accordance with requirements for unprimed ferrous metal items, color matching adjacent surfaces unless otherwise indicated.

F. Piping, Ductwork, and Conduit Exposed to View in Finished Utility, Mechanical, and Electrical Spaces: Finish in accordance with requirements for unprimed ferrous metal items.
   1. Identification markings will be provided by others.
   2. Do not allow coatings on identification tags or markings.
   3. Replace identification markings when painted accidentally.

G. Access Panels, Electrical Panels, and Cover Plates: Finish in accordance with requirements for shop-primed ferrous metal items, including doors, door backs and sight-exposed cabinet surfaces, color matching adjacent surfaces unless otherwise indicated; do not allow coatings on identification plates, tags, or markings.

3.5 CLEANING

A. Clean excess coating materials, and coating materials deposited on surfaces not indicated to receive coatings, as construction activities of this section progress; do not allow to dry.

B. Re-install hardware, electrical equipment plates, mechanical grilles and louvers, lighting fixture trim, and other items that have been removed to protect from contact with coatings.

C. Reconnect equipment adjacent to surfaces indicated to receive coatings.

D. Relocate to original position equipment and fixtures that have been moved to allow application of coatings.

E. Remove protective materials.

3.6 PROTECTION

A. Protect completed coating applications from damage by subsequent construction activities.

B. Repair to Architect's acceptance coatings damaged by subsequent construction activities. Where repairs cannot be made to Architect's acceptance, re-apply finish coating to nearest adjacent change of surface plane, in both horizontal and vertical directions.

3.7 SCHEDULE - INTERIOR PAINT SYSTEMS

A. Metals, Unless Otherwise Indicated:
   1. Unprimed Ferrous Surfaces: Prime with one coat Alkyd White Metal Primer, or one coat Damp Proof Red Oxide Metal Primer, as recommended by finish coating manufacturer for colors of finish coats.
   2. Shop-Primed Ferrous Surfaces: Touch-up with Alkyd White Metal Primer, or Damp Proof Red Oxide Metal Primer, as recommended by finish coating manufacturer for colors of finish coats.
   3. Finish Semi-Gloss, Acrylic: Two coats Interior Acrylic Latex Semi-Gloss Enamel.
   4. SCOPE:
      a. Metal guardrails – campus standard “Grey Matters”.
      b. Hollow metal doors and frames – campus standard “Grey Matters”.
      c. Structural Steel – campus standard “Grey Matters”.
      d. Access Panels – Ceiling White.

B. Wood - Opaque Finish:
   1. Primer: One coat Interior Alkyd Stain Block Enamel.
   2. Finish Flat, Acrylic: Two coats Interior Acrylic Latex Flat Enamel.

C. Wood – Catalyzed Lacquer Finish:
   1. Preparation: Fill open grain woods, vinyl washcoat closed grain woods.
   2. First Coat: Vinyl sealer
   3. Finish: Two coats Pre-catalyzed lacquer, satin finish.
   4. SCOPE: Architectural Woodwork and existing handrails.

D. Gypsum Board, Gypsum Plaster, and Portland Cement Plaster:
   1. Gypsum Board and Gypsum Plaster: Prime with one coat Interior Acrylic Latex Drywall Primer Sealer.
   2. Finish Eggshell, Acrylic: Two coats Interior Acrylic Latex Eggshell Enamel.
   3. SCOPE: All gypsum board wall and ceiling surfaces within the corridors.
      a. Ceilings/soffits – White TBD
      b. Walls – Three colors TBD. One neutral, two deep tone for accent walls.

END OF SECTION

SECTION 31 63 33

DRILLED MICROPILES

PART 1 GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. This section specifies performance requirements, design, drilling, installation, testing and inspection, and all other work necessary for a complete installed system of drilled micropiles consisting of threaded steel reinforcement bars grouted in place.

1.3 PERFORMANCE REQUIREMENTS

A. Structural Performance: Required service load capacity in compression, tension, and lateral loads as indicated on drawings. Required settlement performance under working loads as follows: maximum total settlement = 1/2”, maximum differential settlement = 1/4”, maximum horizontal and vertical movement of battered micropiles = 1/2”. Maximum lateral movement under working downward load = 1/2”. Required design life = 100 years without repair or maintenance.

