Olmsted Parks Conservancy

Tyler Park Stage

Louisville KY

Project Specifications

OLMSTED PARKS CONSERVANCY

October 23, 2023

Project Specifications

for

Olmsted Parks Conservancy –

Tyler Park Stage

Schmidt Project No. 2023-047.TPS

Prepared For:

Olmsted Parks Conservancy
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Louisville, KY 40213
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October 23, 2023

OLMSTED PARKS CONSERVANCY

Tyler Park Stage
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REQUEST FOR COMPETITIVE SEALED BIDS

SECTION I

INSTRUCTIONS TO BIDDERS

A. Olmsted Parks Conservancy is now accepting Bids for Construction Services for the Tyler Park Music Stage Construction Project.

1. The process of accepting Bids and choosing the successful Bidder shall be by competitive bidding.
2. The Olmsted Parks Conservancy, if it chooses to award a contract based on this Bid, shall do so based on contractor bid price and contractor qualifications and experience. Refer to bid evaluation process Section VI.

B. Bid Submittal Requirements

1. All Bids must be signed by a duly authorized officer, agent or employee of the Bidder (See the "Bidder Information and Bid Signature Page" at section III). Bidder promises that the individual signing the Bid document for the Bidder has the authority to bind the Bidder.

2. Electronic bid submissions will be accepted from Contractors.

   Email bids to:

   Major.waltman@olmstedparks.org

   Bids are due by 5PM November 23, 2023

3. Any inquiries about this Bid after the opening date shall be addressed via email to:

   Major Waltman
   Project Director -Olmsted Parks Conservancy
   Major.Waltman@olmstedparks.org
   502-338-4913

4. Bidder Questions and Inquiries: Bidders who have questions and inquiries concerning this Bid prior to the bid opening may contact:

   Major Waltman
   Project Director -Olmsted Parks Conservancy
   502-338-4913
   Major.Waltman@olmstedparks.org

5. Changes, Clarifications, Errors, Addenda:
   a. If a Bidder discovers any ambiguity, conflict, discrepancy, omission or other error in the Bid, Bidder shall immediately notify Olmsted Parks Conservancy of the error in writing and request modification or clarification of the document. Should a prospective Bidder find a discrepancy in or

omissions from the specifications, or be unclear as to what the specifications mean, the Bidder shall notify the Olmsted Parks Conservancy in writing. The Director will send written clarifications to all prospective Bidders. Bidder agrees that the Olmsted Parks Conservancy will not be responsible for any oral instructions.

b. Clarification of Submittal: The Olmsted Parks Conservancy may obtain clarification or additional information from a Bidder.
c. Changes/Alterations: Bidder may change or withdraw its Bid at any time prior to Bid opening. Only written requests for changes of a previously submitted Bid, received by The Olmsted Parks Conservancy prior to the scheduled deadline for receipt of Bids, will be accepted. The Bidder must put the written request in a sealed envelope which is plainly marked "modification of Bid". The Bid, when opened, will then be corrected in accordance with the written request.
d. The Bidder must respond as required in this Bid; failure to make any required response or provide required information may cause rejection of the Bid as nonresponsive. Bidder must submit its Bid in the same order of pages in which the Olmsted Parks Conservancy published the Bid. Any notes and comments may be made on an attachment.
e. Once this Bid has been signed and received by the Purchasing Department of the Olmsted Parks Conservancy, Bidder will not be allowed to alter or withdraw its Bid except with the written permission of the Director of Purchasing.
f. Addenda: The Olmsted Parks Conservancy may issue an addendum, or addenda, changing some aspect of the Bid. All addenda, if any, shall be considered in making the Bid, and such addenda shall be made a part of this Bid. Before submitting a Bid, it is incumbent upon each Bidder to be informed as to whether any addenda have been issued, and the failure to cover in the Bid any such addenda may result in disqualification of that Bid.

6. Additional Information: While not necessary, the Bidder may include any product brochures, software documentation, sample reports, or other documentation that may assist Olmsted Parks Conservancy in better understanding and evaluating the Bidder's Bid. Additional documentation shall not serve as a substitute for other documentation which is required to be submitted. Bidder shall provide samples if the Bid so requires.

7. Plans and specifications may be ordered from:

Lynn Imaging
11460 Bluegrass Parkway
Louisville, KY 40299
(502) 499-8400

There will be a charge for the plans and specifications. When ordering the plans check with Lynn Imaging for the exact cost. Out-of-town vendors shall make arrangements with Lynn Imaging to have the plans and specifications shipped for an additional charge. Plans and specifications may not be obtained from Olmsted Parks Conservancy.

