TOWN OF TRUMBULL, CONNECTICUT
REQUEST FOR PROPOSAL, CONDITIONS, SPECIFICATIONS,
SPECIAL PROVISIONS AND DRAWINGS FOR
REPLACEMENT OF BRIDGE AT OLD MINE PARK
TRUMBULL, CONNECTICUT

RFP #5929 DUE: April 18, 2012 at 3:00PM

Prepared for the Town By:
DeStefano & Chamberlain
50 Thorpe St.
Fairfield, CT 06824
203-254-7131 203-254-0263(fax)
www.destructural.com

TABLE OF CONTENTS

SECTION TITLE	PAGE
GENERAL INSTRUCTIONS	2
STATEMENT OF BIDDER (PROPOSER) QUALIFICATIONS	5
PROPOSAL FORMS	12
PROPOSED SUBCONTRACTORS	14

ATTACHMENT
STATE OF CONNECTICUT STATE PREVAILING WAGE RATES

TECHNICAL SPECIFICATIONS

01410	Structural Tests and Specifications
022210	Demolition
022400	Dewatering
023100	Foundation Earthwork
028210	Chain Link Fences
033000	Cast in Place Concrete
034100	Plant Precast Structural Concrete
051200	Structural Steel
055300	Gratings
061000	Timber Guardrails

DRAWINGS

B001	General Notes
B100	Foundation Plan
B101	Bridge Plan
B300	Sections and Details

TOWN OF TRUMBULL
REQUEST FOR PROPOSAL
REPLACEMENT OF BRIDGE AT OLD MINE PARK

RFP #5929 DUE: APRIL 18, 2012at 3:00PM

GENERAL INSTRUCTIONS

The Town of Trumbull, (hereinafter referred to as Town or Owner), through the office of the Purchasing Agent, will accept sealed proposals for the REPLACEMENT OF BRIDGE AT OLD MINE PARK in accordance with the specifications and requirements as detailed in this request. It is anticipated that this project will occur in the Spring and Summer 2012 time frame. All qualified and interested parties (hereinafter referred to as proposer, bidder, contractor or supplier) are invited to submit proposals under the terms and conditions set forth as follows:

This RFP is not a contract offer, and no contract exists until a written contract is signed by the Town and the successful proposer.

1. PREPARATION FOR PROPOSALS

An original and three (3) exact copies of the Proposal shall be submitted in a sealed envelope, and addressed to: Purchasing Agent, Town of Trumbull, in a sealed envelope and plainly marked on the outside as "**REPLACEMENT OF BRIDGE AT OLD MINE PARK**". The envelope shall bear on the outside the name of the proposer, address, and license number if applicable. No oral, telephone or telegraphic responses will be considered. Proposals received after the advertised time and date due shall not be opened or considered. The Town reserves the right to communicate with any or all of the proposers to clarify the provisions of Proposals. The Town further reserves the right to request additional information from any proposer at any time after proposals are opened

2. PROPOSAL SUBMISSION

a) Proposals are to be completed (unless directed otherwise in the specifications), printed, signed by an authorized agent, and sealed in an envelope (including all official literature, brochures, etc., which support this request) and addressed as follows:

RFP # 5929 DUE: April 18, 2012
Trumbull Town Hall – Attn: Robert Chimini, Purchasing Agent
5866 Main Street, Trumbull CT 06611

b) All Proposals must be made on the enclosed Proposal form. All blank spaces for Proposal prices must be filled in, in ink or typewritten, and the proposal form must be fully completed and executed when submitted. Please be advised that the person signing the formal proposal must be authorized by you organization to contractually bind your firm with regard to prices and related contractual obligations for the subject project

c) The party signing the formal proposal must be authorized by your organization to contractually bind your firm with regard to prices and related contractual obligations for the contractual period requested.

d) The Town reserved the right to correct, after proposer verification, any mistake in a proposal that is a clerical error, such as a price extension or decimal point error.

3. PROPOSAL RESPONSE TIME

Responses to this request shall be received at the office of the Purchasing Agent, Town Hall prior to the advertised hour (noted above) of opening, at which time all proposals (total proposal amount only) shall be publicly opened and read aloud. A proposer may withdraw a proposal at any time prior to the above scheduled date and time. Any proposal received after the above scheduled date and time shall not be considered or opened. No proposer may withdraw a proposal within ninety (90) days after the actual proposal opening.

4. TOWN OPTIONS

The Town reserves the right to accept all or any part of a proposal, reject any or all proposals and to waive any requirements, informalities or irregularities, technical defects or non-material deficiencies in a proposal. The Town also reserves the right, if applicable, to award the purchase of individual items under this RFP to any combination of separate proposals or proposers. The award shall be made after careful consideration of all factors including but not limited to price.

5. TAX EXEMPT

The Town of Trumbull is exempt from the payment of taxes imposed by the Federal Government and/or State of Connecticut. Such taxes must not be included in the proposal price. The Town of Trumbull Tax Exempt number is 05-010 31-000.

6. TIME FOR COMPLETION/NOTICE TO PROCEED

a) Construction of this project will occur during the 2012 construction season, beginning on or around May 15, 2012.
b) The work under this Contract shall commence within twenty-one (21) calendar days of the Notice to Proceed/Purchase Oder. After the work has begun, it shall continue in an orderly fashion such that all contract work is completed within seventy-five (75) calendar days from the date of commencement.

7. SPECIFICATIONS

If quoted materials and/or equipment do not meet or better the attached specifications on ALL points, the proposer must note ALL exceptions as separate attachments to their formal response; otherwise, it will be presumed that the proposal is in accordance with all specifications requested herein.

8. INQUIRIES & ADDENDUMS

a) All technical inquiries or requests for site visits may be directed to William Maurer, Town of Trumbull, Engineering Department, (203)452.5050) (wmaurer@trumbull-ct.gov). No inquiries shall be responded to that are received after April 16, 2012.
b) Answers to questions the Town deems to be in the interest of all proposers will be made available in writing, email or by Fax as appropriate to all proposers.
c) The Town reserves the right to communicate with any or all of the proposers to clarify the provisions of this request; the Town further reserves the right to request additional information from any proposer at any time after proposals are opened.
d) **It is the sole responsibility of a proposer to verify any addendums that may have been issued relating to this request prior to submission of a proposal. Any notice of addendum shall be published on the Town website (www.trumbull-ct.gov) in the Purchasing Department Section (Bid Notices). Failure to submit a response that does not address any changes or addendums may result in a disqualification of a proposal submission**.

9. ASSIGNMENT OF RIGHTS, TITLES, AND INTERESTS

Any assignment or subcontracting by a proposer, bidder, supplier, or contractor for work to be performed, or goods and/or services to be provided, in whole or in part, and any other interest in conjunction with a Town procurement shall not be permitted without the express written consent of the Town of Trumbull.

10. HOLD HARMLESS CLAUSE

The Contractor agrees to indemnify, hold harmless and defend the Town from and against any and all liability for loss, damage or expense which the Town may suffer or for which the Town may be held liable by reason of injury, including death, to any person or damage to any property arising out of or in any manner connected with the operations to be performed under this request, whether or not due in whole or in part of any act, omission or negligence of the Owner or any of his representatives or employees.

11. WORK REGULATIONS, STANDARDS AND FEDERAL AND STATE PREVAILING WAGE

a) All work activities performed in association with this request must be performed and completed for the Town in accordance with current Federal State and Local regulations. All services performed shall also conform to the latest OSHA standards and/or regulations.
b) Applicable laws and regulations relating to **State Prevailing Wages**, employment practices, nondiscrimination, safety and health regulations shall be adhered to by the contractor. The contractor shall be responsible for "Certified Statements of Compliance" regarding Prevailing Wages. Contractor shall also collect and submit four (4) Certified "Statements of Compliance" from any sub-contractors.

12. INSURANCE

The successful proposer shall provide the Town Purchasing Agent with a Certificate of Insurance before work commences. The Town shall be named as an additional insured with an Insurance Company licensed to write such insurance in Connecticut, against the following risks and in not less than the following amounts:

Commercial General Liability	**Each Occurrence**	**Aggregate**
Bodily Injury Liability	$2,000,000	$5,000,000
Property Damage Liability	$1,000,000	$5,000,000
Personal Injury Liability	$2,000,000	$5,000,000
Comprehensive Auto Liability	**Each Occurrence**	**Aggregate**
Including coverage of owned, non owned & rented vehicles	$2,000,000	$5,000,000

The insurance policy must contain the additional provision wherein the company agrees that fifteen (15) days prior to termination, expiration, cancellation or reduction of the insurance afforded by this policy with respect to the contract involved, written notice will be served by registered mail to the Purchasing Agent, Town of Trumbull.
Additionally the successful proposer (Contractor) shall provide adequate statutory Workmen's Compensation Insurance for all labor employed on this project, and comprehensive General Public Liability Insurance (Coverage "B")

The successful proposer (Contractor) and each Subcontractor agree that their insurance carriers waive subrogation against the Town, its agents or employees with respect to any loss covered by the Contractor's and each Subcontractor's insurance.

13. CONFLICT OF INTEREST

No purchase shall be made from nor shall services (other than services as an officer, agent, or employee of the Town) be secured from any officer or employee of the Town, or from any partnership or corporation in which such officer or employee is a partner or officer, or holds a substantial interest, unless such relationship and the fact that such purchase is contemplated shall be made known in writing to the agency making such purchase, and notice thereof posted, for at least five (5) days before such purchase be made , in the office of the agency making such purchase and in a public place in the Trumbull Town Hall.

14. PROPOSAL, PERFORMANCE AND PAYMENT BONDS

a) A Bid Bond payable to the Owner must accompany each Proposal for ten (10%) percent of the total amount of the Proposal. As soon as the Proposal prices have been compared, the Owner will return the bonds of all except the three lowest responsible Proposals. When the Agreement is executed, the bonds of the two remaining unsuccessful Proposers will be returned. The Bid Bond of the successful Proposer will be retained until the Payment Bond and Performance Bond have been executed and approved, after which it will be returned. A certified check may be used in lieu of a Bid Bond.

b) A Performance Bond and a Payment Bond, each in the amount of 100 percent (100%) of the Contract Price, with a corporate surety approved by the Owner, will be required for the faithful performance of the contract. Attorneys-in-fact who sign the Bid Bonds or Payment Bonds and Performance Bonds must file with each bond, a certified and effective dated copy of their power of attorney.

c) The party to whom the contract is awarded will be required to execute the Agreement and obtain the Performance Bond and Payment Bond within ten (10) calendar days from the date when Notice of Award is delivered to the Proposer. The Notice of Award shall be accompanied by the necessary Agreement and Bond forms. In case of failure of the Proposer to execute the Agreement, the Owner may, at his option, consider the Proposer in default, in which case the Bid Bond accompanying the proposal shall become the property of the Owner.

d) The Owner, upon receipt of acceptable Performance Bond, Payment Bond and Agreement signed by the Contractor, shall sign the Agreement and return to the Contractor an executed duplicate of the Agreement within a reasonable period of time. The returned executed Agreement by the Owner to the Contractor shall be accompanied with a Notice to Proceed.

15. LIQUIDATED DAMAGES:

a) Non-compliance with the scheduled completion date of the Contract shall result in engineering charges as follows:

b) The Contractor shall pay liquidated damages of $250.00 per working day for each day after the agreed Contract completion date up to, and including, the actual date of completion.

16. LOWEST RESPONSIBLE PROPOSAL

a) The Town shall determine the "lowest responsible qualified proposer" on the basis of the Proposer submitting the lowest "Total Proposal", responsiveness of his Technical Proposal; and demonstrating a history of the ability and integrity necessary to perform the required work; and certifying that it shall perform the work in accordance with the specifications .

b) Proposals will be compared on the basis of the "Total Proposal" of the items listed in the Proposal and on basis of the Proposer's experience and competence.

c) If the Lowest Total Proposal exceeds the amount of funds available for the project, the Town reserves the right to increase or decrease any class, item or part of the work. After determining the "lowest responsible qualified proposer", the Town will issue a Notice of Award to the successful Proposer.

d) The Proposer designated by the Town as the "lowest responsible qualified proposer" to whom the contract is awarded shall execute the Contact and submit the following documents:
   i. Performance Bond
   ii. Labor, Payment and Materials Bond
   iii. Copy of valid license issued by the State of Connecticut, Department of Consumer Protection.

e) In the event that the lowest responsible qualified proposer fails to execute the Contact and/or fails to provide the required documents within the time period prescribed, the Town, at its option, may consider the lowest responsible qualified proposer to be in default, in which case the Bid Guarantee shall become the property of the Town.

17. MISCELLANEOUS

a) All Contractors must develop a complete and thorough schedule which demonstrates that the Contractor will be able to complete the project in a timely fashion.

b) Selected proposer agrees to warranty all work completed for this requirement.

c) The Town may make such investigations as necessary and it deems appropriate to determine the qualifications of the proposer to perform the work required. Each proposer shall submit a Statement of Bidder Qualifications. If the Town is not satisfied that the proposer is properly qualified, the Town reserves the right to reject the proposal of said proposer.

STATEMENT BIDDERS QUALIFICATION STATEMENT

Submitted by:

Name of Organization _____

Name of Individual _____

Title _____

Address _____

_____

_____

Telephone _____

Submitted to:

Name _____

Address _____

_____

_____

Telephone _____

Project Name and Description (if applicable)

_____

_____

Contractor's General Business Information

Check If:

Corporation Partnership Joint Venture Sole Proprietorship

If Corporation:

a. Date and State of Incorporation

_____

_____

b. List of Executive Officers

Name Title

_____

_____

_____

_____

If Partnership:

a. Date and State of Organization

_____

_____

b. Names of Current General Partners

_____

_____

c. Type of Partnership

General Publicly Traded

Limited Other (describe):_____

If Joint Venture:

a. Date and State of Organization

_____

_____

b. Name, Address and Form of Organization of Joint Venture Partners: (Indicate managing partner by an asterisk*)

_____

_____

_____

_____

_____

If Sole Proprietorship:

a. Date and State of Organization

_____

_____

b. Name and Address of Owner or Owners

_____

_____

_____

_____

1. On Schedule A, attached, list major engineered construction projects completed by this organization in the past five (5) years. (If a joint venture list each participant's projects separately).
2. On Schedule B, attached, list current projects under construction by this organization. (If joint venture, list each participant's projects separately).
3. Name of surety company and name, address, and phone number of agent.

_____

_____

4. Is your organization a member of a controlled group of corporations as defined in I.R.C. Sec. 1563?

Yes___ No ____

If yes, show names and addresses of affiliated companies.

_____

_____

5. Furnish on Schedule C, attached, details of the construction experience of the principal individuals of your organization directly involved in construction operations.

6. Has your organization ever failed to complete any construction contract awarded to it?

Yes___ No ____

If yes, describe circumstances on attachment.

7. Has any Corporate officer, partner, joint venture participant or proprietor ever failed to complete a construction contract awarded to him or her in their own name or when acting as a principal of another organization?

Yes___ No ____

If yes, describe circumstances on attachment.

8. In the last five years, has your organization ever failed to substantially complete a project in a timely manner?

Yes___ No ____

If yes, describe circumstances on attachment.

9. Indicate general types of work performed with your own work force.

_____

_____

10. If required, can your organization provide a bid bond for this project? Yes No

11. What is your approximate total bonding capacity?

$500,000 to $2,000,000 _____

$2,000,000 to $5,000,000 ____

$5,000,000 to $10,000,00 ____

$10,000,000 or more ____

12. Describe the permanent safety program you maintain within your organization. Use attachment if necessary.

_____

_____

_____

_____

13. Furnish the following information with respect to an accredited banking institution familiar with your organization.

Name of Bank _____

Address _____

_____

_____

Account Manager _____

Telephone _____

I hereby certify that the information submitted herewith, including any attachment is true to the best of my knowledge and belief.