B. Engineering design of drilled micropiles by Contractor. Micropiles are a performance specified item that requires a stamped engineered submittal.

C. Design shall indicate minimum length of time after micropile construction before contractor can build on top of micropile foundations.

1.4 UNIT PRICES

A. Basis of Bids: Bids shall be based on the number and location of micropiles shown on the drawings and on diameters and lengths determined by the Contractor’s design. Do not base bids solely on the minimum lengths and embedments listed herein.

B. Basis for Payment: Payment for micropiles will be made on length, size, type, and number of micropiles in place and approved. Actual length and size/type of micropile may vary to coincide with elevations where satisfactory bearing strata are encountered, and with actual strength of bearing strata determined by the testing with Owner’s geotechnical engineering review and approval. Adjustments will be made on net variation of total quantities.
   1. Unit prices shall include labor, materials, tools, equipment, and incidentals required for drilling, casings, reinforcement, grout, hardware, and other items for complete micropile installation.
   2. See Division 00 Form "Basis for Bids – Drilled Micropile Construction”.

1.5 SUBMITTALS

A. Proposed Means and Methods
   1. Submit a narrative with proposed method of construction, drilling equipment, area of disturbance, and extent of disturbance for Owner’s review and approval. Submit proposed methods to minimize dust, debris, noise, and

drilling spatter.

2. Submit methods statement describing all load testing of micropiles. Include a drawing describing the setup, method of applying the test loads, and method of measuring movements. A submittal is required for compression tests, tension tests, and lateral tests.

B. Stamped and Signed engineering calculations by a qualified engineer registered in the state of the project. Calculations shall include design of complete micropile foundation system, including calculations substantiating required design life. Designs shall consider slenderness of micropiles for unbraced lengths at top of micropiles.

C. Product Data: For each type of product indicated including:
   1. Grout materials, grouting admixtures, grout mix design, and grout cube breaks indicating proposed material conforms to the contract documents.
   2. Rebar, threaded and deformed
   3. Steel plates, bolts, weld metal, etc. including grade and finish
   4. Centralizers
   5. Finishes on rebar

D. Shop Drawings: Submit shop drawings for all fabricated steel elements including plates, washers, etc. indicating dimensions, material specification, and finishes.

E. Grout mix design and grout test results from previous testing.

F. Verification and Proof Load Test Equipment: Submit hydraulic pump and pressure gauge calibration curve to Architect prior to performing any tests.

1.6 QUALITY ASSURANCE

A. Design Standard: IBC 2006 Section 1810.8 “Micropiles”, “Micropile Design and Construction Guidelines" Published by the Federal Highway Administration; Publication Number FHWA-SA97-070, and “Micropile Design and Construction, FHWA NHI-05-039”. Maximum allowable stresses used for micropile design shall not exceed those found in the IBC 2006.

B. Bar Verification Testing Standard: Comply with provisions in “Manual for Design and Construction Monitoring of Soil Nail Walls, FHWA-SA_96-069-R” unless modified in this section.

C. Contractor Qualifications: The Contractor performing the work described in this specification shall have installed micropiles for a minimum of five years. At the time of bid, the Contractor shall submit a list containing at least five projects of similar size and complexity on which the Contractor has installed micropiles. A brief description of each project and a reference shall be included for each project listed. As a minimum, the reference shall include an individual’s name and current phone number.

D. Structural Steel: Fabricate and assemble in shop to greatest extent possible. Fabricate according to AISC's "Code of Standard Practice for Steel Buildings and Bridges", latest edition.

E. Survey Work: Engage a qualified land surveyor to perform surveys, layouts, and measurements for micropiles. After installation, record actual measurements of each micropile location, diameter, bottom and top elevations, depth to bearing strata, and deviations from specified tolerances, and other specified data.
   1. Record and maintain information pertinent to each micropile and submit to Owner within 2 weeks of installation.

1.7 PROJECT CONDITIONS

A. Existing Utilities or Structure: Locate existing underground utilities and structure before installing micropiles. If utilities or structure are to remain in place, provide protection from damage during drilling operations.