8. The Olmsted Parks Conservancy shall not permit a Bidder to withdraw its Bid for sixty days after Bids are opened unless the Olmsted Parks Conservancy makes a specific exception in writing.
9. Olmsted Parks Conservancy shall not be responsible for any cost incurred by the Bidder in the preparation of its Bid.
10. When the Bidder signs its Bid and submits it to the Olmsted Parks Conservancy for consideration of award, the Bidder agrees that it is offering to enter into a contract with the Olmsted Parks Conservancy subject to all the conditions herein, without exception. If the Olmsted Parks Conservancy decides to accept the Bidder's offer, the Bidder agrees that the Olmsted Parks Conservancy creates a contract by signing the Bidder Information and Bid Signature Page contained in this Bid. Bidder agrees that the contract shall contain all of the conditions herein. **Bidder agrees that nothing in this Bid is negotiable.** "Condition", as used here, means, but is not limited to meaning, requirements, terms, obligations, duties, specifications, etc. If the Bidder attempts to change any of the conditions in this Bid, whether in its Bid response or otherwise, the Olmsted Parks Conservancy shall reject Bidder's Bid as nonresponsive. If Bidder considers any condition herein unacceptable to it, Bidder should not submit a Bid.
    a. If Bidder submits any document which purports to be contractual, the Olmsted Parks Conservancy shall reject the Bid as nonresponsive. If Bidder submits any such document after the contract has been executed, Bidder agrees that the Olmsted Parks Conservancy may terminate that contract for cause immediately.
11. If the award is divided among or between vendors, written notification will be given to each vendor of the specific items covered on their respective contracts.

C. Pre-Bid Meeting

Pre-bid meeting will be held at Tyler Park on the west side of the park. The pre-bid meeting will be held at 9:00AM on November 9, 2023.

SECTION II

GENERAL PROVISIONS

2.1 Payment terms shall be Net 30 days.

2.2 Pricing:

A. Bid prices shall be firm for six (6) months after the Bid opening date.
B. Project-Specific Contracts:
C. Pricing shall not change for the duration of the contract, including all renewals.
D. Time discounts or cash discounts will not be considered in Bid evaluation.
E. Prices for any Bid item shall not be contingent upon the purchase of any other Bid item.
F. Bidder should show unit prices and extended prices (unit prices multiplied by the number of units proposed to be purchased).
G. If this Bid is for a stated number of items, the Olmsted Parks Conservancy may request that the bidder extend the offered bid pricing to a future purchase or purchases, for up to one year after the date a contract under this Bid has been executed. If the Bidder agrees to extend the pricing, the Olmsted Parks Conservancy may purchase those items by issuing an additional Purchase Order or Orders, as the case may be.

2.3 Special Conditions for Construction Contracts:

A. All Bidders are required to visit job site to completely familiarize themselves with all existing conditions, measurements, etc., and be responsible for same.
B. Bonds (Applicable for Construction Contracts)

1. For construction projects awarded with a value of more than $25,000.00, Bidder must furnish the following bonds when it submits its Bid:
   a. Bid Bond:

      1. Bidder is required to furnish a Bid Bond in an amount of not less than five percent (5%) of its base Bid. This may be in the form of a Bid Bond, Certified Check or Cashier's Check. No personal checks will be accepted. The Bid Bond shall be supplied at the time of the Bid opening.
      2. Bidder's security shall be a bond provided by a surety company authorized to do business in Kentucky.

   b. Performance Bond:

      1. The successful Bidder must submit a performance bond satisfactory to the Olmsted Parks Conservancy executed by a surety company authorized to do business in Kentucky, or otherwise supplied, satisfactory to the Olmsted Parks Conservancy, in an amount equal to one hundred percent (100%) of the contract price as it may be increased.

   c. Payment Bond:

      1. The successful Bidder must submit a payment bond satisfactory to the Olmsted Parks Conservancy, executed by a surety company authorized to do business in Kentucky, or otherwise supplied, satisfactory to the Olmsted Parks Conservancy,

for the protection of all persons supplying labor and material to the Bidder or its subcontractors for the performance of the work provided for in this Bid. The bond shall be in an amount equal to one hundred percent (100%) of the original contract price.

2.4 The Bidder agrees to comply with all statutes, rules, and regulations governing safe and healthful working conditions, including the Occupational Health and Safety Act of 1970, *29 U.S.C. 650 et.seq.*, as amended, and KRS Chapter 338. The Bidder will provide training documentation for all standards applicable to the job being bid. Necessary trainings would include, but are not limited to, remediation, abatement, powered industrial truck equipment brought on site by bidder, SDS for all chemicals brought to site by bidder, confined space, fall protection, or any other trainings required by an afore mentioned standard under the scope of work being bid. The Bidder also agrees to notify the Olmsted Parks Conservancy in writing immediately upon detection of any unsafe and/or unhealthful working conditions on Olmsted Parks Conservancy property. Bidder agrees to indemnify, defend and hold the Olmsted Parks Conservancy harmless from all penalties, fines or other expenses arising out of the alleged violation of said laws.