Name of Organization: _____

By: _____

Title: _____

Dated: _____

_____

Notary Public Signature

_____

Date Commission Expires

Schedule A: Prior Experience (Copy Additional Pages as Needed)

Project	Owner	Design Professional	Contract Price	Amount Completed	Date of Scheduled Completion

Schedule B: Current Experience (Copy Additional Pages as Needed)

Project	Owner	Design Pro-fessional	Contract Price	Amount Completed	Date of Scheduled Completion

Schedule C: Personnel (Copy Additional Pages as Needed)

Name	Position	Date of Hire	Date Started in Construction	Prior Positions & Construction Experience

TOWN OF TRUMBULL
REQUEST FOR PROPOSAL
REPLACEMENT OF BRIDGE AT OLD MINE PARK

RFP # 5929 DUE: APRIL 18, 2012 AT 3:00 PM

PROPOSAL FORM

Proposal of _____ (hereinafter called "Proposer, Bidder"), organized and existing under the laws of the State of Connecticut, doing business as to the Town of Trumbull, Connecticut (hereinafter called the "Owner").

In compliance with your Advertisement for Proposals, Proposer hereby proposes for the Replacement of Bridge at Old Mine Park, in the Town of Trumbull, Connecticut together with all related incidental and appurtenant work as described in the specifications or outlined and/or shown on the drawings. The work is to be done in strict accordance with the Specifications, Drawings and all Contract Documents, within the time agreed to, and at the prices stated on the Proposal Schedule.

By submission of this Proposal, each Proposer certifies, that this Proposal has been arrived at independently, without consultation, communication, or agreement as to any matter relating to this Proposal with any other Proposer or with any competitor.

Proposer hereby agrees to commence work under this contract on or before a date to be specified in the "Notice to Proceed", and to fully complete the Project within seventy-five (75) consecutive calendar days thereafter.

Proposer further agrees to pay as liquidated damages, the sum of ($250.00) two hundred and fifty dollars for each consecutive calendar day thereafter till completion of the full contract as provided in the General Conditions. Proposer further agrees that he will provide and sustain the required Bonds and Insurance Policies as required.

Proposer acknowledges receipt of the following Addenda:

_____ _____ _____

Proposer understands that the Owner reserves the right to reject any or all proposals and to waive any informality in the bidding.

Proposer agrees that this proposal shall be good and may not be withdrawn for a period of sixty (60) calendar days after the scheduled closing time for receiving proposals.

Upon receipt of written notice of the acceptance of this proposal, proposer shall execute the formal contract attached within five (5) days and deliver a Surety Bond or Bonds as required in the General Conditions. The Bid Security attached in the sum of_____Dollars ($_____) is to become the property of the Owner in the event the contract and bond are not executed within the time above set forth, as liquidated damages for the delay and additional expense to the Owner caused thereby.

_____ _____
Company Name By (Signature)

_____ _____
Address Print Name

_____ _____
City, State Title

_____ _____
Date Telephone/Fax

BID NUMBER: 5929 PROPOSAL FORM (Continued)

PROPOSAL

Pursuant to and in compliance with the Invitation to Bid relating thereto, the Undersigned,

_____

himself/herself with the conditions present and carefully examined all the documents (including the drawings and specifications, General Instructions, Bid Proposal Form, etc., together with all Addenda issued and received prior to closing time for receipt of Bids as prepared by the Town hereby offers and agrees as follows:

To provide all materials, all labor and all else whatsoever necessary to erect and properly finish all work in accordance with said documents for the above mentioned projects to the satisfaction of the Architect and Owner for the stipulated sum of

Bid (in words) _____

Bid (in figures) $_____

ACCEPTANCE

This offer shall be open to acceptance for ninety (90) days from the Bid opening date. If this Bid is accepted by the Owner within the time period stated above, Undersigned will Execute an Agreement within ten days of receipt of acceptance of this Bid. Furnish the required bond (s) within ten days of receipt of acceptance of this Bid. Commence work within seven days after written Notice to Proceed or Contract signing. If this Bid is accepted within the time stated, and the Undersigned fails to provide the required Bond(s), the Owner may charge against the Undersigned the difference between the amount of this bid and the amount for which the contract for the work is subsequently executed, irrespective of whether the amount thus due exceeds the amount of the bid guaranty. In the event this Bid is not accepted within the time stated above, the required security deposit shall be returned to the undersigned, in accordance with the provisions of the Instructions to Bidders; unless a mutually satisfactory arrangement is made for its retention and validity for an extended period of time.

CONTRACT TIME

If this Bid is accepted, the Undersigned will complete all the work in seventy-five (75) calendar days from Notice to Proceed. It is additionally understood that liquidated damages, in the amount of $250.00 per day, will be accessed for failure to complete the project within the above time period as described in the General Conditions.

CHANGES TO THE WORK

Equitable adjustments for Changes in the Work will be net cost plus a percentage feed in accordance with the General Conditions.

_____ _____
Company Name By (Signature)

_____ _____
Address Print Name

_____ _____
City, State Title

_____ _____
Date Telephone/Fax

(SEAL-if proposal is by a corporation)

Note: Insert Proposer's name. If a corporation, give the State of Incorporation using the phrase, "A corporation organized under the laws of

_____ composed of officers as follows:

_____ _____
President Secretary

_____ _____
Vice President Treasurer

If a partnership, give names of partners, using also the phrase, "co-partners trading and doing business under the firm name and style of_____, composed of partners as follows:

_____

THE PROPOSER SHALL STATE THE NAMES OF ALL OF ALL PROPOSED SUBCONTRACTORS

PROPOSED SUBCONTRACTORS

If none, write "None"_____.

*Description of Work_____
Proposed Subcontractor Name _____
Address_____

*Description of Work_____
Proposed Subcontractor Name _____
Address_____

*Description of Work_____
Proposed Subcontractor Name _____
Address_____

*Description of Work_____
Proposed Subcontractor Name _____
Address_____

*Insert description of work and subcontractors' names as may be required.

This is to certify that the names of the above mentioned subcontractors are submitted with full knowledge and consent of the respective parties.

The Proposer warrants that none of the proposed subcontractors have any conflict of interest as respects this contract.

_____ Company Name

_____ By (Signature)

_____ Address

_____ Print Name

_____ City, State

_____ Title

_____ Date

_____ Telephone/Fax

Project: Old Mine Park Foot Bridge Removal And Replacement

Minimum Rates and Classifications
for Heavy/Highway Construction

Connecticut Department of Labor
Wage and Workplace Standards Division

ID#: **H** 16243

By virtue of the authority vested in the Labor Commissioner under provisions of Section 31-53 of the General Statutes of Connecticut, as amended, the following are declared to be the prevailing rates and welfare payments and will apply only where the contract is advertised for bid within 20 days of the date on which the rates are established. Any contractor or subcontractor not obligated by agreement to pay to the welfare and pension fund shall pay this amount to each employee as part of his/her hourly wages.

Project Number:
Project Town Trumbull
State Number:
FAP Number:
Project: Old Mine Park Foot Bridge Removal And Replacement

CLASSIFICATION	Hourly Rate	Benefits
01) Asbestos/Toxic Waste Removal Laborers: Asbestos removal and encapsulation (except its removal from mechanical systems which are not to be scrapped), toxic waste removers, blasters. **See Laborers Group 5 and 7**		
1) Boilermaker	33.79	34% + 8.96
1a) Bricklayer, Cement Masons, Cement Finishers, Plasterers, Stone Masons	32.50	23.55
2) Carpenters, Piledrivermen	29.11	20.29
2a) Diver Tenders	29.11	20.29

As of: Wednesday, March 21, 2012

Project: Old Mine Park Foot Bridge Removal And Replacement

3) Divers	37.57	20.29
4) Painters: (Bridge Construction) Brush, Roller, Blasting (Sand, Water, etc.), Spray	41.35	16.35
4a) Painters: Brush and Roller	29.17	16.35
4b) Painters: Spray Only	31.47	15.40
4c) Painters: Steel Only	30.47	15.40
4d) Painters: Blast and Spray	32.17	16.35
4e) Painters: Tanks, Tower and Swing	31.17	16.35
5) Electrician (Trade License required: E-1,2 L-5,6 C-5,6 T-1,2 L-1,2 V-1,2,7,8,9)	35.10	22.26

As of: Wednesday, March 21, 2012

Project: Old Mine Park Foot Bridge Removal And Replacement

6) Ironworkers: (Ornamental, Reinforcing, Structural, and Precast Concrete Erection)	33.50	27.03 + a
7) Plumbers (Trade License required: (P-1,2,6,7,8,9 J-1,2,3,4 SP-1,2) and Pipefitters (Including HVAC Work) (Trade License required: S-1,2,3,4,5,6,7,8 B-1,2,3,4 D-1,2,3,4 G-1, G-2, G-8, G-9)	38.67	24.46
----LABORERS---- - Last updated 4/27/11		
8) Group 1: Laborer (Unskilled), Common or General, acetylene burner, concrete specialist	25.75	15.60
9) Group 2: Chain saw operators, fence and guard rail erectors, pneumatic tool operators, powdermen, air tool operator	26.00	15.60
10) Group 3: Pipelayers (Installation of water, storm drainage or sewage lines outside of the building line with P6, P7 license)	26.25	15.60
11) Group 4: Jackhammer/Pavement breaker (handheld); mason tenders (cement/concrete), catch basin builders, asphalt rakers, air track operators, block pavers and curb setters	26.25	15.60
12) Group 5: Toxic waste removal (non-mechanical systems)	27.75	15.60

As of: Wednesday, March 21, 2012

Project: Old Mine Park Foot Bridge Removal And Replacement

13) Group 6: Blasters	27.50	15.60
Group 7: Asbestos Removal, non-mechanical systems (does not include leaded joint pipe)	26.75	15.60
Group 8: Traffic control signalmen	16.00	15.60
----LABORERS (TUNNEL CONSTRUCTION, FREE AIR). Shield Drive and Liner Plate Tunnels in Free Air.---- Last updated 4/27/11----		
13a) Miners, Motormen, Mucking Machine Operators, Nozzle Men, Grout Men, Shaft & Tunnel Steel & Rodmen, Shield & Erector, Arm Operator, Cable Tenders	30.32	15.60 + a
13b) Brakemen, Trackmen	29.44	15.60 + a
----CLEANING, CONCRETE AND CAULKING TUNNEL----Last updated 4/27/11----		
14) Concrete Workers, Form Movers, and Strippers	29.44	15.60 + a

As of: Wednesday, March 21, 2012

Project: Old Mine Park Foot Bridge Removal And Replacement

15) Form Erectors	29.74	15.60 + a
----ROCK SHAFT LINING, CONCRETE, LINING OF SAME AND TUNNEL IN FREE AIR:----Last updated 4/27/11----		
16) Brakemen, Trackmen, Tunnel Laborers, Shaft Laborers	29.44	15.60 + a
17) Laborers Topside, Cage Tenders, Bellman	29.33	15.60 + a
18) Miners	30.32	15.60 + a
----TUNNELS, CAISSON AND CYLINDER WORK IN COMPRESSED AIR: ----Last updated 4/27/11----		
18a) Blaster	35.213	15.60 + a
19) Brakemen, Trackmen, Groutman, Laborers, Outside Lock Tender, Gauge Tenders	35.036	15.60 + a

As of: Wednesday, March 21, 2012

Project: Old Mine Park Foot Bridge Removal And Replacement

20) Change House Attendants, Powder Watchmen, Top on Iron Bolts	33.268	15.60 + a
21) Mucking Machine Operator	35.745	15.60 + a
----TRUCK DRIVERS----(*see note below)		
Two axle trucks	27.88	15.71 + a
Three axle trucks; two axle ready mix	27.98	15.71 + a
Three axle ready mix	28.03	15.71 + a
Four axle trucks, heavy duty trailer (up to 40 tons)	28.08	15.71 + a
Four axle ready-mix	28.13	15.71 + a

As of: Wednesday, March 21, 2012

Project: Old Mine Park Foot Bridge Removal And Replacement

Heavy duty trailer (40 tons and over)	28.33	15.71 + a
Specialized earth moving equipment other than conventional type on-the road trucks and semi-trailer (including Euclids)	28.13	15.71 + a
----POWER EQUIPMENT OPERATORS----		
Group 1: Crane handling or erecting structural steel or stone, hoisting engineer (2 drums or over), front end loader (7 cubic yards or over), Work Boat 26 ft. & Over. (Trade License Required)	35.05	19.40 + a
Group 2: Cranes (100 ton rate capacity and over); Backhoe/Excavator over 2 cubic yards; Piledriver ($3.00 premium when operator controls hammer). (Trade License Required)	34.73	19.40 + a
Group 3: Excavator/Backhoe under 2 cubic yards; Cranes (under 100 ton rated capacity), Gradall; Master Mechanic; Hoisting Engineer (all types of equipment where a drum and cable are used to hoist or drag material regardless of motive power of operation), Rubber Tire Excavator (Drott-1085 or similar);Grader Operator; Bulldozer Fine Grade (slopes, shaping, laser or GPS, etc.). (Trade License Required)	33.99	19.40 + a
Group 4: Trenching Machines; Lighter Derrick; Concrete Finishing Machine; CMI Machine or Similar; Koehring Loader (Skooper)	33.60	19.40 + a
Group 5: Specialty Railroad Equipment; Asphalt Paver; Asphalt Spreader; Asphalt Reclaiming Machine; Line Grinder; Concrete Pumps; Drills with Self Contained Power Units; Boring Machine; Post Hole Digger; Auger; Pounder; Well Digger; Milling Machine (over 24" Mandrell)	33.01	19.40 + a

As of: Wednesday, March 21, 2012

Project: Old Mine Park Foot Bridge Removal And Replacement

Group 5 continued: Side Boom; Combination Hoe and Loader; Directional Driller.	33.01	19.40 + a
Group 6: Front End Loader (3 up to 7 cubic yards); Bulldozer (rough grade dozer).	32.70	19.40 + a
Group 7: Asphalt Roller; Concrete Saws and Cutters (ride on types); Vermeer Concrete Cutter; Stump Grinder; Scraper; Snooper; Skidder; Milling Machine (24" and Under Mandrel).	32.36	19.40 + a
Group 8: Mechanic, Grease Truck Operator, Hydroblaster, Barrier Mover, Power Stone Spreader; Welder; Work Boat under 26 ft.; Transfer Machine.	31.96	19.40 + a
Group 9: Front End Loader (under 3 cubic yards), Skid Steer Loader regardless of attachments (Bobcat or Similar); Fork Lift, Power Chipper; Landscape Equipment (including hydroseeder).	31.53	19.40 + a
Group 10: Vibratory Hammer, Ice Machine, Diesel and Air Hammer, etc.	29.49	19.40 + a
Group 11: Conveyor, Earth Roller; Power Pavement Breaker (whiphammer), Robot Demolition Equipment.	29.49	19.40 + a
Group 12: Wellpoint Operator.	29.43	19.40 + a

As of: Wednesday, March 21, 2012

Project: Old Mine Park Foot Bridge Removal And Replacement

Group 13: Compressor Battery Operator.	28.85	19.40 + a
Group 14: Elevator Operator; Tow Motor Operator (Solid Tire No Rough Terrain).	27.71	19.40 + a
Group 15: Generator Operator; Compressor Operator; Pump Operator; Welding Machine Operator; Heater Operator.	27.30	19.40 + a
Group 16: Maintenance Engineer/Oiler	26.65	19.40 + a
Group 17: Portable asphalt plant operator; portable crusher plant operator; portable concrete plant operator.	30.96	19.40 + a
Group 18: Power Safety Boat; Vacuum Truck; Zim Mixer; Sweeper; (minimum for any job requiring CDL license).	28.54	19.40 + a

**NOTE: SEE BELOW

----LINE CONSTRUCTION----(Railroad Construction and Maintenance)----Last updated 9/3/2010----

As of: Wednesday, March 21, 2012

Project: Old Mine Park Foot Bridge Removal And Replacement

20) Lineman, Cable Splicer, Dynamite Man	44.36	3% + 13.70
21) Heavy Equipment Operator	39.92	3% + 13.70
22) Equipment Operator, Tractor Trailer Driver, Material Men	37.71	3% + 13.70
23) Driver Groundmen	33.27	3% + 13.70

----LINE CONSTRUCTION----Last updated 4/17/09----

24) Driver Groundmen	30.92	6.5% + 9.70
25) Groundmen	22.67	6.5% + 6.20
26) Heavy Equipment Operators	37.10	6.5% + 10.70

As of: Wednesday, March 21, 2012

Project: Old Mine Park Foot Bridge Removal And Replacement

27) Linemen, Cable Splicers, Dynamite Men	41.22	6.5% + 12.20
28) Material Men, Tractor Trailer Drivers, Equipment Operators	35.04	6.5% + 10.45

As of: Wednesday, March 21, 2012

Project: Old Mine Park Foot Bridge Removal And Replacement

Welders: Rate for craft to which welding is incidental.