B. Site Information: A geotechnical report has been prepared for this Project and is included elsewhere in the Project Manual for information only.
   1. The drilling log and accompanying report are believed to be accurate; however, neither the Owner nor Architect guarantees the information contained nor do they guarantee the conditions indicated to exist at the location of the test holes will prevail at other locations on the site.

1.8 DELIVERY STORAGE AND HANDLING

A. Store cement to prevent moisture degradation and partial hydration. Do not use cement that has become caked or lumpy. Store aggregates so that segregation and inclusion of foreign materials are prevented. Do not use the bottom six inches of aggregate piles in contact with the ground..

B. Store steel casings and reinforcement on supports to keep the steel from contacting the ground. Damage to the bar steel as a result of abrasion, cuts, nicks, welds and weld splatter shall be cause for rejection. Do not ground welding leads to bars. Protect steel from dirt, rust and other deleterious substances prior to installation.

PART 2 PRODUCTS

2.1 STEEL REINFORCEMENT

A. Deformed Reinforcing Bars: ASTM A 615, Grade 60, deformed.

B. Threaded Reinforcing Bars: ASTM A 615, Grade 75 minimum, ASTM A722, Grade 150 minimum, or per German Certificates of Approval Z-1.5-76, Z1.5-149, or Z1.5-2, 72.5ksi (500 $N/mm^{2)}$ minimum yield strength. Actual yield strength may need to be greater than these minimums as required by the contractor's design to satisfy the performance requirements herein. Continuously threaded.
   1. Subject to all requirements herein, the following products are acceptable:
      a. Williams All-thread Rebar by the Williams Form Company
      b. GEWI Threadbar by Dywidag-Systems International

C. Hollow Threaded Reinforcing Bars: ASTM A 519, Grade 85 minimum. Continuously threaded.
   1. Subject to all requirements herein, the following products are acceptable:
      a. Williams Geo-Drill Injection Bar by the Williams Form Company

D. Couplings:
   1. Couplings for Grade 75 Threaded Reinforcing Bar: ASTM A108, Stop-Type.
   2. Couplings for Grade 150 Threaded Reinforcing Bar: ASTM A29, Grade C1045, Stop-Type.

3. Couplings for Hollow Threaded Reinforcing Bar: ASTM A29, Stop-Type.
4. All couplings shall be stop-type, and shall develop 100 percent of the ultimate tensile strength of the coupled reinforcing bars without evidence of any failure.

E. Nuts:
1. Nuts for Grade 75 Threaded Reinforcing Bar: ASTM A108.
2. Nuts for Grade 150 Threaded Reinforcing Bar: ASTM A29.
3. Nuts for Hollow Threaded Reinforcing Bar: ASTM A29 or A108.

F. Washers: ASTM F436

G. Galvanized Reinforcing Bars: ASTM A767, Class II zinc coated, hot-dip galvanized after fabrication. Mechanically clean bars prior to galvanization. Galvanize top 15 feet of all reinforcing bars in micropile construction.

H. Galvanized Hardware for Reinforcing Bars: ASTM A153, zinc coated, hot-dip galvanized after fabrication. Galvanize all hardware in top 15 feet of micropile construction.

2.2 REINFORCEMENT ACCESSORIES

A. Bar Supports: spacers, and other devices for spacing, supporting, and fastening reinforcing bars in place. Manufacture bar supports according to CRSI's "Manual of Standard Practice," as follows:
1. For zinc-coated reinforcement, use galvanized wire or dielectric-polymer-coated wire bar supports.

2.3 GROUT MATERIALS

A. Grout shall be nonshrink grout conforming to ASTM C1107, Grades B or C and shall achieve 4000 psi compressive strength at 28 days.

B. Alternatively grout may be neat Portland Cement or Portland Cement with fine aggregate. The Portland Cement grout shall conform to the following:
1. Portland Cement: ASTM C150, Type I, II, or Type III.
2. Water: Potable, complying with ASTM C 94/C 94M requirements, and shall be free from substances that may be detrimental to cement and steel
3. Fine Aggregate: Fine Aggregate, if used, shall conform to AASHTO M6/ASTM C33. Free of materials with deleterious reactivity to alkali in cement
4. Admixtures: Admixtures shall conform to AASHTO M194/ASTM C494. Admixtures which control bleeding, improve flowability, reduce water content and retard setting may be used. Accelerators are not permitted. Admixtures shall be compatible with the grout and mixed in accordance with the manufacturer’s recommendations
5. Grout Mix: Cement shall be fresh and shall not contain lumps or other indications of hydration. Resin, epoxy or other non-cementitious grouts shall not be used. Chloride-containing grouts or other grouts, which in the opinion of the Architect may be detrimental to the micropile, are not permitted. The grout shall be capable of reaching cube strength (AASHTO T 106/ASTM C109) of 2500 psi in 3 days and 4000 psi in 28 days. The grout shall have a maximum water-cement ratio of 0.45. The grout shall be free of lumps and un-dispersed cement.\

C. Grout Materials:
   1. Portland Cement: ASTM C 150, Type I/II, gray.
   2. Water: Potable
   3. Admixtures: Subject to Manufacturer's recommendations and Architect's Approval.

2.4 STRUCTURAL STEEL MATERIALS

A. Plate and Bar: ASTM A 36

B. Centralizers. Centralizers are to be manufactured from Schedule 40 PVC pipe or tube, ASTM D-1785, steel or other material not detrimental to the steel (wood shall not be used); and are to be securely attached to the bar and pipe. Centralizers shall be sized to position the bar/pipe within the center of the drill hole, sized to allow grout tube insertion to the bottom of the drill hole, and sized to allow grout to freely flow up the drill hole.

C. Welding Electrodes: Comply with AWS D1.1 requirements, 70 Series.

D. Headed Anchor Rods: ASTM A449, weldable, straight, Heavy Hex headed.
   1. Nuts: ASTM A 563 heavy hex carbon steel.
   2. Plate Washers: ASTM A 36 carbon steel.
   3. Washers: ASTM F 436 hardened carbon steel.
   4. Select one finish from options in subparagraph below.
   5. Finish: Hot-dip zinc coating, ASTM A 153, Class C

E. Cold-Formed Hollow Structural Sections: ASTM A 500, Grade B, structural tubing.

F. Galvanized Structural Steel Material: ASTM A 123, zinc coated, hot-dip galvanized after fabrication. Galvanize all structural steel material in top 15 feet of micropile construction.

PART 3 EXECUTION

3.1 PREPARATION

A. Protect existing and new structures, utilities, sidewalks, pavements, and other facilities from damage caused by drilling, equipment use, stored materials, and other hazards created by these operations.

3.2 DRILLING

A. General.
   1. By personnel experienced and properly equipped to construct micropiles of indicated diameter and length.
   2. Drilling may be by any method the Contractor chooses for the particular ground conditions including core drilling, rotary drilling, percussion drilling, and auger drilling; however site constraints will dictate the size and accessibility of the drilling equipment. Drill with penetration into competent bearing material per contractor's design or deeper if required by on-site testing. Driven casing is not allowed.
   3. Micropile reinforcing may be installed in the hole after drilling or advanced by the drill.
   4. Use of drilling muds such as bentonite slurry to assist in drill cutting removal is not allowed. Provide a written plan for controlling dust and drill splatter if air is used. Existing construction shall be cleaned to the satisfaction of the owner

after drilling operations are complete. The Contractor shall control and properly dispose of drill flush and construction-related waste, including excess grout, in accordance with the specifications and all applicable local codes and regulations. The Contractor shall control the dust and drill spatter during the drilling operations to limit the impacts to the environment, public traffic, and pedestrians.

5. If water is used in the drilling operation, the Contractor shall be responsible for controlling and disposing of the water in such a manner that is not harmful to the site or existing structures. Any damage by drilling water shall be repaired by the Contractor at no cost to the Owner. Holes shall be thoroughly cleaned of all dust, rock chips, grease or other deleterious material.