**Note: Hazardous waste removal work receives additional $1.25 per hour for truck drivers.*

***Note: Hazardous waste premium $3.00 per hour over classified rate*

Crane with 150 ft. boom (including jib) - $1.50 extra
Crane with 200 ft. boom (including jib) - $2.50 extra
Crane with 250 ft. boom (including jib) - $5.00 extra
Crane with 300 ft. boom (including jib) - $7.00 extra
Crane with 400 ft. boom (including jib) - $10.00 extra

All classifications that indicate a percentage of the fringe benefits must be calculated at the percentage rate times the "base hourly rate".

Apprentices duly registered under the Commissioner of Labor's regulations on "Work Training Standards for Apprenticeship and Training Programs" Section 31-51-d-1 to 12, are allowed to be paid the appropriate percentage of the prevailing journeymen hourly base and the full fringe benefit rate, providing the work site ratio shall not be less than one full-time journeyperson instructing and supervising the work of each apprentice in a specific trade.

~~Connecticut General Statute Section 31-55a: Annual Adjustments to wage rates by contractors doing state work ~~

The Prevailing wage rates applicable to this project are subject to annual adjustments each July 1st for the duration of the project.

Each contractor shall pay the annual adjusted prevailing wage rate that is in effect each July 1st, as posted by the Department of Labor.

It is the contractor's responsibility to obtain the annual adjusted prevailing wage rate increases directly from the Department of Labor's website.

The annual adjustments will be posted on the Department of Labor's Web page: www.ct.gov/dol.

The Department of Labor will continue to issue the initial prevailing wage rate schedule to the Contracting Agency for the project.

All subsequent annual adjustments will be posted on our Web Site for contractor access.

As of: Wednesday, March 21, 2012

Project: Old Mine Park Foot Bridge Removal And Replacement

Effective October 1, 2005 - Public Act 05-50: any person performing the work of any mechanic, laborer, or worker shall be paid prevailing wage

All Person who perform work ON SITE must be paid prevailing wage for the appropriate mechanic, laborer, or worker classification.

All certified payrolls must list the hours worked and wages paid to All Persons who perform work ON SITE regardless of their ownership i.e.: (Owners, Corporate Officers, LLC Members, Independent Contractors, et. al)

Reporting and payment of wages is required regardless of any contractual relationship alleged to exist between the contractor and such person.

~~Unlisted classifications needed for work not included within the scope of the classifications listed may be added after award only as provided in the labor standards contract clause (29 CFR 5.5 (a) (1) (ii)).

Please direct any questions which you may have pertaining to classification of work and payment of prevailing wages to the Wage and Workplace Standards Division, telephone (860)263-6790.

As of: Wednesday, March 21, 2012

PREVAILING WAGE BID PACKAGE

- Section 31-53b: Construction safety and Health Course. Proof of completion required for employees on public building projects. (PDF, 10KB)
  - Informational Bulletin - The 10-Hour OSHA Construction Safety and Health Course (PDF, 20KB)
- Notice For All Mason Contractors (PDF, 5KB)
- CT General Statute 31-55a
- Contracting Agency Certification Form (PDF, 89KB)
- Contractor's Wage Certification Form (PDF, 11KB)
- Payroll Certification - Public Works Projects
- Occupational Classification Bulletin
- Footnotes (PDF, 94KB)

OLD MINE PARK BRIDGE
Trumbull, CT
February 2012

SECTION 01410 – STRUCTURAL TESTS AND INSPECTIONS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 GENERAL REQUIREMENTS

A. Structural Tests and Inspections shall be in accordance with *CASE National Practice Guideline for Special Inspections*.

C. The program of Structural Tests and Inspections is a Quality Assurance program intended to ensure that the work is performed in accordance with the Contract Documents.

D. This specification section is intended to inform the Contractor of the Owner's quality assurance program and the extent of the Contractor's responsibilities. This specification section is also intended to notify the Inspector, Testing Laboratory, and other Agents of the Inspector of their requirements and responsibilities.

1.3 SCHEDULE OF INSPECTIONS AND TESTS

A. Required inspections and tests are described in the individual specification Sections for the items to be inspected or tested.

1.4 QUALIFICATIONS

A. The Inspector shall be a licensed Professional Engineer or Structural Engineer who is approved by the Structural Engineer of Record (SER) and Owner.

B. The Testing Laboratory and individual technicians shall be approved by the Structural Engineer of Record (SER) and Owner.

C. The testing laboratory shall be NVLAP certified for each test performed and shall maintain a full time licensed Professional Engineer or Structural Engineer on staff who shall certify all test reports. The Engineer shall be responsible for the training of the testing technicians and shall be in responsible charge of the field and laboratory testing operations.

D. Inspections shall be performed by inspectors who are either licensed Professional Engineers (P.E.), Structural Engineers (S.E.), or Engineers-In-Training (EIT) with an education and background in

structural engineering except as indicated below.

1. Inspections of soils and foundations may be performed by inspectors with an education and background in geotechnical engineering in lieu of a background in structural engineering.

2. Technicians performing sampling and testing of concrete shall be ACI certified *Concrete Field Testing Technicians - Grade 1.*

3. Inspectors performing inspections of concrete work such as inspections of concrete placement, batching, reinforcing placement, curing and protection, may be ACI certified *Concrete Construction Inspectors* in lieu of being a licensed P.E., S.E., or EIT.

4. Technicians performing visual inspection of welding shall be AWS *Certified Welding Inspectors,* technicians performing non-destructive testing such as ultrasonic testing, radiographic testing, magnetic particle testing, or dye-penetrant testing shall be certified as an ASNT-TC Level II or Level III technician.

5. Technicians performing standard tests described by specific ASTM Standards shall have training in the performance of such tests and must be able to demonstrate either by oral or written examination competence for the test to be conducted. They shall be under the supervision of a licensed Professional Engineer and shall not be permitted to independently evaluate test results.

1.5 SUBMITTALS

A. The Inspector and Testing Laboratory shall submit to the SER and Owner for review a copy of their qualifications which shall include the names and qualifications of each of the individual inspectors and technicians who will be performing inspections or tests.

B. The Inspector and Testing Laboratory shall disclose any past or present business relationship or potential conflict of interest with the Contractor or any of the Subcontractors whose work will be inspected or tested.

1.6 PAYMENT

A. The Owner shall engage and pay for the services of the Inspector, Agents of the Inspector, and Testing Laboratory.

B. If any materials which require Inspections are fabricated in a plant which is not located within 100 miles of the project, the Contractor shall be responsible for the travel expenses of the Inspector or Testing Laboratory.

C. The Contractor shall be responsible for the cost of any retesting or reinspection of work which fails

to comply with the requirements of the Contract Documents.

1.7 CONTRACTOR RESPONSIBILITIES

A. The Contractor shall cooperate with the Inspector and his agents so that the Inspections and testing may be performed without hindrance.

B. The Contractor shall be responsible for coordinating and scheduling inspections and tests. The Contractor shall notify the Inspector or Testing Laboratory at least 24 hours in advance of a required inspection or test. Uninspected work that required inspection may be rejected solely on that basis.

C. The Contractor shall provide incidental labor and facilities to provide access to the work to be inspected or tested, to obtain and handle samples at the site or at source of products to be tested, to facilitate tests and inspections, storage and curing of test samples.

D. The Contractor shall keep at the project site the latest set of construction drawings, field sketches, approved shop drawings, and specifications for use by the inspectors and testing technicians.

E. The Inspection program shall in no way relieve the Contractor of his obligation to perform work in accordance with the requirements of the Contract Documents or from implementing an effective Quality Control program. All work that is to be subjected to Inspections shall first be reviewed by the Contractor's quality control personnel.

F. The Contractor shall be solely responsible for construction site safety.

1.8 LIMITS ON AUTHORITY

A. The Inspector or Testing Laboratory may not release, revoke, alter, or enlarge on the requirements of the Contract Documents.

B. The Inspector or Testing Laboratory will not have control over the Contractor's means and methods of construction.

C. The Inspector or Testing Laboratory shall not be responsible for construction site safety.

D. The Inspector or Testing Laboratory has no authority to stop the work.

1.9 RECORDS AND REPORTS

A. Detailed daily reports shall be prepared of each inspection or test and submitted to the Inspector. Reports shall include:

1. date of test or inspection
2. name of inspector or technician

3. location of specific areas tested or inspected
4. description of test or inspection and results
5. applicable ASTM standard
6. weather conditions
7. Engineer's seal and signature

B. The Inspector shall submit interim reports to the Owner at the end of each week which include all inspections and test reports received that week. Copies shall be sent to the SER and Contractor.

C. Any discrepancies from the Contract Documents found during an Inspection shall be immediately reported to the Contractor. If the discrepancies are not corrected, the Inspector shall notify the SER and Owner. Reports shall document all discrepancies identified and the corrective action taken.

D. The Testing Laboratory shall immediately notify the Inspector and the SER by telephone, fax, or email of any test results which fail to comply with the requirements of the Contract Documents.

E. Reports shall be submitted to the Inspector within 7 days of the inspection or test. Hand written reports may be submitted if final typed copies are not available.

F. At the completion of the work requiring Inspections, each inspection agency and testing laboratory shall provide a statement to the Inspector that all work was completed in substantial conformance with the Contract Documents and that all appropriate inspections and tests were performed.

1.10 FINAL REPORT OF INSPECTIONS

A. The *Final Report of Inspections* shall be completed by the Inspector and submitted to the SER and Owner prior to project completion.

B. The *Final Report of Inspections* will certify that all required inspections have been performed and will itemize any discrepancies that were not corrected or resolved.

PART 2 – PRODUCTS (not applicable)

PART 3 – EXECUTION (not applicable)

END OF SECTION 01410

OLD MINE PARK BRIDGE
Trumbull, CT
February 2012

SECTION 022210 - DEMOLITION

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 the following:

1. Demolition and removal of structures and site improvements.
2. Removing below-grade construction.

1.3 DEFINITIONS

A. Remove: Detach items from existing construction and legally dispose of them off-site unless indicated to be removed and salvaged or recycled.

B. Remove and Salvage: Detach items from existing construction and deliver them to Owner ready for reuse.

C. Existing to Remain: Existing items of construction that are not to be removed and that are not otherwise indicated to be removed, removed and salvaged, or recycled.

1.4 MATERIALS OWNERSHIP

A. Historic items, relics, and similar objects including, but not limited to, cornerstones and their contents, commemorative plaques and tablets, antiques, and other items of interest or value to Owner that may be encountered during building demolition remain Owner's property. Carefully remove and salvage each item or object in a manner to prevent damage and deliver promptly to Owner.

1. Coordinate with Owner, who will establish special procedures for removal and salvage.

1.5 QUALITY ASSURANCE

A. Demolition Firm Qualifications: An experienced firm that has specialized in demolition work similar in material and extent to that indicated for this Project.

B. Regulatory Requirements: Comply with governing EPA notification regulations before beginning demolition. Comply with hauling and disposal regulations of authorities having jurisdiction.

C. Standards: Comply with ANSI A10.6 and NFPA 241.

D. Predemolition Conference: Conduct conference at Project site to comply with requirements in Division 1 Section "Project Management and Coordination."

1.6 PROJECT CONDITIONS

A. Owner assumes no responsibility for structures to be demolished.

1. Conditions existing at time of inspection for bidding purpose will be maintained by Owner as far as practical.

B. Hazardous Materials: It is not expected that hazardous materials will be encountered in the Work.

1. Hazardous materials will be removed by Owner before start of the Work.
2. If materials suspected of containing hazardous materials are encountered, do not disturb; immediately notify Engineer and Owner. Hazardous materials will be removed by Owner under a separate contract.

C. Storage or sale of removed items or materials on-site is not permitted.

1.7 COORDINATION

A. Arrange demolition schedule so as not to interfere with Owner's on-site operations.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 EXAMINATION

A. Survey existing conditions and correlate with requirements indicated to determine extent of building demolition required.

B. Inventory and record the condition of items to be removed and salvaged.

3.2 PREPARATION

A. Existing Utilities: Locate, identify, disconnect, and seal or cap off indicated utilities serving structures to be demolished.

B. Temporary Shoring: Provide and maintain interior and exterior shoring, bracing, or structural support to preserve stability and prevent unexpected movement or collapse of construction being demolished.

1. Strengthen or add new supports when required during progress of demolition.

C. Removed and Salvaged Items: Comply with the following:

1. Clean salvaged items of dirt and demolition debris.
2. Pack or crate items after cleaning. Identify contents of containers.
3. Store items in a secure area until delivery to Owner.
4. Transport items to Owner's storage area designated by Owner.
5. Protect items from damage during transport and storage.

3.3 PROTECTION

A. Existing Facilities: Protect adjacent walkways, loading docks, building entries, and other building facilities during demolition operations.

B. Existing Items to Remain: Protect construction indicated to remain against damage and soiling during demolition.

C. Existing Utilities: Maintain utility services indicated to remain and protect them against damage during demolition operations.

D. Temporary Protection: Erect temporary protection, such as walks, fences, railings, canopies, and covered passageways, where required by authorities having jurisdiction and as indicated. Comply with requirements in Division 1 Section "Temporary Facilities and Controls."

1. Protect existing site improvements, appurtenances, and landscaping to remain.
2. Erect a plainly visible fence around drip line of individual trees or around perimeter drip line of groups of trees to remain.
3. Provide temporary barricades and other protection required to prevent injury to people and damage to adjacent buildings and facilities to remain.
4. Provide protection to ensure safe passage of people around building demolition area and to and from occupied portions of adjacent buildings and structures.
5. Protect walls, windows, roofs, and other adjacent exterior construction that are to remain and that are exposed to building demolition operations.
6. Erect and maintain dustproof partitions and temporary enclosures to limit dust and dirt migration and to separate areas from fumes and noise from occupied portions of adjacent buildings.

3.4 DEMOLITION, GENERAL

A. General: Demolish indicated existing site improvements completely. Use methods required to complete the Work within limitations of governing regulations and as follows:

1. Do not use cutting torches until work area is cleared of flammable materials. Maintain portable fire-suppression devices during flame-cutting operations.
2. Maintain adequate ventilation when using cutting torches.

B. Site Access and Temporary Controls: Conduct building demolition and debris-removal operations to ensure minimum interference with roads, streets, walks, walkways, and other adjacent occupied and used facilities.

1. Do not close or obstruct streets, walks, walkways, or other adjacent occupied or used facilities without permission from Owner and authorities having jurisdiction. Provide alternate routes around closed or obstructed traffic ways if required by authorities having jurisdiction.
2. Use water mist and other suitable methods to limit spread of dust and dirt. Comply with governing environmental-protection regulations. Do not use water when it may damage adjacent construction or create hazardous or objectionable conditions, such as ice, flooding, and pollution.

3.5 MECHANICAL DEMOLITION

A. Remove intact when permitted by authorities having jurisdiction.

B. Proceed with demolition of structural framing members systematically, from higher to lower level. Complete building demolition operations above each floor or tier before disturbing supporting members on the next lower level.

C. Remove debris from elevated portions by chute, hoist, or other device that will convey debris to grade level in a controlled descent.

1. Remove structural framing members and lower to ground by method suitable to minimize ground impact or dust generation.

D. Concrete: Cut concrete full depth at junctures with construction indicated to remain, using power-driven saw, then remove concrete between saw cuts.

E. Structural Steel: Dismantle field connections without bending or damaging steel members. Do not use flame-cutting torches unless otherwise authorized by authorities having jurisdiction.

F. Below-Grade Construction: Remove foundation walls and other below-grade construction. Cut below-grade construction flush with grade.

G. Below-Grade Construction: Demolish foundation walls and other below-grade construction that is within 5 feet outside of footprint indicated for new construction. Abandon below-grade construction outside this area.

H. Existing Utilities: Abandon existing utilities and below-grade utility structures. Cut utilities flush with grade.

3.6 SITE RESTORATION

A. Below-Grade Areas: Rough grade below-grade areas ready for further excavation or new construction.

B. Below-Grade Areas: Completely fill below-grade areas and voids resulting from building demolition operations with **[satisfactory soil materials]** **[recycled pulverized concrete]** according to backfill requirements in Division 2 Section "Earthwork."

C. Site Grading: Uniformly rough grade area of demolished construction to a smooth surface, free from irregular surface changes. Provide a smooth transition between adjacent existing grades and new grades.

3.7 DISPOSAL OF DEMOLISHED MATERIALS

A. General: Except for items or materials indicated to be recycled, reused, salvaged, reinstalled, or otherwise indicated to remain Owner's property, remove demolished materials from Project site and legally dispose of them in an EPA-approved landfill.

1. Do not allow demolished materials to accumulate on-site.
2. Remove and transport debris in a manner that will prevent spillage on adjacent surfaces and areas.

B. Burning: Do not burn demolished materials.

C. Disposal: Transport demolished materials off Owner's property and legally dispose of them.

3.8 CLEANING

A. Clean adjacent structures and improvements of dust, dirt, and debris caused by building demolition operations. Return adjacent areas to condition existing before building demolition operations began.

END OF SECTION 022210

OLD MINE PARK BRIDGE
Trumbull, CT
February 2012

SECTION 022400 - DEWATERING

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 construction dewatering.

1.3 PERFORMANCE REQUIREMENTS

A. Dewatering Performance: Furnish, install, test, operate, monitor, and maintain dewatering system of sufficient scope, size, and capacity to control water flow into excavations and permit construction to proceed on dry, stable subgrades.

1. Maintain dewatering operations to ensure erosion control, stability of excavations and constructed slopes, that excavation does not flood, and that damage to subgrades and permanent structures is prevented.
2. Prevent surface water from entering excavations by grading, dikes, or other means.
3. Accomplish dewatering without damaging existing buildings adjacent to excavation.
4. Remove dewatering system if no longer needed.

1.4 SUBMITTALS

A. Shop Drawings for Information: For dewatering system. Show arrangement, locations, and details of wells and well points; locations of headers and discharge lines; and means of discharge and disposal of water.

B. Photographs or videotape, sufficiently detailed, of existing conditions of adjoining construction and site improvements that might be misconstrued as damage caused by dewatering operations.

C. Record drawings at Project closeout identifying and locating capped utilities and other subsurface structural, electrical, or mechanical conditions performed during dewatering.

1. Note locations and capping depth of wells and well points.

1.5 QUALITY ASSURANCE

A. Regulatory Requirements: Comply with water disposal requirements of authorities having jurisdiction.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 PREPARATION

A. Protect structures, utilities, sidewalks, pavements, and other facilities from damage caused by settlement, lateral movement, undermining, washout, and other hazards created by dewatering operations.

1. Prevent surface water and subsurface or ground water from entering excavations, from ponding on prepared subgrades, and from flooding site and surrounding area.
2. Protect subgrades and foundation soils from softening and damage by rain or water accumulation.

B. Install dewatering system to ensure minimum interference with roads, streets, walks, and other adjacent occupied and used facilities.

1. Do not close or obstruct streets, walks, or other adjacent occupied or used facilities without permission from Owner and authorities having jurisdiction. Provide alternate routes around closed or obstructed traffic ways if required by authorities having jurisdiction.

3.2 INSTALLATION

A. Install dewatering system utilizing wells, well points, or similar methods complete with pump equipment, standby power and pumps, filter material gradation, valves, appurtenances, water disposal, and surface-water controls.

B. Before excavating below ground-water level, place system into operation to lower water to specified levels. Operate system continuously until drains, sewers, and structures have been constructed and fill materials have been placed, or until dewatering is no longer required.

C. Provide an adequate system to lower and control ground water to permit excavation, construction of structures, and placement of fill materials on dry subgrades. Install sufficient dewatering equipment to drain water-bearing strata above and below bottom of foundations, drains, sewers, and other excavations.

1. Do not permit open-sump pumping that leads to loss of fines, soil piping, subgrade softening, and slope instability.

D. Dispose of water removed by dewatering in a manner that avoids endangering public health, property, and portions of work under construction or completed. Dispose of water in a manner that avoids inconvenience to others. Provide sumps, sedimentation tanks, and other flow-control devices as required by authorities having jurisdiction.

E. Provide standby equipment on-site, installed and available for immediate operation, to maintain dewatering on continuous basis if any part of system becomes inadequate or fails. If dewatering requirements are not satisfied due to inadequacy or failure of dewatering system, restore damaged structures and foundation soils at no additional expense to Owner.

1. Remove dewatering system from Project site on completion of dewatering. Plug or fill well holes with sand or cut off and cap wells a minimum of 36 inches below overlying construction.

F. Damages: Promptly repair damages to adjacent facilities caused by dewatering operations.

END OF SECTION 022400

OLD MINE PARK BRIDGE
Trumbull, CT
February 2012

SECTION 023100 – FOUNDATION EARTHWORK

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 DESCRIPTION

A. Furnish all labor, materials, tools, equipment and transportation to complete all excavation and disposal of unsuitable soil and placing and compacting of controlled fill.

1.3 SUMMARY

A. This Section includes the following:

1. Preparing subgrades for slabs-on-grade.
2. Excavating and backfilling for foundations and structures.
3. Drainage course for slabs-on-grade.

1.4 SUBMITTALS

A. Material Test Reports: From a qualified testing agency for select controlled fill material:

1. Sieve analysis.
2. Modified Proctor moisture-density curve according to ASTM D 1557.
3. Submit a sample of fill material in a 12 oz. labeled jar.

1.5 QUALITY ASSURANCE

A. The Owner shall engage an Inspector and Testing Agency to perform inspections and testing services.

1.6 PROJECT CONDITIONS

A. Existing Utilities: Locate existing underground utilities and fuel storage tanks in areas of work. If utilities are to remain in place, provide adequate means of support and protection during earthwork operations. Contact "Call Before You Dig" prior to any excavation.

B. Data on indicated subsurface conditions are not intended as representations or warranties of accuracy or continuity between soil bearings. It is expressly understood that Owner will not be

responsible for interpretations or conclusions drawn by Contractor. Where provided, data is made available for the convenience of Contractor.

PART 2 - PRODUCTS

2.1 SOIL MATERIALS

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

B. Satisfactory Soils: ASTM D 2487 Soil Classification Groups GW, GP, GM, SW, SP, and SM, or a combination of these groups; free of rock or gravel larger than 6 **inches** in any dimension, debris, waste, frozen materials, vegetation, and other deleterious matter.

C. Unsatisfactory Soils: Soil Classification Groups GC, SC, CL, ML, OL, CH, MH, OH, and PT according to ASTM D 2487, or a combination of these groups.

D. Bank-run gravel: well graded granular soil free of organic material and complying with the following gradation:

3 1/2" sieve	90% to 100% passing
1 1/2" sieve	55% to 95% passing
1/4" sieve	25% to 60% passing
#10 sieve	15% to 45% passing
#40 sieve	5% to 25% passing
#100 sieve	0% to 10% passing
#200 sieve	0% to 5% passing

E. Crushed stone: crushed durable stone screened to a uniform size.

F. Processed stone: crusher run stone consisting of a blend of crushed stone and stone dust with not more than 5% passing the #200 sieve.

G. Recycled aggregate: crushed concrete or brick, free of organic material, with not more than 5% passing the #200 sieve.

H. Drainage Course: Narrowly graded mixture of crushed stone, ASTM D 448; coarse-aggregate grading Size 57; with 100 percent passing a 1-1/2-inch sieve and 0 to 5 percent passing a No. 8 sieve.

I. Processed gravel consisting of a blend of recycled aggregate and soil contaminated with petroleum products or other hazardous materials shall not be used for borrow material.

2.2 SELECT CONTROLLED FILL MATERIAL

A. Select material used for the controlled fill shall be clean, well graded sand and gravel containing not more than 10 percent by weight passing the no. 200 sieve.

B. The maximum size of select material shall be 6 inches except the upper 8 inches of subfloor fill, directly beneath the floor slab shall have a maximum size of 2 inches to facilitate fine grading.

C. Select material shall be free of organic matter, rubble, frost, petroleum and all deleterious substances.

D. Samples of the select material shall be obtained and subjected to a sieve analysis and a moisture - density relationship test ASTM D1557 to determine its maximum density and optimum moisture content.

E. Free draining material shall be crushed stone or processed stone containing less than 30 percent by weight passing the no. 40 sieve and 10 percent by weight passing the no. 100 sieve. The maximum particle size permitted is 6 inches

PART 3 - EXECUTION

3.1 PREPARATION

A. Protect structures, utilities, sidewalks, pavements, and other facilities from damage caused by settlement, lateral movement, undermining, washout, and other hazards created by earthwork operations.

B. Preparation of subgrade for earthwork operations: remove all vegetation, topsoil, debris, obstructions, and deleterious materials from ground surface .

C. Protect and maintain erosion and sedimentation controls during earthwork operations.

D. Provide protective insulating materials to protect subgrades and foundation soils against freezing temperatures or frost.

3.2 DEWATERING

A. Prevent surface water and ground water from entering excavations, from ponding on prepared subgrades, and from flooding Project site and surrounding area.

B. Protect subgrades from softening, undermining, washout, and damage by rain or water accumulation.

1. Reroute surface water runoff away from excavated areas. Do not allow water to accumulate in excavations. Do not use excavated trenches as temporary drainage ditches.
2. Install a dewatering system to keep subgrades dry and convey ground water away from excavations. Maintain until dewatering is no longer required.

3.3 EXCAVATION FOR FOUNDATIONS

A. Excavate to indicated elevations and dimensions within a tolerance of plus or minus 0.1 feet. If applicable, extend excavations a sufficient distance from structures for placing and removing concrete formwork, for installing services and other construction, and for inspections.

B. Excavations for Footings and Foundations: Do not disturb bottom of excavation. Excavate by hand to final grade. Compact soil with a vibratory tamper or a jumping soil rammer after subgrade has been inspected and approved.

C. Slope sides of excavations to produce a safe and stable embankment. Shore and brace where sloping is not possible because of space restrictions or stability of material excavated. The Contractor shall be responsible for the structural adequacy of all shoring and bracing.

D. Place 6 inches minimum of crushed stone under all foundations. Crushed stone shall be placed after the soil has been inspected, approved, and tamped.

E. Footings shall bear on crushed stone placed over undisturbed virgin soil, free of frost, mud, or ice.

F. Concrete shall not be placed in water.

G. Where footings bear directly on bedrock, clean and level rock to a slope not exceeding 2 vertical on 12 horizontal. Where it is not practical to level the rock surface, drill and grout steel reinforcing bars into the rock as directed by the Engineer.

H. Underpin adjacent structures which may be damaged by excavation work.

I. The Contractor shall comply with all OSHA regulations

3.4 BACKFILLING OF FOUNDATIONS

A. Place and compact backfill in excavations promptly, but not before completing the following:

1. Construction below finish grade.
2. Removing concrete formwork.
3. Removing trash and debris.
4. Removing temporary shoring and bracing, and sheeting.
5. Inspections.

B. Where indicated on the drawings, use crushed stone for backfill material.

C. Place backfill on subgrades free of mud, frost, snow, or ice.

D. Backfill shall be compacted granular soil with not more than 10% passing the #200 sieve. If on-site soil does not meet these requirements, the Contractor shall furnish soil from off-site at his own expense.

E. Backfill shall be placed and compacted in 8 inch lifts. Compact to 95% of the maximum density except backfill under landscaped areas need not exceed 90% of the maximum density.

F. Place backfill evenly on both sides of foundations.

G. Recycled aggregate may be used as a backfill material.

3.5 SLAB SUB-BASE

A. Sub-base for slabs on grade shall be 3/4 inch crushed stone, 6" thickness unless indicated otherwise on the drawings.

3.6 GRADING

A. General: Uniformly grade areas to a smooth surface, free of irregular surface changes. Comply with compaction requirements and grade to cross sections, lines, and elevations indicated.

1. Provide a smooth transition between adjacent existing grades and new grades.
2. Cut out soft spots, fill low spots, and trim high spots to comply with required surface tolerances.

B. Site Grading: Slope grades to direct water away from buildings and to prevent ponding.

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

3.7 SUBGRADE INSPECTION

A. Notify Inspector when excavations have reached required subgrade.

B. The Inspector shall inspect the subgrade prior to the placement of controlled fill and verify that all unsuitable material has been removed.

3.8 TESTING

A. Backfill material shall be subjected to a Sieve Analysis and a Modified Procter Test.

END OF SECTION 023100

OLD MINE PARK BRIDGE
Trumbull, CT
February 2012

SECTION 028210 - CHAIN-LINK FENCES

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 the following:

1. Chain-Link Fences

1.3 PERFORMANCE REQUIREMENTS

A. Structural Performance: Provide chain-link fences and gates capable of withstanding the effects of gravity loads and wind loads.

1.4 SUBMITTALS

A. Product Data: Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for chain-link fences and gates.

1. Fence and gate posts, rails, and fittings.
2. Chain-link fabric, reinforcements, and attachments.

B. Shop Drawings: Show locations of fences, gates, posts, rails, tension wires, details of extended posts, extension arms, gate swing, or other operation, hardware, and accessories. Indicate materials, dimensions, sizes, weights, and finishes of components. Include plans, gate elevations, sections, details of post anchorage, attachment, bracing, and other required installation and operational clearances.

C. Samples for Initial Selection: Manufacturer's color charts or 6-inch lengths of actual units showing the full range of colors available for components with factory-applied color finishes.

D. Qualification Data: For Installer.

1.5 QUALITY ASSURANCE

A. Installer Qualifications: An experienced installer who has completed chain-link fences and gates similar in material, design, and extent to those indicated for this Project and whose work has resulted in construction with a record of successful in-service performance.

1. Engineering Responsibility: Preparation of data for chain-link fences and gates, including Shop Drawings, based on testing and engineering analysis of manufacturer's standard units in assemblies similar to those indicated for this Project.

1.6 PROJECT CONDITIONS

A. Field Measurements: Verify layout information for chain-link fences and gates shown on Drawings in relation to property survey and existing structures. Verify dimensions by field measurements.

PART 2 - PRODUCTS

2.1 CHAIN-LINK FENCE FABRIC

A. General: Provide fabric in one-piece heights measured between top and bottom of outer edge of selvage knuckle or twist. Comply with ASTM A 392, CLFMI CLF 2445, and requirements indicated below:

1. Steel Wire Fabric: Metallic-coated wire with a diameter of 0.192 inch

   a. Mesh Size: 2-1/8 inches.
   b. Weight of Metallic (Zinc) Coating: ASTM A 392, Type II, Class 1, 1.2 oz./sq. ft. with zinc coating applied before weaving.

   c. Coat selvage ends of fabric that is metallic coated before the weaving process with manufacturer's standard clear protective coating.

2.2 RESIDENTIAL FENCE AND GATE FRAMING

A. Posts and Rails: Round cold-formed, electric-resistance-welded, steel pipe or tubing, with minimum yield strength of 45,000 psi and with outside dimension, minimum wall thickness, and weight complying with ASTM F 761 or ASTM F 654 for the following fence height and strength and stiffness requirements:

1. Fence Height: 4 feet.
2. Duty Rating: Medium.
3. Tube or Pipe Diameter and Thickness: According to ASTM F 761.
4. Tube Size and Thickness: According to ASTM F 654.
5. Metallic-Coated Steel: Posts, rails, and frames protected with an external coating of not less than 0.6 oz. of zinc/sq. ft., a chromate conversion coating, and a clear, verifiable polymer film; with an internal protective coating of not less than 0.6 oz. of zinc/sq. ft. or 81 percent, not less than 0.3-mil- thick, zinc pigmented coating.

2.3 TENSION WIRE

A. General: Provide horizontal tension wire at the following locations:

1. Location: Extended along top and bottom of fence fabric.

B. Metallic-Coated Steel Wire: 0.177-inch- diameter, marcelled tension wire complying with ASTM A 817, ASTM A 824, and the following:

1. Metallic Coating: Type II, zinc coated (galvanized) by hot-dip process, with the following minimum coating weight:
   a. Matching chain-link fabric coating weight.