B. Prevent surface water from entering excavated holes. Do not leave holes open overnight.

C. Drill holes to proper depths. Clean sides of hole and remove loose material from bottom.

D. Owner's Geotechnical Engineer shall inspect each hole. If unsuitable material is encountered, contractor shall stop drilling operations and shall submit alternate procedures for Architect's review. Holes may not be made smaller or shallower than specified.
   1. Do not excavate holes deeper than elevations indicated, unless approved by the Geotechnical Engineer.
   2. Additional authorized excavation will be paid according to Contract provisions for changes in the Work.

E. Excavate closely spaced holes only after adjacent holes are filled with grout and allowed to set to prevent holes from interfering or weakening each other. Set shall be achieved when the grout achieves 500 psi.

F. Tolerances: Construct micropiles within the following tolerances.
   1. Plan location: steel projecting from ground shall be located within 1 1/2" from specified position.
   2. Plumbness: Hole and steel projecting from ground shall be plumb to within 1 percent.
   3. Elevation: Top of threaded rebar and bearing plate elevations shall with within 1" of specified elevation. Top of grout and permanent steel casing shall be within 1" of specified elevation.
   4. Subparagraph below is based on ACI 336.1 requirements. Revise scope, design responsibility, or corrective procedure if required.
   5. If location or out-of-plumb tolerances are exceeded, provide corrective construction. Submit design and construction proposals to Architect for review and approval before proceeding.

G. Inspection: Each micropile must be inspected by the Owner's Geotechnical Engineer before placing grout, unless a hollow bar simultaneous drilling and grouting procedure is used.

3.3 GROUTING AND EMBEDING REBAR AND CASING

A. Reinforcing bars and permanent steel casing shall be placed prior to grouting, unless a hollow bar simultaneous drilling and grouting procedure is used, and shall be free of deleterious substances that might contaminate the grout or impair bond.

B. The Contractor shall have means and methods of measuring the grout quantity and pumping pressure (if pressure grouting is used) during the grouting operations. The grout mixture shall be kept in agitation prior to placement and shall be placed in one continuous operation

C. The Contractor shall prepare and submit to the Architect full installation records for each micropile installed. The records shall be submitted within one week. The date shall be recorded on the installation log. A separate log shall be completed for each micropile.

D. Grout equipment shall produce a uniformly mixed grout free of lumps and undispersed cement, and be capable of continuously agitating the grout. Size the grouting equipment to enable the entire micropile to be grouted in one continuous operation. Place the grout within 60 minutes after mixing, or within the time recommended by the admixture manufacturer, if admixtures are used. Grout not placed in the allowed time limit will be rejected.

E. Install the grout after installation of the steel bar and permanent steel casing, if any, unless a hollow bar simultaneous drilling and grouting procedure is used. Accurately position, support, and secure reinforcement against displacement during grouting. Place spacers at 9 feet on center maximum, and within 4 feet of top and bottom of micropile. Maintain minimum 3/4” cover to reinforcement.

F. Bar couplings shall be installed tight with jamb nuts.

G. Each hole will be grouted the same day of drilling, unless otherwise approved by the Owner’s geotechnical engineer. Inject the grout at the lowest point of each hole through a grout tube. Keep the outlet end of the grout tube at the bottom of the borehole to prevent the creation of voids. Completely fill the hole in one continuous operation. Cold joints in the grout column are not allowed. At the Contractor’s option, the grout tube may remain in the hole provided it is filled with grout. Grouting before insertion of the bar will not be allowed, but simultaneous grouting is acceptable if a hollow bar system is used. The quantity of the grout placed in each hole shall be recorded on the installation records.

H. Prior to placing the grout, the bar and casing shall be at a temperature of at least 40 degrees F but not more than 90 degrees F. At the time of placing the grout, the grout shall have a temperature of at least 50 degrees F but not more than 90 degrees F. The mixing water shall be a minimum temperature of 50 degrees F. If the air temperature is below 35 degrees F, exposed portions of the bar shall be protected against freezing immediately after the grout is placed until the grout achieves 1,000 psi unconfined compressive strength. These requirements shall be met any time the outside air temperature is expected to drop below 35 degrees F.

I. Maintain the grout level in the hole to the top of the hole until the grout achieves initial set. The borehole will require “topping off” to the surface after the set of the initially installed grout.

J. Completed installation of reinforcement, spacers, grout tube, etc. must be approved by the Owner’s Testing Agency before placing grout.