2.4 FITTINGS

A. General: Comply with ASTM F 626.

B. Post and Line Caps: Provide for each post.

1. Line post caps with loop to receive tension wire or top rail.

C. Rail and Brace Ends: Attach rails securely to each gate, corner, pull, and end post.

D. Rail Fittings: Provide the following:

1. Top Rail Sleeves: Pressed-steel or round-steel tubing not less than 6 inches long.
2. Rail Clamps: Line and corner boulevard clamps for connecting intermediate and bottom rails in the fence line-to-line posts.

E. Tension and Brace Bands: Pressed steel.

F. Tension Bars: Steel, length not less than 2 inches shorter than full height of chain-link fabric. Provide one bar for each gate and end post, and two for each corner and pull post, unless fabric is integrally woven into post.

G. Tie Wires, Clips, and Fasteners: According to ASTM F 626.

1. Standard Round Wire Ties: For attaching chain-link fabric to posts, rails, and frames, complying with the following:

   a. Hot-Dip Galvanized Steel: galvanized coating thickness matching coating thickness of chain-link fence fabric.

H. Finish:

1. Metallic Coating for Pressed Steel or Cast Iron: Not less than 1.2 oz. /sq. ft. zinc.

2.5 CAST-IN-PLACE CONCRETE

A. Materials: Portland cement complying with ASTM C 150, Type I aggregates complying with ASTM C 33, and potable water. Measure, batch, and mix Project-site-mixed concrete according to ASTM C 94.

1. Concrete Mixes: Normal-weight concrete air entrained with not less than 3000-psi compressive strength (28 days), 3-inch slump, and 1-inch maximum size aggregate.

B. Materials: Dry-packaged concrete mix complying with ASTM C 387 for normal-weight concrete mixed with potable water according to manufacturer's written instructions.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine areas and conditions, with Installer present, for compliance with requirements for site clearing, earthwork, pavement work, and other conditions affecting performance.

1. Do not begin installation before final grading is completed, unless otherwise permitted by Architect.
2. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Stake locations of fence lines, gates, and terminal posts. Do not exceed intervals of 500 feet or line of sight between stakes. Indicate locations of utilities, lawn sprinkler system, underground structures, benchmarks, and property monuments.

3.3 INSTALLATION, GENERAL

A. Install chain-link fencing to comply with ASTM F 567 and more stringent requirements specified.

3.4 CHAIN-LINK FENCE INSTALLATION

A. Post Excavation: Drill or hand-excavate holes for posts to diameters and spacings indicated, in firm, undisturbed soil.

B. Post Setting: Set posts in concrete at indicated spacing into firm, undisturbed soil.

1. Verify that posts are set plumb, aligned, and at correct height and spacing, and hold in position during setting with concrete or mechanical devices.
2. Concrete Fill: Place concrete around posts to dimensions indicated and vibrate or tamp for consolidation. Protect aboveground portion of posts from concrete splatter.

a. Concealed Concrete: Top 2 inches below grade to allow covering with surface material.

C. Terminal Posts: Locate terminal end, corner, and gate posts per ASTM F 567 and terminal pull posts at changes in horizontal or vertical alignment of 15 degrees or more.

D. Line Posts: Space line posts uniformly at 8 feet o.c.

E. Post Bracing and Intermediate Rails: Install according to ASTM F 567, maintaining plumb position and alignment of fencing. Install braces at end and gate posts and at both sides of corner and pull posts.

1. Locate horizontal braces at midheight of fabric 6 feet or higher, on fences with top rail and at 2/3 fabric height on fences without top rail. Install so posts are plumb when diagonal rod is under proper tension.

F. Tension Wire: Install according to ASTM F 567, maintaining plumb position and alignment of fencing. Pull wire taut, without sags. Fasten fabric to tension wire with 0.120-inch- diameter hog rings of same material and finish as fabric wire, spaced a maximum of 24 inches o.c. Install tension wire in locations indicated before stretching fabric.

1. Top Tension Wire: Install tension wire through post cap loops.
2. Bottom Tension Wire: Install tension wire within 6 inches of bottom of fabric and tie to each post with not less than same diameter and type of wire.

G. Top Rail: Install according to ASTM F 567, maintaining plumb position and alignment of fencing. Run rail continuously through line post caps, bending to radius for curved runs and terminating into rail end attached to posts or post caps fabricated to receive rail at terminal posts. Provide expansion couplings as recommended in writing by fencing manufacturer.

H. Bottom Rails: Install, spanning between posts.

I. Chain-Link Fabric: Apply fabric to **[outside]** **[inside]** of enclosing framework. Leave **[1 inch (25.4 mm)]** **[2 inches (50 mm)]** between finish grade or surface and bottom selvage, unless otherwise indicated. Pull fabric taut and tie to posts, rails, and tension wires. Anchor to framework so fabric remains under tension after pulling force is released.

J. Tension or Stretcher Bars: Thread through fabric and secure to end, corner, pull, and gate posts with tension bands spaced not more than 15 inches (380 mm) o.c.

K. Tie Wires: Use wire of proper length to firmly secure fabric to line posts and rails. Attach wire at 1 end to chain-link fabric, wrap wire around post a minimum of 180 degrees, and attach other end to chain-link fabric per ASTM F 626. Bend ends of wire to minimize hazard to individuals and clothing.

1. Maximum Spacing: Tie fabric to line posts at 12 inches (300 mm) o.c. and to braces at 24 inches (610 mm) o.c.

L. Fasteners: Install nuts for tension bands and carriage bolts on the side of the fence opposite the fabric side.**[Peen ends of bolts or score threads to prevent removal of nuts.]**

OLD MINE PARK BRIDGE
Trumbull, CT
February 2012

END OF SECTION 02821

OLD MINE PARK BRIDGE
Trumbull, CT
February 2012

SECTION 033000 - CAST-IN-PLACE CONCRETE

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 specifies cast-in place concrete, including formwork, reinforcement, concrete materials, mixture design, placement procedures, and finishes.

1.3 SUBMITTALS

A. Product Data: For all admixtures, patching compounds, waterstops, joint systems, or any other proprietary materials or items.

B. Design Mixtures: For each concrete mixture. Submit alternate design mixtures when characteristics of materials, Project conditions, weather, test results, or other circumstances warrant adjustments.

1. Indicate amounts of mixing water to be withheld for later addition at Project site.

C. Submit for review a detailed description of the methods which will be used for curing concrete, for cold weather protection of concrete, and for hot weather concreting

1.4 QUALITY ASSURANCE

A. ACI Publications: Comply with the following unless modified by requirements in the Contract Documents:

1. ACI 301, "Specification for Structural Concrete"
2. ACI 117, "Specifications for Tolerances for Concrete Construction and Materials."

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 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 number of joints.

1. Plywood, metal, or other approved panel materials.

B. Chamfer Strips: Wood, metal, PVC, or rubber strips, 3/4 by 3/4 inch, minimum.

C. Rustication Strips: Wood, metal, PVC, or rubber strips, kerfed for ease of form removal.

D. 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.

E. 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 1 inch to the plane of exposed concrete surface.

2.2 STEEL REINFORCEMENT

A. Epoxy-Coated Reinforcing Bars: ASTM A 615/A 615M, Grade 60, deformed bars, epoxy coated, with less than 2 percent damaged coating in each 12-inch bar length.

2.3 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 epoxy-coated reinforcement, use epoxy-coated or other dielectric-polymer-coated wire bar supports.

2.4 CONCRETE MATERIALS

A. Cementitious Material: Use the following cementitious materials, of the same type, brand, and source, throughout Project:

1. Portland Cement: ASTM C 150, Type I/II, gray.
2. Ground Granulated Blast-Furnace Slag: ASTM C 989, Grade 100 or 120.
3. Fly Ash: ASTM C618, Class C or F.

B. Silica Fume: ASTM C 1240, amorphous silica.

C. Normal-Weight Aggregates: ASTM C 33. Provide aggregates from a single source.

D. Water: ASTM C 94/C 94M and potable.

2.5 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/C 494M, Type A.
2. Retarding Admixture: ASTM C 494/C 494M, Type B.
3. Water-Reducing and Retarding Admixture: ASTM C 494/C 494M, Type D.
4. High-Range, Water-Reducing Admixture: ASTM C 494/C 494M, Type F.
5. High-Range, Water-Reducing and Retarding Admixture: ASTM C 494/C 494M, Type G.
6. Plasticizing and Retarding Admixture: ASTM C 1017/C 1017M, Type II.
7. Accelerating admixture: PolarSet by W.R. Grace or Accelguard 80 by Euclid Chemical Company.
8. Pumping admixture: Darex Pumping Aid by W.R. Grace

2.6 CURING MATERIALS

A. Clear, Waterborne, Membrane-Forming Curing Compound: ASTM C 309, Type 1, Class B, 18 to 25 percent solids, nondissipating, certified by curing compound manufacturer to not interfere with bonding of floor covering.

1. Products:

a. Burke by Edoco; Spartan Cote WB II 20 Percent.
b. ChemMasters; Safe-Cure Clear.
c. Dayton Superior Corporation; Safe Cure and Seal (J-19).
d. Euclid Chemical Company (The); Diamond Clear VOX.
e. L&M Construction Chemicals, Inc.; Dress & Seal WB.
f. Meadows, W. R., Inc.; Vocomp-20.
g. Sonneborn, Div. of ChemRex; Kure-N-Seal.
h. Symons Corporation, a Dayton Superior Company; Cure & Seal 18 Percent E.

2.7 RELATED MATERIALS

A. Expansion- and Isolation-Joint-Filler Strips: ASTM D 1751, asphalt-saturated cellulosic fiber.

B. Rigid insulation: Dow Styrofoam XPS

C. Bonding Agent: ASTM C 1059, Type II, non-redispersible, acrylic emulsion or styrene butadiene.

2.8 CONCRETE MIXTURES, GENERAL

A. Prepare design mixtures for each type and strength of concrete, proportioned on the basis of laboratory trial mixture or field test data, or both, according to ACI 301.

1. Use a qualified independent testing agency for preparing and reporting proposed mixture designs based on laboratory trial mixtures.

B. Cementitious Materials: Limit percentage, by weight, of cementitious materials other than portland cement in concrete as follows:

1. Fly Ash: 25 percent.
2. Combined Fly Ash and Pozzolan: 25 percent.
3. Ground Granulated Blast-Furnace Slag: 50 percent.
4. Combined Fly Ash or Pozzolan and Ground Granulated Blast-Furnace Slag: 50 percent portland cement minimum, with fly ash or pozzolan not exceeding 25 percent.
5. Silica Fume: 10 percent.
6. Combined Fly Ash, Pozzolans, and Silica Fume: 35 percent with fly ash or pozzolans not exceeding 25 percent and silica fume not exceeding 10 percent.
7. Combined Fly Ash or Pozzolans, Ground Granulated Blast-Furnace Slag, and Silica Fume: 50 percent with fly ash or pozzolans not exceeding 25 percent and silica fume not exceeding 10 percent.

C. Limit water-soluble, chloride-ion content in hardened concrete to 0.06 percent by weight of cement.

D. Admixtures: Use admixtures according to manufacturer's written instructions.

1. Use water-reducing 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 accelerating admixture in all concrete placed at ambient temperatures below 40 degrees F.

2.9 CONCRETE MIXTURES

A. Proportion normal-weight concrete mixture as follows:

1. Minimum Compressive Strength: 4000 psi at 28 days.
2. Maximum Water-Cementitious Materials Ratio: 0.50.
3. Slump Limit: 5 inches.
4. Air Content: 5 percent, plus or minus 1.5 percent at point of delivery for 1-1/2-inch nominal maximum aggregate size.

2.10 CONCRETE MIXING

A. Ready-Mixed Concrete: Measure, batch, mix, and deliver concrete according to ASTM C 94/C 94M, and furnish batch ticket information.

1. When air temperature is between 85 and 90 deg F, reduce mixing and delivery time from 1-1/2 hours to 75 minutes; when air temperature is above 90 deg F, reduce mixing and delivery time to 60 minutes.

PART 3 - EXECUTION

3.1 FORMWORK

A. Design, erect, shore, brace, and maintain formwork, according to ACI 301, to support vertical, lateral, static, and dynamic loads, and construction loads that might be applied, until structure can support such loads.

B. Construct formwork so concrete members and structures are of size, shape, alignment, elevation, and position indicated, within tolerance limits of ACI 117.

C. Construct forms tight enough to prevent loss of concrete mortar.

D. Fabricate forms for easy removal without hammering or prying against concrete surfaces. Provide crush or wrecking plates where stripping may damage cast concrete surfaces. Provide top forms for inclined surfaces steeper than 1.5 horizontal to 1 vertical.

1. Install keyways, reglets, recesses, and the like, for easy removal.
2. Do not use rust-stained steel form-facing material.

E. 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.

F. Provide temporary openings for cleanouts and inspection ports where interior area of formwork is inaccessible. Close openings with panels tightly fitted to forms and securely braced to prevent loss of concrete mortar. Locate temporary openings in forms at inconspicuous locations.

G. Chamfer exterior corners and edges of permanently exposed concrete.

H. Form openings, chases, offsets, sinkages, keyways, reglets, blocking, screeds, and bulkheads required in the Work. Determine sizes and locations from trades providing such items.

I. Clean forms and adjacent surfaces to receive concrete. Remove chips, wood, sawdust, dirt, and other debris just before placing concrete.

J. Retighten forms and bracing before placing concrete, as required, to prevent mortar leaks and maintain proper alignment.

K. Coat contact surfaces of forms with form-release agent, according to manufacturer's written instructions, before placing reinforcement. DO NOT ALLOW RELEASE AGENT TO COME IN CONTACT WITH REINFORCING STEEL OR HARDENED CONCRETE.

3.2 EMBEDDED ITEMS

A. Place and secure anchorage devices and other embedded items required for adjoining work that is attached to or supported by cast-in-place concrete. Use setting drawings, templates, diagrams, instructions, and directions furnished with items to be embedded.

1. Install anchor rods, accurately located, to elevations required and complying with tolerances in Section 7.5 of AISC's "Code of Standard Practice for Steel Buildings and Bridges." Anchor rods shall be positioned and secured to formwork prior to placing concrete.

3.3 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 deg F for 24 hours after placing concrete, if concrete is hard enough to not be damaged by form-removal operations and curing and protection operations are maintained.

1. Leave formwork for beam soffits, joists, slabs, and other structural elements that supports weight of concrete in place until concrete has achieved at least 70 percent of its 28-day design compressive strength.
2. Remove forms only if shores have been arranged to permit removal of forms without loosening or disturbing shores.

B. Clean and repair surfaces of forms to be reused in the Work. Split, frayed, delaminated, or otherwise damaged form-facing material will not be acceptable for exposed surfaces. Apply new form-release agent.

C. When forms are reused, clean surfaces, remove fins and laitance, and tighten to close joints. Align and secure joints to avoid offsets. Do not use patched forms for exposed concrete surfaces unless approved by Architect.

3.4 STEEL REINFORCEMENT

A. General: Comply with CRSI's "Manual of Standard Practice" for placing reinforcement.

B. Clean reinforcement of loose rust and mill scale, earth, ice, and other foreign materials that would reduce bond to concrete.

C. Accurately position, support, and secure reinforcement against displacement. Locate and support reinforcement with bar supports to maintain minimum concrete cover. Do not tack weld crossing reinforcing bars.

D. Set wire ties with ends directed into concrete, not toward exposed concrete surfaces.

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

F. Epoxy-Coated Reinforcement: Repair cut and damaged epoxy coatings with epoxy repair coating according to ASTM D 3963/D 3963M. Use epoxy-coated steel wire ties to fasten epoxy-coated steel reinforcement.

G. Splices shall be lapped 40 bar diameters and securely tied.

H. Heat shall not be used to bend reinforcing bars

3.5 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 Engineer.

1. Place joints perpendicular to main reinforcement. Continue reinforcement across construction joints, unless otherwise indicated. Do not continue reinforcement through sides of strip placements of floors and slabs.
2. Form keyed joints as indicated. Embed keys at least 1-1/2 inches into concrete.
3. Locate joints for beams, slabs, joists, and girders in the middle third of spans. Offset joints in girders a minimum distance of twice the beam width from a beam-girder intersection.
4. Locate horizontal joints in walls and columns at underside of floors, slabs, beams, and girders and at the top of footings or floor slabs.
5. Space vertical joints in walls no more than 40 feet apart. Locate joints beside piers integral with walls, near corners, and in concealed locations where possible.
6. V-chamfer wall construction joints where exposed to view.

3.6 CONCRETE PLACEMENT

A. 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 mixture.

2. Do not exceed maximum water-cement ratio.

B. Clean forms prior to concrete placement. Remove all chips, wood, sawdust, dirt, rubbish, or other debris.

C. No concrete shall be placed during rain, sleet, or snow unless protection is provided.

D. Deposit concrete continuously in one layer or in horizontal layers of such thickness that no new concrete will be placed on concrete that has hardened enough to cause seams or planes of weakness. If a section cannot be placed continuously, provide construction joints as indicated. Deposit concrete to avoid segregation.

1. Deposit concrete in horizontal layers of depth to not exceed formwork design pressures and in a manner to avoid inclined construction joints.
2. Consolidate placed concrete with mechanical vibrating equipment according to ACI 301.
3. Do not use vibrators to transport concrete inside forms. Insert and withdraw vibrators vertically at uniformly spaced locations to rapidly penetrate placed layer and at least 6 inches into preceding layer. Do not insert vibrators into lower layers of concrete that have begun to lose plasticity. At each insertion, limit duration of vibration to time necessary to consolidate concrete and complete embedment of reinforcement and other embedded items without causing mixture constituents to segregate.

E. Deposit and consolidate concrete for slabs in a continuous operation, within limits of construction joints, until placement of a panel or section is complete.

1. Consolidate concrete during placement operations so concrete is thoroughly worked around reinforcement and other embedded items and into corners.
2. Maintain reinforcement in position on chairs during concrete placement.
3. Screed slab surfaces with a straightedge and strike off to correct elevations.
4. Slope surfaces uniformly to drains where required.
5. Begin initial floating using bull floats to form a uniform and open-textured surface plane, before excess bleedwater appears on the surface. Do not further disturb slab surfaces before starting finishing operations.

F. Protect adjacent finish materials against splattering or dripping of concrete during placement.

G. Cold-Weather Placement: Comply with ACI 306.1 and as follows. Protect concrete work from physical damage or reduced strength that could be caused by frost, freezing actions, or low temperatures.

1. When average high and low temperature is expected to fall below 40 deg F for three successive days, maintain delivered concrete mixture temperature within the temperature range required by ACI 301.
2. Do not use frozen materials or materials containing ice or snow. Do not place concrete on frozen subgrade or on subgrade containing frozen materials.
3. Do not use calcium chloride.

H. Hot-Weather Placement: Comply with ACI 305 and as follows:

1. Maintain concrete temperature below 90 deg F at time of placement. Chilled mixing water or chopped ice may be used to control temperature, provided water equivalent of ice is calculated to total amount of mixing water. Using liquid nitrogen to cool concrete is Contractor's option.
2. Fog-spray forms, steel reinforcement, and subgrade just before placing concrete. Keep subgrade uniformly moist without standing water, soft spots, or dry areas.

3.7 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 projections 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 tie holes and defects. Remove fins and other projections that exceed specified limits on formed-surface irregularities.

1. Apply to concrete surfaces to receive a rubbed finish,.

C. Rubbed Finish: Apply the following to smooth-formed finished as-cast concrete where surfaces are exposed to view:
1. Grout-Cleaned Finish: Wet concrete surfaces and apply grout of a consistency of thick paint to coat surfaces and fill small holes. Mix one part portland cement to one and one-half parts fine sand with a 1:1 mixture of bonding admixture and water. Add white portland cement in amounts determined by trial patches so color of dry grout will match adjacent surfaces. Scrub grout into voids and remove excess grout. When grout whitens, rub surface with clean burlap and keep surface damp by fog spray for at least 36 hours.

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

3.8 FINISHING SLABS

A. General: Comply with ACI 302.1R recommendations for screeding, restraightening, and finishing operations for concrete surfaces. Do not wet concrete surfaces.

B. Broom Finish: Apply a broom finish to exterior concrete platforms, steps, parking decks 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.

3.9 MISCELLANEOUS CONCRETE ITEMS

A. Filling In: Fill in holes and openings 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.

3.10 CONCRETE PROTECTING AND CURING

A. General: Protect freshly placed concrete from premature drying and excessive cold or hot temperatures. Comply with ACI 306.1 for cold-weather protection and ACI 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 to manufacturer's written instructions after placing, screeding, and bull floating concrete, but before float finishing.

C. Formed Surfaces: Cure formed concrete surfaces, including underside of beams, supported slabs, and other similar surfaces. If forms remain during curing period, moist cure after loosening forms. If removing forms before end of curing period, continue curing for the remainder of the curing period.

D. Unformed Surfaces: Begin curing immediately after finishing concrete. Cure unformed surfaces, including floors and slabs, concrete floor toppings, and other surfaces.

E. Cure concrete according to ACI 308.1, by one or a combination of the following methods:

1. Moisture Curing: Keep surfaces continuously moist for not less than seven days with the following materials:

a. Water.

b. Continuous water-fog spray.
c. Absorptive cover, water saturated, and kept continuously wet. Cover concrete surfaces and edges with 12-inch lap over adjacent absorptive covers.

2. 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 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 hours after initial application. Maintain continuity of coating and repair damage during curing period.

a. After curing period has elapsed, remove curing compound without damaging concrete surfaces by method recommended by curing compound manufacturer unless manufacturer certifies curing compound will not interfere with bonding of floor covering used on Project.

4. Curing and Sealing Compound: Apply uniformly to floors and slabs that do not receive a finish floor material in a continuous operation by power spray or roller according to manufacturer's written instructions. Recoat areas subjected to heavy rainfall within three hours after initial application. Repeat process 24 hours later and apply a second coat. Maintain continuity of coating and repair damage during curing period.

3.11 JOINT FILLING

A. Prepare, clean, and install joint filler according to manufacturer's written instructions.

1. Defer joint filling until concrete has aged at least six month(s). Do not fill joints until construction traffic has permanently ceased.

B. Remove dirt, debris, saw cuttings, curing compounds, and sealers from joints; leave contact faces of joint clean and dry.

C. Install semirigid joint filler full depth in saw-cut joints and at least 2 inches deep in formed joints. Overfill joint and trim joint filler flush with top of joint after hardening.

3.12 CONCRETE SURFACE REPAIRS

A. Defective Concrete: Repair and patch defective areas when approved by Engineer. Remove and replace concrete that cannot be repaired and patched to Engineer's approval.

B. Patching Mortar: Mix dry-pack patching mortar, consisting of one part portland cement to two and one-half parts fine aggregate passing a No. 16 sieve, using only enough water for handling and placing.

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.

1. Immediately after form removal, cut out honeycombs, rock pockets, and voids more than 1/2 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 a 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 Engineer.

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.

1. Repair finished surfaces containing defects. Surface defects include spalls, popouts, honeycombs, rock pockets, crazing and cracks in excess of 0.01 inch wide or that penetrate to reinforcement or completely through unreinforced sections regardless of width, and other objectionable conditions.
2. After concrete has cured at least 14 days, correct high areas by grinding.
3. Correct localized low areas during or immediately after completing surface finishing operations by cutting out low areas and replacing with patching mortar. Finish repaired areas to blend into adjacent concrete.
4. Correct other low areas scheduled to receive floor coverings with a repair underlayment. Prepare, mix, and apply repair underlayment and primer according to manufacturer's written instructions to produce a smooth, 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 1/4 inch to match adjacent floor elevations. Prepare, mix, and apply repair topping and primer according to manufacturer's written instructions to produce a smooth, uniform, plane, and level surface.
6. Repair defective areas, except random cracks and single holes 1 inch or less in diameter, by cutting out and replacing with fresh concrete. Remove defective areas with clean,

square cuts and expose steel reinforcement with at least a 3/4-inch clearance all around. Dampen concrete surfaces in contact with patching concrete and apply bonding agent. Mix patching concrete of same materials and mixture as original concrete except without coarse aggregate. Place, compact, and finish to blend with adjacent finished concrete. Cure in same manner as adjacent concrete.

7. Repair random cracks and single holes 1 inch or less in diameter with patching mortar. Groove top of cracks and cut out holes to sound concrete and clean off dust, dirt, and loose particles. Dampen cleaned concrete surfaces and apply bonding agent. Place patching mortar before bonding agent has dried. Compact patching mortar and finish to match adjacent concrete. Keep patched area continuously moist for at least 72 hours.

E. Perform structural repairs of concrete, subject to Engineer's approval, using epoxy adhesive and patching mortar.

F. Repair materials and installation not specified above may be used, subject to Engineer's approval.

3.13 FIELD QUALITY CONTROL

A. Testing and Inspecting: Owner will engage an Inspector and qualified testing agency to perform field tests and inspections and prepare test reports.

B. Inspections:

1. Steel reinforcement placement.
2. Verification of use of required design mixture.
3. Concrete placement, including conveying and depositing.
4. Curing procedures and maintenance of curing temperature.

C. Concrete Tests: Testing of composite samples of fresh concrete obtained according to ASTM C 172 shall be performed according to the following requirements:

1. Testing Frequency: Obtain one composite sample for each day's pour of each concrete mixture exceeding 5 cu. yd., one set for each additional 50 cu. yd. or fraction thereof.
2. Slump: ASTM C 143; one test at point of placement for each composite sample, but not less than one test for each day's pour of each concrete mixture. Perform additional tests when concrete consistency appears to change.
3. Air Content: ASTM C 231, pressure method, for normal-weight concrete; one test for each composite sample, but not less than one test for each day's pour of each concrete mixture.
4. Concrete Temperature: ASTM C 1064; one test hourly when air temperature is 40 deg F and below and when 80 deg F and above, and one test for each composite sample.
5. Compression Test Specimens: ASTM C 31.

    a. Cast and laboratory cure four standard cylinder specimens for each composite sample.

6. Compressive-Strength Tests: ASTM C 39; test one laboratory-cured specimens at 7 days, two specimens at 28 days, and if concrete has not reached compressive strength by 28 days test one cylinder at 56 days.
7. 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 Engineer. Testing and inspecting agency may conduct tests to determine adequacy of concrete by cored cylinders complying with ASTM C 42or by other methods as directed by Engineer.
8. Additional testing and inspecting, at Contractor's expense, will be performed to determine compliance of replaced or additional work with specified requirements.
9. Correct deficiencies in the Work that test reports and inspections indicate dos not comply with the Contract Documents.

END OF SECTION 033000

OLD MINE PARK BRIDGE
Trumbull, CT
February 2012

SECTION 034100 - PLANT-PRECAST STRUCTURAL CONCRETE

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 plant-precast structural concrete units, including the following:

1. Solid precast bridge slabs.

1.3 PERFORMANCE REQUIREMENTS

A. Structural Performance: Provide precast structural concrete units and connections capable of withstanding design loads indicated on the drawings.

1.4 SUBMITTALS

A. Product Data: For each type of product indicated.

B. Design Mixes: For each concrete mix.

C. Shop Drawings: Detail fabrication and installation of precast structural concrete units. Indicate member locations, plans, elevations, dimensions, shapes, cross sections, openings, and types of reinforcement, including special reinforcement.

1. Detail loose and cast-in hardware, inserts, connections, and joints, including accessories.
2. Indicate locations and details of anchorage devices to be embedded in other construction.
3. Comprehensive engineering analysis signed and sealed by a qualified Professional Engineer licensed in the State of Connecticut responsible for its preparation.

D. Qualification Data: For firms and persons specified in "Quality Assurance" Article to demonstrate their capabilities and experience. Include lists of completed projects with project names and addresses, names and addresses of architects and owners, and other information specified.

E. Material Test Reports: From a qualified testing agency indicating and interpreting test results of the following for compliance with requirements indicated:

F. Material Certificates: Signed by manufacturers certifying that each of the following items complies with requirements:

1. Concrete materials.
2. Reinforcing materials and prestressing tendons.
3. Admixtures.
4. Bearing pads.

1.5 QUALITY ASSURANCE

A. Installer Qualifications: An experienced installer who has completed precast structural concrete work similar in material, design, and extent to that indicated for this Project and whose work has resulted in construction with a record of successful in-service performance.

B. Fabricator Qualifications: A firm that complies with the following requirements and is experienced in manufacturing precast structural concrete units similar to those indicated for this Project and with a record of successful in-service performance.

1. Assumes responsibility for engineering precast structural concrete units to comply with performance requirements. This responsibility includes preparation of Shop Drawings and comprehensive engineering analysis by a qualified professional engineer.
2. Professional Engineer Qualifications: A professional engineer licensed in the State of Connecticut and who is experienced in providing engineering services of the kind indicated. Engineering services are defined as those performed for installations of precast structural concrete that are similar to those indicated for this Project in material, design, and extent.
3. Participates in PCI's Plant Certification program and is designated a PCI-certified plant for Group C.
4. Has sufficient production capacity to produce required units without delaying the Work.

C. Design Standards: Comply with ACI 318-02 and the design recommendations of PCI MNL 120, "PCI Design Handbook--Precast and Prestressed Concrete."

D. Quality-Control Standard: For manufacturing procedures and testing requirements, quality-control recommendations, and camber and dimensional tolerances for types of units required, comply with PCI MNL 116, "Manual for Quality Control for Plants and Production of Precast and Prestressed Concrete Products."

1.6 DELIVERY, STORAGE, AND HANDLING

A. Deliver precast structural concrete units to Project site in such quantities and at such times to ensure continuity of installation. Store units at Project site to prevent cracking, distorting, warping, staining, or other physical damage, and so markings are visible.

B. Lift and support units only at designated lifting and supporting points as shown on Shop Drawings.

1.7 SEQUENCING

A. Furnish anchorage items to be embedded in other construction without delaying the Work. Provide setting diagrams, templates, instructions, and directions, as required, for installation.

PART 2 - PRODUCTS

2.1 MOLD MATERIALS

A. Molds: Provide molds and, where required, form-facing materials of metal, plastic, wood, or another material that is nonreactive with concrete and dimensionally stable to produce continuous and true precast concrete surfaces within fabrication tolerances and suitable for required finishes.

2.2 REINFORCING MATERIALS

A. Epoxy-Coated Reinforcing Bars: ASTM A 775 or ASTM A 934, as follows:

1. Steel Reinforcement: ASTM A 615, Grade 60, deformed.

B. Epoxy-Coated-Steel Wire: ASTM A 884, Class A coated.

C. Supports: Manufacturer's bolsters, chairs, spacers, and other devices for spacing, supporting, and fastening reinforcing bars and welded wire fabric in place according to CRSI's "Manual of Standard Practice," PCI MNL 116, and as follows:
1. For epoxy-coated reinforcement, use CRSI Class 1A epoxy-coated or other dielectric-polymer-coated wire bar supports.

2.3 PRESTRESSING TENDONS

A. Prestressing Strand: ASTM A 416, Grade 270, uncoated, 7-wire, low-relaxation strand.

2.4 CONCRETE MATERIALS

A. Portland Cement: ASTM C 150, Type I or Type III, of same type, brand, and source.

B. Normal-Weight Aggregates: Except as modified by PCI MNL 116, ASTM C 33.

C. Water: Potable; free from deleterious material that may affect color stability, setting, or strength of concrete and complying with chemical limits of PCI MNL 116.

D. Air-Entraining Admixture: ASTM C 260, certified by manufacturer to be compatible with other required admixtures.

E. Water-Reducing Admixture: ASTM C 494, Type A.

F. Retarding Admixture: ASTM C 494, Type B.

G. Water-Reducing and Retarding Admixture: ASTM C 494, Type D.

H. High-Range, Water-Reducing Admixture: ASTM C 494, Type F.

I. High-Range, Water-Reducing and Retarding Admixture: ASTM C 494, Type G.

J. Plasticizing Admixture: ASTM C 1017.

K. Fly Ash Admixture: ASTM C 618, Class C or F.

2.5 STEEL CONNECTION MATERIALS

A. Carbon-Steel Shapes and Plates: ASTM A 36/A 36M.

B. Carbon-Steel Headed Studs: ASTM A 108, AISI 1018 through AISI 1020, cold finished; AWS D1.1, Type A or B, with arc shields.

C. Carbon-Steel Bolts and Studs: ASTM A 307, Grade A; carbon-steel, hex-head bolts and studs; carbon-steel nuts; and flat, unhardened steel washers.