3.4 STEEL REINFORCEMENT ABOVE GROUND

A. Comply with recommendations in CRSI's "Manual of Standard Practice" for fabricating, placing, and supporting reinforcement.
   1. Reinforcing: Exact location of dowels extending into work above shall be

verified by the Contractor. Deviations in location of such reinforcing in excess of specified placing tolerances shall be reported to the Architect within 1 week after grout is placed.

B. Clean reinforcement of earth, and other materials that reduce or destroy bond.

C. Zinc-Coated Reinforcement: Repair cut and damaged zinc coatings with zinc repair material according to ASTM A 780. Use galvanized steel wire ties to fasten zinc-coated steel reinforcement.

D. Protect exposed ends of extended reinforcement, grout, and casing damage and exposure to weather.

3.5 FIELD QUALITY CONTROL

A. Testing Agency: Owner will engage a qualified Geotechnical Engineer to perform geotechnical field services and an independent testing and inspecting agency to sample materials, perform tests, and submit reports for drilling, grouting, and reinforcing. Geotechnical Engineer shall review initial engineering submittal, and return to Architect and Engineer within five business days.

B. An installation report shall be prepared by the Owner's Geotechnical Engineer for each micropile as follows:
1. Identification Mark.
2. Hole diameter.
3. Actual top and bottom elevations and design top and bottom elevations.
4. Top of ground surface elevation and top of competent bedrock elevation.
5. Description of soil materials.
6. Description, location, and dimensions of obstructions/voids during drilling.
7. Final top centerline location and deviations from requirements.
8. Variation from plumb.
9. Verification that drilling and installation method matches those used in approved verification test(s).
10. Cleanliness of hole.
11. Ground-water conditions and water-infiltration rate and depth.
12. Description of soil or water movement, sidewall stability, loss of ground, and means of control.
13. Date and time of starting and completing hole excavation and hole grouting.
14. Type, size, and length of reinforcing steel and casing.
15. Grout placing method, including delays.
16. Remarks, unusual conditions encountered, and deviations from requirements.
17. Grout testing results.
18. Overrun or underrun.

C. Grout: Owner's Testing and Inspection Agency shall sample and test grout as follows:
1. Grout Temperature: ASTM C 1064; one test hourly when air temperature is 40 deg F (4.4 deg C) and below and when 80 deg F (27 deg C) and above, and one test for each set of compressive-strength specimens.
2. Compression Test Specimens: ASTM C 31/C 31M; one set of four cubes for each compressive-strength test, unless otherwise indicated. Mold and store cubes for laboratory-cured test specimens.
3. Compressive-Strength Tests: ASTM C 39; one set for each micropile. One specimen will be tested at 3 days, one specimen will be tested at 7 days, and 2 specimens will be tested at 28 days.
4. Include time water was added to cement when making the grout batch and time when placement of grout was finished.

D. Inspections: the following shall be inspected/tested by the Owner's Geotechnical Engineer:

1.Grout placement:

a. Inspect all grout placement, including mixing, conveying and placing

2. Steel reinforcement placement:

a. Inspect all reinforcing, verifying type of reinforcing, bar sizes, spacings, grout cover to bar, bar locations, splices including splice location and mechanical connector, in place condition of coated bars, and method of support of reinforcing.

b. Inspect partially embedded reinforcement, which is field bent, or field straightened. Verify that procedures specified in ACI- 301-05 Section 3.3.2.8 – "Field Bending or Straightening" are followed. Inspect all field bent using visual and magnetic particle methods after bending is complete.

3. Structural Steel:

a. Inspect plates, nuts, washers at the top of micropile reinforcing. Verify that sizes and embedment are as specified.

b. Welds: All (100%) shop and all field welds shall be visually inspected and 10% of all welds shall be magnetic particle tested.

4. Verification and Proof Testing:

a. Review Contractor's proposed means and methods for verification and proof tests.

b. Observe and review all data for all verification and proof tests.

c. Return reviewed copies of above information to the Architect and Structural Engineer within five business days.

3.6 DISPOSAL OF MATERIALS

A. Material removed during micropile construction shall be disposed of offsite.

END OF SECTION