D. Finish: Apply zinc coating by hot-dip process according to ASTM A 123, after fabrication, and ASTM A 153, as applicable.

1. Galvanizing Repair Paint: High-zinc-dust-content paint with dry film containing not less than 94 percent zinc dust by weight, and complying with DOD-P-21035A or SSPC-Paint 20.

E. Welding Electrodes: Comply with AWS standards.

F. Accessories: Provide clips, hangers, plastic shims, and other accessories required to install precast structural concrete units.

2.6 BEARING PADS

A. Provide one of the following types of bearing pads for precast structural concrete units as follows:

1. Elastomeric Pads: AASHTO M 251, plain, vulcanized, 100 percent polychloroprene (neoprene) elastomer, molded to size or cut from a molded sheet, 50 to 70 Shore A durometer, minimum tensile strength 2250 psi per ASTM D 412.
2. Random-Oriented, Fiber-Reinforced Elastomeric Pads: Preformed, randomly oriented synthetic fibers set in elastomer. Surface hardness of 70 to 90 Shore A durometer.
3. Cotton-Duck-Fabric-Reinforced Elastomeric Pads: Preformed, horizontally layered cotton-duck fabric bonded to an elastomer. Surface hardness of 80 to 100 Shore A durometer.

4. Frictionless Pads: Tetrafluoroethylene, glass-fiber reinforced, bonded to mild-steel plate, of type required for in-service stress.
5. Hardboard: AHA A135.4, Class 1, tempered hardboard strips, smooth on both sides.
6. High-Density Plastic: Multimonomer, nonleaching, plastic strip.

2.7 GROUT MATERIALS

A. Sand-Cement Grout: Portland cement, ASTM C 150, Type I, and clean, natural sand, ASTM C 144. Mix at ratio of 1 part cement to 2-1/2 parts sand, by volume, with minimum water required for placement and hydration.

B. Nonmetallic, Nonshrink Grout: Premixed, nonmetallic, noncorrosive, nonstaining grout containing selected silica sands, portland cement, shrinkage-compensating agents, plasticizing and water-reducing agents, complying with ASTM C 1107, of consistency suitable for application.

C. Epoxy Grout: ASTM C 881, 2-component epoxy resin, of type, grade, and class to suit requirements.

2.8 CONCRETE MIXES

A. Prepare design mixes for each type of concrete required.

1. Limit use of fly ash or ground granulated blast furnace slag to not exceed, in aggregate, 25 percent of portland cement by weight.

B. Design mixes may be prepared by a qualified independent testing agency or by qualified precast plant personnel at precast structural concrete fabricator's option.

C. Calcium Chloride or admixtures containing calcium chloride shall not be used.

D. Normal-Weight Concrete: Proportion mixes by either laboratory trial batch or field test data methods according to ACI 211.1, with materials to be used on Project, to provide normal-weight concrete with the following properties:

1. Compressive Strength (28 Days): **5000 psi.**
2. Maximum Water-Cementitious Materials Ratio: 0.40.
3. Add air-entraining admixture at manufacturer's prescribed rate to result in normal-weight concrete at point of placement having an air content as follows, with a tolerance of plus or minus 1-1/2 percent:
   a. Air Content: 4 to 7 percent.

E. Other Admixtures: Use water-reducing, high-range water-reducing, water-reducing and accelerating, or water-reducing and retarding admixtures according to manufacturer's written instructions.

F. Concrete Mix Adjustments: Concrete mix design adjustments may be proposed if characteristics of materials, Project conditions, weather, test results, or other circumstances warrant.

2.9 FABRICATION

A. Formwork: Accurately construct forms, mortar tight, of sufficient strength to withstand pressures due to concrete-placement operations and temperature changes and for pretensioning and detensioning operations. Maintain formwork to provide completed precast concrete units of shapes, lines, and dimensions indicated, within fabrication tolerances.

1. Coat surfaces of forms with bond-breaking compound before reinforcement is placed. Provide commercial-formula, form-coating compounds that will not bond with, stain, or adversely affect concrete surfaces and that will not impair subsequent treatments of concrete surfaces requiring bond or adhesion. Apply in compliance with manufacturer's written instructions.
2. Unless forms for precast, prestressed concrete units are stripped before detensioning, design forms so stresses are not induced in precast concrete units because of deformation or movement of concrete during detensioning.

B. Built-in Anchorages: Accurately position built-in anchorage devices and secure to formwork. Locate anchorages where they do not affect position of main reinforcement or concrete placement. Do not relocate bearing plates in units unless approved by Architect.

C. Cast-in openings larger than 10 inches in diameter or 10 inches square according to Shop Drawings. Smaller holes may be field cut by trades requiring them, as approved by the Engineer.

D. Reinforcement: Comply with recommendations in CRSI's "Manual of Standard Practice" for fabricating, placing, and supporting reinforcement.

1. Clean reinforcement of loose rust and mill scale, earth, and other materials that reduce or destroy the bond with concrete.
2. Accurately position, support, and secure reinforcement against displacement by formwork, construction, or concrete-placement operations. Locate and support reinforcement by metal chairs, runners, bolsters, spacers, and hangers, as required.
3. Place reinforcement to obtain at least the minimum coverage for concrete protection. Arrange, space, and securely tie bars and bar supports to hold reinforcement in position while placing concrete. Set wire ties so ends are directed into concrete, not toward exposed concrete surfaces.

E. Prestress tendons for precast structural concrete units by either pretensioning or posttensioning methods. Comply with PCI MNL 116.

1. Delay detensioning until concrete has reached at least 70 percent of its compressive strength as established by test cylinders cured under the same conditions as concrete.
2. If concrete has been heat cured, detension while concrete is still warm and moist to avoid dimensional changes that may cause cracking or undesirable stresses.

3. Detension pretensioned tendons either by gradually releasing tensioning jacks or by heat-cutting tendons, using a sequence and pattern to prevent shock or unbalanced loading.

F. Mix concrete according to PCI MNL 116 and requirements in this Section. After concrete batching, no additional water may be added.

G. Place concrete in a continuous operation to prevent seams or planes of weakness from forming in precast concrete units. Comply with requirements in PCI MNL 116 for measuring, mixing, transporting, and placing concrete.

H. Thoroughly consolidate placed concrete by internal and external vibration without dislocating or damaging reinforcement and built-in items. Use equipment and procedures complying with PCI MNL 116.

I. Comply with ACI 306.1 procedures for cold-weather concrete placement.

J. Comply with ACI 305R recommendations for hot-weather concrete placement.

K. Identify pickup points of precast concrete units and orientation in structure with permanent markings, complying with markings indicated on Shop Drawings. Imprint casting date on each precast concrete unit on a surface that will not show in finished structure.

L. Cure concrete, according to requirements in PCI MNL 116, by moisture retention without heat or by accelerated heat curing using low-pressure live steam or radiant heat and moisture.

M. Product Tolerances: Fabricate precast structural concrete units straight and true to size and shape with exposed edges and corners precise and true so each finished unit complies with PCI MNL 116 product tolerances.

N. Finish formed surfaces of precast structural concrete as indicated for each type of unit, and as follows:

1. Standard Finish: Normal plant-run finish produced in forms that impart a smooth finish to concrete. Small surface holes caused by air bubbles, normal color variations, form joint marks, and minor chips and spalls will be tolerated. Major or unsightly imperfections, honeycombs, or structural defects are not permitted.

O. Rake finish unformed surfaces. Strike off and consolidate concrete with vibrating screeds to a uniform finish. Hand screed at projections.

P. Recess prestressing and post-tensioning tendons a minimum of 1/2 inch, fill recesses with grout, and apply a sack finish to vertical ends of precast concrete units.

2.10 SLAB UNITS

A. Type: Plant-fabricated, precast, prestressed concrete solid slabs.

B. Furnish units free of voids and honeycombs.

C. Provide standard finish to precast concrete units, unless otherwise indicated.

1. Rake top finish of precast concrete units.

D. Reinforce units to resist transportation and erection stresses.

E. Include cast-in items where required.

F. Coordinate with other trades for installation of cast-in items.

2.11 SOURCE QUALITY CONTROL

A. Fabricator will employ an independent testing agency to evaluate precast structural concrete fabricator's quality-control and testing methods.

B. Quality-Control Testing: Test and inspect precast concrete according to PCI MNL 116 requirements.

C. Strength of precast concrete units will be considered deficient if units fail to comply with PCI MNL 116 requirements, including the following:

1. Units fail to comply with compressive-strength test requirements.
2. Reinforcement and prestressed tendons of units do not comply with fabrication requirements.
3. Concrete curing and protection of units against extremes in temperature fail to comply with requirements.
4. Units are damaged during handling and erecting.

D. Testing: If there is evidence that the strength of precast concrete units may be deficient or may not comply with PCI MNL 116 requirements, Owner will employ an independent testing agency to obtain, prepare, and test cores drilled from hardened concrete to determine compressive strength according to ASTM C 42.

1. A minimum of three representative cores will be taken from units of suspect strength, from locations directed by Architect.
2. Cores will be tested, after immersion in water, in a wet condition per ACI 301 if units will be wet under service conditions.
3. Cores will be tested in an air-dry condition per ACI 301 if units will be dry under service conditions.
4. Strength of concrete for each series of 3 cores will be considered satisfactory if the average compressive strength is equal to at least 85 percent of the 28-day design compressive strength and no single core is less than 75 percent of the 28-day design compressive strength.
5. Test results will be made in writing on the same day that tests are performed, with copies to Engineer and Owner. Test reports will include the following:

a. Project identification name and number.
b. Date when tests were performed.
c. Name of precast concrete fabricator.

d. Name of concrete testing agency.
e. Identification letter, name, and type of precast concrete unit or units represented by core tests; design compressive strength; type of break; compressive strength at break, corrected for length-diameter ratio; and direction of applied load to core in relation to horizontal plane of concrete as placed.

E. Patching: If core test results are satisfactory and precast concrete units comply with requirements, clean and dampen core holes and solidly fill with precast concrete mix that has no coarse aggregate, and finish to match adjacent precast concrete surfaces.

F. Dimensional Tolerances: Units with dimensions smaller or larger than required and not complying with tolerance limits may be subject to additional testing.

1. Precast concrete units with dimensions larger than required will be rejected if the appearance or function of the structure is adversely affected or if larger dimensions interfere with other construction. Repair or remove and replace rejected units, as required, to comply with construction conditions.

G. Defective Work: Precast concrete units that do not comply with requirements, including strength, manufacturing tolerances, and finishes, are unacceptable. Replace with precast concrete units that comply with requirements.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates and conditions for compliance with requirements for installation tolerances, true and level bearing surfaces, and other conditions affecting performance. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

A. Bearing Pads: Install bearing pads as precast concrete units are being erected. Set pads on true, level, and uniform bearing surfaces and maintain in correct position until precast concrete units are placed.

B. Install precast structural concrete. Shore and brace precast concrete units to maintain location, stability, and alignment until permanent connections are installed.

C. Fasteners: Do not use drilled or powder-actuated fasteners for attaching accessory items to precast, prestressed concrete units unless approved by the Engineer.

D. Erection Tolerances: PCI MNL 127, "Recommended Practice for Erection of Precast Concrete."

E. Grouting Connections and Joints: After precast concrete units have been placed and secured, grout open spaces at keyways, connections, and joints as follows:

1. Provide forms or other approved method to retain grout in place until hard enough to support itself. Pack spaces with stiff grout material, tamping until voids are completely filled. Place grout to finish smooth, level, and plumb with adjacent concrete surfaces. Keep grouted joints damp for not less than 24 hours after initial set. Promptly remove grout material from exposed surfaces before it hardens.

3.3 FIELD QUALITY CONTROL

A. Testing and Inspecting: Owner will engage an Inspector and qualified testing agency to perform field tests and inspections and prepare test reports.

B. Inspections:
   1. Field welds
   2. Field connections
   3. Post-tensioning installation.

3.4 CLEANING

A. Clean exposed surfaces of precast concrete units after erection to remove weld marks, other markings, dirt, and stains.

   1. Wash and rinse according to precast concrete fabricator's written recommendations. Protect other work from staining or damage due to cleaning operations.
   2. Do not use cleaning materials or processes that could change the appearance of exposed concrete finishes.

END OF SECTION 034100

OLD MINE PARK BRIDGE
Trumbull, CT
February 2012

SECTION 051200 - STRUCTURAL STEEL

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 SUBMITTALS

A. Product Data: For each type of product indicated.

1. Steel primer paint.
2. Tension-control bolts.

B. Shop Drawings: shop drawings, erection plans, and anchor bolt plans shall be submitted for review in accordance with the contract documents. Submit four prints. Review shall be for general compliance with the Contract Documents. The Contractor shall be solely responsible for the accuracy of dimensions indicated on shop drawings.

1. Shop drawings shall show details of construction, connections, gauges, thickness and sizes of all members. Welding symbols, as recommended by the American Welding Society, shall be used where welds occur.
2. Submit erection plans and shop standard connection details prior to submitting beam or column details.
3. No beam details will be checked for approval unless accompanied by erection plans which show the location of all beams.
4. The design of simple shear connections not indicated on the design drawings shall be completed by the fabricator. Such design shall conform to AISC *"Allowable Stress Design of Simple Shear Connections."* Shop drawings shall indicate the connection design reactions and actual connection capacities. Shop drawings should also indicate the method used to calculate connection capacity, such as referencing the specific design table or computer program.
5. Any fabrication of structural members by the Contractor before receipt of the approved shop and erection drawings shall be at the Contractor's risk.
6. The omission of any material from the shop drawings that is shown on the Contract Drawings or called for in the Specifications, shall not relieve the Contractor from the furnishing of such material even though the Engineer approved the shop drawings.
7. Resubmitted shop drawings shall have revisions clouded.
8. It shall not be incumbent on the Engineer to discover any errors, omissions, faulty details, or deviations on the drawings submitted by the Contractor. The Engineer's approval of the Contractor's drawings shall not relieve the Contractor from the responsibility for unauthorized changes, deviation, omissions or for errors of any sort in his drawings, nor shall it relieve him from the sole responsibility for the corrections of fit or strength of details.

C. Welding certificates: submit certification that Welders to be employed in the work have satisfactorily passed AWS qualification tests within the previous 12 months.

D. Mill Test Reports: Signed by manufacturers certifying that the following products comply with requirements:

1. Submit ladle analysis and reports of tensile properties and bend tests for all wide-flange shapes.
2. High-strength bolt certifications: submit certification that high-strength bolts, nuts and washers comply with the requirements of ASTM A325 and provide manufacturer's mill test reports. Certification numbers must appear on the product containers and correspond to identification numbers on mill test reports. Manufacturer's symbol and grade marking must appear on all bolts and nuts.

1.3 QUALITY ASSURANCE

A. Installer Qualifications: A qualified installer who participates in the AISC Quality Certification Program and is designated an AISC-Certified Erector, Category CSE.

B. Fabricator Qualifications: A qualified fabricator who participates in the AISC Quality Certification Program and is designated an AISC-Certified Plant, Category Sbd.

C. Welding: Qualify procedures and personnel according to AWS D1.1, "Structural Welding Code--Steel."

D. Comply with applicable provisions of the following specifications and documents:

1. AISC's "Code of Standard Practice for Steel Buildings and Bridges."
2. RCSC's "Specification for Structural Joints Using ASTM A 325 or A 490 Bolts."

1.4 DELIVERY, STORAGE, AND HANDLING

A. Deliver materials to site at such intervals to insure uninterrupted progress of the work. Deliver anchor bolts and anchorage devices, which are to be embedded in cast-in-place concrete or masonry, in ample time to not delay that work.

B. Store materials to permit easy access for inspection and identification. Keep steel members off ground and spaced by using pallets, sleepers, or other supports and spacers. Protect steel members and packaged materials from corrosion and deterioration.

1. Bolts shall be stored in weather tight enclosures. Clean and lubricate 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.

3. Welding electrodes shall be stored in unopened, sealed containers or drying ovens until the day they are used.

PART 2 - PRODUCTS

2.1 STRUCTURAL-STEEL MATERIALS

A. W-Shapes: ASTM A 992/A 992M.

B. Channels, Angles-Shapes: ASTM A 36/A 36M.

C. Plate and Bar: ASTM A 36/A 36M.

D. Cold-Formed Hollow Structural Sections: ASTM A 500, Grade B, structural tubing.

E. All steel shall be hot dip galvanized after fabrication.

2.2 BOLTS, CONNECTORS, AND ANCHORS

A. Tension-Control, High-Strength Bolt-Nut-Washer Assemblies: ASTM A325 and ASTM F 1852, Type 1, round head steel structural bolts with splined ends; ASTM A 563 heavy hex carbon-steel nuts; and ASTM F 436 hardened carbon-steel washers.

B. Unheaded Anchor Rods: ASTM F 1554, Grade 36.

1. Configuration: Hooked.
2. Nuts: ASTM A 563.
3. Plate Washers: ASTM A 36/A 36M carbon steel.
4. Washers: ASTM F 436 hardened carbon steel.

2.3 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"

1. Camber structural-steel members where indicated. If heat is used to camber beams, do not heat steel above 1100 degrees F. Allow steel to cool slowly do not quench steel with water
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.
4. Complete structural-steel assemblies, including welding of units, before starting shop-priming operations.

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.

C. Bolt Holes: drill, or punch standard bolt holes perpendicular to metal surfaces. Flame cut bolt holes, or holes enlarged by flame cutting are not acceptable.

D. Finishing: Accurately finish ends of columns and other members transmitting bearing loads.

E. Splicing of members will not be permitted except where approved by the engineer.

2.4 CONNECTIONS

A. Do not use one-sided or eccentric connections where two-sided or concentric connections can be used except where indicated on the drawings.

B. Design the connections to resist reactions, moments and stresses indicated on the drawings or that can be reasonably inferred from the information shown.

C. For members requiring accurate alignment provide slotted holes for horizontal adjustment and shims for vertical adjustment of at least 3/8 inch in each direction, or more where required.

D. Where field bolts are common to two connections, erection seats shall be provided.

2.5 HIGH-STENGTH BOLTING

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.

B. All bolts shall be 3/4" diameter Tension-Control bolts. Bolts shall be fully tightened. Snug tight bolts are not permitted.

C. All bolts shall be hot dip galvanized.

D. Bolt holes shall be 1/16" larger than bolt diameter. Short slotted holes may be used, perpendicular to direction of load.

E. When assembled, all joint surfaces, including those adjacent to the bolt heads, nuts or washers, shall be free of scale, except tight mill scale, and shall also be free of burrs, dirt, and other foreign material that would prevent solid seating of the parts. Paint is permitted except for slip critical bolts.

F. A hardened washer shall be used under the nut and over short slotted holes in an outer ply.

G. Use beveled washers where the slope of surfaces of bolted parts in contact with the bolt head and nut exceed 1:20 with respect to a plane normal to the bolt axis.

H. Bolts shall not be reused after tightening.

I. Bolts shall be tightened in a sequence which will minimize the relaxation of previously tightened bolts. All bolts in a connection shall be first tightened to a snug tight condition. All

bolt shall then be tightened, progressing systematically from the most rigid part of the connection to the free edges.

J. Bolts shall be kept clean and dry prior to installation.

2.6 WELDING

A. Operators shall be certified per AWS Standard Qualification Procedure.

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.

C. Equipment shall provide proper current to produce satisfactory welds.

D. Welding Electrodes: ASTM A233, E70xx series. Electrodes shall be suitable for positions and other conditions of use per manufacturer's instructions.

E. Minimum fillet weld size - 1/4 inch.

F. Sequence of welding shall minimize distortion and shrinkage stresses.

G. No field welding shall be done when the temperature is less then 20 degrees F. At temperatures below 35 degrees F, preheat area within 3" of weld to warm to the touch with a rosebud torch. Do not use a burning torch for preheating. Provide wind shields when required.

H. The minimum length of any segment of an intermittent fillet weld shall be 2 inches. The maximum spacing of segments of weld shall be 8 inches on-center.

I. Slag shall be removed from all welds.

J. Groove welds shall have backer bars and runoff tabs to carry weld 3/4" beyond edge of base metal. Remove backing bars, back gouge, and reinforce moment connection bottom flange welds.

2.7 GALVANIZING

A. Hot-Dip Galvanized Finish: Apply zinc coating by the hot-dip process to all structural steel according to ASTM A 123/ A 123M.

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.

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 ANCHOR RODS

A. Furnish anchor rods and other connectors required for securing structural steel to foundations and other in place work.

B. Furnish an anchor rod setting plan which shows the exact location of all anchor bolts and other structural steel elements which are to be embedded in concrete or masonry prior to structural steel erection.

C. The erector shall verify the correct locations of all anchors before commencing erection of structural steel.

D. Anchor rods are engineered to anchor the completed structure to the foundation and may not be adequate for load conditions encountered during steel erection. The Contractor is responsible for all guy wires and temporary bracing required to maintain the stability of the structure during erection. Verification of adequacy of anchor rods and foundations to resist erection induced forces is soley the responsibility of the steel erector.

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".

B. Leveling and Bearing Plates: Clean concrete- and masonry-bearing surfaces of bond-reducing materials, and roughen surfaces prior to setting leveling and bearing plates.

1. Weld plate washers to top of base plate.
2. Snug-tighten anchor rods after supported members have been positioned and plumbed.
3. Set leveling plates and bearing plates on non-shrink grout.

C. 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 the structure to an accuracy of 1 to 500, but not to exceed 1/2" in the full height of column.

2. Make allowances for difference between temperature at time of erection and mean temperature when structure is completed and in service.

D. Splice members only where indicated.

E. Do not use gas cutting torches in the field for correcting fabrication errors in the structural framing. Flame cutting will be permitted only when approved by the Engineer

F. Any bolt holes needed in the field shall be made with a magnetic drill. Holes may not be burned.

G. Do not enlarge unfair holes in members by burning or using drift pins. Ream holes that must be enlarged to admit bolts.

3.4 INSPECTIONS AND TESTING

A. Owner will engage an Inspector and testing agency to inspect and test structural steel work in the shop and in the field.

B. Shop Inspection:

1. The inspector shall verify that the fabricator maintains detailed fabrication and quality control procedures and that these procedures are properly implemented. AISC certified shops are exempt from this inspection item.
2. The individual structural steel members shall be inspected to verify that they are being fabricated in conformance with the structural drawings and approved shop drawings, and that the quality of the workmanship is acceptable.
3. The fabricator shall be responsible for notifying the Special Inspector when fabrication has been started so that the shop inspections may be scheduled. The fabricator shall provide access for the inspector to the fabricating shop.

C. Welding Inspection:

1. The inspector shall verify that all welders have been certified in accordance AWS standard qualification procedures.
2. All welds shall be visually inspected for defects.
3. Any welds which do not pass the visual inspection shall be tested. The Contractor shall pay the cost of testing.
4. All unacceptable welds shall be ground down and rewelded, or reinforced at the direction of the engineer.

D. Weld Testing:

1. All full penetration welds shall be ultrasonic tested in accordance with ASTM E164.
2. Fillet welds shall be magnetic particle tested in accordance with ASTM E109 when directed by the Special Inspector.

E. High-strength bolt installation will be inspected for proper tightening and for spline separation.

F. Correct deficiencies in Work that test reports and inspections indicate does not comply with the Contract Documents.

3.5 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.

END OF SECTION 05120

OLD MINE PARK BRIDGE
Trumbull, CT
February 2012

SECTION 055300 - GRATINGS

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 the following:

1. Metal bar gratings.

1.3 SUBMITTALS

A. Product Data: For the following:

1. Formed-metal plank gratings.
2. Clips and anchorage devices for gratings.

B. Shop Drawings: Include plans, elevations, sections, details, and attachments to other work.

1. Provide templates for anchors and bolts specified for installation under other Sections.
2. For installed products indicated to comply with design loads, include structural analysis data signed and sealed by the qualified professional engineer responsible for their preparation.

C. Mill Certificates: Signed by manufacturers of stainless-steel sheet certifying that products furnished comply with requirements.

D. Welding certificates.

E. Qualification Data: For professional engineer.

1.4 QUALITY ASSURANCE

A. Metal Bar Grating Standards: Comply with NAAMM MBG 531, "Metal Bar Grating Manual."

B. Welding: Qualify procedures and personnel according to the following:

1. AWS D1.1, "Structural Welding Code--Steel."

1.5 PROJECT CONDITIONS

A. Field Measurements: Verify actual locations of walls and other construction contiguous with gratings by field measurements before fabrication and indicate measurements on Shop Drawings.

1. Established Dimensions: Where field measurements cannot be made without delaying the Work, establish dimensions and proceed with fabricating gratings without field measurements. Coordinate wall and other contiguous construction to ensure that actual dimensions correspond to established dimensions.
2. Provide allowance for trimming and fitting at site.

1.6 COORDINATION

A. Coordinate installation of anchorages for gratings, grating frames, and supports. 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.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Metal Bar Gratings:

a. Alabama Metal Industries Corporation.
b. All American Grating, Inc.
c. Barnett/Bates Corp.
d. Borden Metal Products (Canada) Limited.
e. Fisher & Ludlow.
f. Grupo Metelmex, S.A. de C.V.
g. IKG Industries; a Harsco Company.
h. Marwas Steel Co.; Laurel Steel Products Division.
i. Ohio Gratings, Inc.
j. Seidelhuber Metal Products, Inc.
k. Tru-Weld.

2.2 FERROUS METALS

A. Steel Plates, Shapes, and Bars: ASTM A 36/A 36M.

2.3 FASTENERS

A. General: Unless otherwise indicated, provide hot dip galvanized or Type 316 stainless-steel fasteners for exterior use. Select fasteners for type, grade, and class required.

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. Plain Washers: Round, ASME B18.22..

D. Lock Washers: Helical, spring type, ASME B18.21.1.

E. Anchors: Provide anchors with capability to sustain, without failure, a load equal to six times the load imposed when installed in unit masonry and equal to four times the load imposed when installed in concrete, as determined by testing per ASTM E 488 conducted by a qualified independent testing agency.

2.4 MISCELLANEOUS MATERIALS

A. Welding Rods and Bare Electrodes: Select according to AWS specifications for metal alloy that is welded.

B. Galvanizing Repair Paint: High-zinc-dust-content paint for regalvanizing welds in steel, complying with SSPC-Paint 20.

2.5 FABRICATION

A. Shop Assembly: Fabricate grating sections in shop to greatest extent possible to minimize field splicing and assembly. Disassemble units only as necessary for shipping and handling limitations. Use connections that maintain structural value of joined pieces. Clearly mark units for reassembly and coordinated installation.

B. Cut, drill, and punch material 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.

C. Form from materials of size, thickness, and shapes indicated, but not less than that needed to support indicated loads.

D. Fit exposed connections accurately together to form hairline joints.

E. Welding: Comply with AWS recommendations and the following:

1. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.
2. Obtain fusion without undercut or overlap.
3. Remove welding flux immediately.

F. Provide for anchorage of type indicated; coordinate with supporting structure. Fabricate and space the anchoring devices to secure gratings, frames, and supports rigidly in place and to support indicated loads.

2.6 METAL BAR GRATINGS

A. Welded Steel Grating
   1. Grating Mark W-19-4 (1-1/4 x 3/16) STEEL: 1-1/4-by-3/16-inch bearing bars at 1-3/16 inches o.c., and crossbars at 4 inches o.c.
   2. Traffic Surface: Plain.
   3. Steel Finish: Hot-dip galvanized with a coating weight of not less than 1.8 oz./sq. ft. of coated surface.

B. Removable Grating Sections: Fabricate with banding bars attached by welding to entire perimeter of each section. Include anchors and fasteners of type indicated or, if not indicated, as recommended by manufacturer for attaching to supports.
   1. Provide not less than 4 saddle clips for each grating section composed of rectangular bearing bars 3/16 inch or less in thickness and spaced 15/16 inch or more o.c., with each clip designed and fabricated to fit over 2 bearing bars.
   2. Furnish threaded bolts with nuts and washers for securing grating to supports.
   3. Furnish galvanized malleable-iron flange clamp with galvanized bolt for securing grating to supports. Furnish as a system designed to be installed from above grating by one person.
      a. Product: Subject to compliance with requirements, provide "Grate-Fast" by Lindapter North America, Inc.

C. Do not notch bearing bars at supports to maintain elevation.

2.7 STEEL FINISHES

A. Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.

B. Finish gratings, frames, and supports after assembly.

C. Galvanizing: For those items indicated for galvanizing, apply zinc coating by the hot-dip process complying with ASTM A 123.

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

A. Fastening to In-Place Construction: Provide anchorage devices and fasteners where necessary for securing gratings to in-place construction. Include threaded fasteners for concrete and masonry inserts, through-bolts, lag bolts, and other connectors.

B. Cutting, Fitting, and Placement: Perform cutting, drilling, and fitting required for installing gratings. Set units accurately in location, alignment, and elevation; measured from established lines and levels and free of rack.

C. Fit exposed connections accurately together to form hairline joints.

1. Weld connections that are not to be left as exposed joints but cannot be shop welded because of shipping size limitations. Do not weld, cut, or abrade the surfaces of exterior units that have been hot-dip galvanized after fabrication and are for bolted or screwed field connections.

D. Field Welding: Comply with the following requirements:

1. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.
2. Obtain fusion without undercut or overlap.
3. Remove welding flux immediately.

3.2 INSTALLING METAL BAR GRATINGS

A. General: Install gratings to comply with recommendations of referenced metal bar grating standards that apply to grating types and bar sizes indicated, including installation clearances and standard anchoring details.

B. Attach removable units to supporting members with type and size of clips and fasteners indicated or, if not indicated, as recommended by grating manufacturer for type of installation conditions shown.

3.3 ADJUSTING AND CLEANING

A. Galvanized Surfaces: Clean field welds, bolted connections, and abraded areas and repair galvanizing to comply with ASTM A 780.

END OF SECTION 055300

OLD MINE PARK BRIDGE
Trumbull, CT
February 2012

SECTION 06100 – TIMBER GUARDRAILS

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 DELIVERY, STORAGE, AND HANDLING

A. Stack lumber flat with spacers between each bundle to provide air circulation. Provide for air circulation around stacks and under coverings.

PART 2 - PRODUCTS

2.1 GENERAL

A. Lumber Standards: Manufacture lumber to comply with PS 20 "American Softwood Lumber Standard" and with applicable grading rules of inspection agencies certified by American Lumber Standards Committee's (ALSC) Board of Review.

B. Grade Stamps: Factory-mark each piece of lumber with grade stamp of inspection agency evidencing compliance with grading rule requirements and identifying grading agency, grade, species, moisture content at time of surfacing, and mill.

C. Provide dressed lumber, S4S, unless otherwise indicated.

D. Provide lumber with 19% maximum moisture content at time of enclosure for sizes 2" or less in nominal thickness, unless otherwise indicated

2.2 WOOD-PRESERVATIVE-TREATED LUMBER

A. Preservative Treatment by Pressure Process:
   1. AWPA C2.
      a. Preservative Chemicals: CCA.
      b. Retention: 0.6 PCF
      c. Lumber: southern pine #2 or better.

B. Mark lumber with treatment quality mark of an inspection agency approved by the ALSC Board of Review.

C. Application: Treat items indicated on Drawings, and the following:

1. Wood guard rails.

2.3 FASTENERS

A. General: Provide fasteners of size and type indicated that comply with requirements specified in this Article for material and manufacture.

1. Where rough carpentry is exposed to weather, in ground contact, pressure-preservative treated, or in area of high relative humidity, provide fasteners of Type 316 stainless steel or hot dip galvanized.

B. Nails, Brads, and Staples: ASTM F 1667.

C. Power-Driven Fasteners: NES NER-272.

D. Wood Screws: ASME B18.6.1.

E. Lag Bolts: ASME B18.2.1.

F. Bolts: Steel bolts complying with ASTM A 307, Grade A; with ASTM A 563 hex nuts and, where indicated, flat washers.

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

A. Set guardrails to required levels and lines, with members plumb, true to line, cut, and fitted. Fit to other construction; scribe and cope as needed for accurate fit. Install fasteners as indicated on the drawings. Sand sharp edges and cut ends of timbers. Cut ends of timbers shall be treated with 3 coats of copper based wood preservative in accordance with AWPA Standard M4.

END OF SECTION 061000