2.5 Bidder shall maintain during the course of the work, and retain not less than five years from the date of final payment on the contract, complete and accurate records of all of Bidder's costs which are chargeable to the Olmsted Parks Conservancy under this Agreement; and the Olmsted Parks Conservancy shall have the right, at any reasonable time, to inspect and audit those records by authorized representatives of its own or of any public accounting firm selected by it. The records to be thus maintained and retained by Bidder shall include (without limitation): (a) payroll records accounting for total time distribution of Bidder's employees working full or part time on the work (to permit tracing to payrolls and related tax returns), as well as canceled payroll checks, or signed receipts for payroll payments in cash; (b) invoices for purchases receiving and issuing documents, and all the other unit inventory records for Bidder's stores stock or capital items; and (c) paid invoices and canceled checks for materials purchased and for subcontractors' and any other third parties' charges.

2.6 It shall be allowed for a secondary or lower ranking contract to be used if the primary contractor is unable to perform. However, the primary contractor shall be given the first opportunity to provide the services required. Contracts shall be utilized in the order stated in the award.

2.7 Entire Agreement: A contract executed under this Bid shall constitute the entire agreement and understanding of the parties with respect to the subject matter set forth herein and that contract supersedes any and all prior and contemporaneous oral or written agreements or understandings between the parties relative thereto. No representation, promise, inducement, or statement of intention has been made by the parties which will not be embodied in that contract. The contract cannot be amended, modified, or supplemented in any respect except by a subsequent written agreement duly executed by all of the parties hereto.

2.8 Assignment of Contract: The Bidder shall not assign or subcontract any portion of the Contract without the express written consent of Olmsted Parks Conservancy. Any purported assignment or subcontract without the written consent of the Olmsted Parks Conservancy shall be void. Bidder agrees that the Olmsted Parks Conservancy shall consent to any request for assignment or subcontract in its sole discretion. If ownership of Bidder changes, Bidder or its successor firm shall notify Olmsted Parks Conservancy in writing within 30 days of the Bidder's

receiving notice that its ownership is changing, including but not limited to purchase or other transfer.

2.9 No Waiver: No failure or delay by Olmsted Parks Conservancy in exercising any right, remedy, power or privilege hereunder, nor any single or partial exercise thereof, nor the exercise of any other right, remedy, power or privilege shall operate as a waiver hereof or thereof. No failure or delay by Olmsted Parks Conservancy in exercising any right, remedy, power or privilege under or in respect of this Contract shall affect the rights, remedies, powers or privileges of Olmsted Parks Conservancy hereunder or shall operate as a waiver thereof.

2.10 Authority to do Business: The Bidder must be a duly organized and authorized to do business under the laws of Kentucky. Bidder must be in good standing with all government agencies and have full legal capacity to provide the services specified under this Contract. The Bidder must have all necessary right and lawful authority to enter into this Contract for the full term hereof and that proper corporate or other action has been duly taken authorizing the Bidder to enter into this Contract. The Bidder will provide Olmsted Parks Conservancy with a copy of a corporate resolution authorizing this action and a letter from an attorney confirming that the Bidder is authorized to do business in the State of Kentucky, if requested.

2.11 Ability to Meet Obligations: Bidder affirms that there are no actions, suits or proceedings of any kind pending against Bidder or, to the knowledge of the Bidder, threatened against Bidder before or by any court, governmental body or agency or other tribunal or authority which would, if adversely determined, have a materially adverse effect on the authority or ability of Bidder to perform its obligations under this Contract, or which question the legality, validity or enforceability hereof or thereof.

2.12 The contractor agrees that in the performance of this agreement with the Olmsted Parks Conservancy, he/she will not discriminate against any workers because of race, creed, color, religion, national origin, handicap or sex and will comply with all applicable Federal, State or local laws and regulation prohibiting such discrimination. The aforesaid provision shall include, but not be limited to the following: Employment and upgrading, demolition or transfer, recruitment and recruitment advertising, lay-off or termination, rates of pay or other forms of compensation, selection for training including apprenticeship. The contractor agrees to post thereafter in conspicuous places, available for employees and all applicants for employment, notices setting forth the provisions of the above non-discrimination clause. The contractor further agrees to insert the foregoing provision in all sub-contracts hereunder.

2.13 Invoicing Requirements:

A. Proper Invoice:

For an invoice to be a proper invoice the requirements must be set forth in the agreement or contract; however, in addition, no invoice submitted by Supplier/Contractor will be considered a proper invoice unless the invoice is an original invoice, delivered to the Olmsted Parks Conservancy in accordance with the purchase order, and containing the following additional information:

- Purchase Order or Release Number under which the purchase was made;
- Invoice date;
- Vendor Name, Address, and Contact Information, including remittance if different;
- Unique invoice number;

- Account number or other identifying number agreed to by contract (if applicable);
- Description of goods, services or property provided to Olmsted Parks Conservancy;
- Date good, services, or property were provided to Olmsted Parks Conservancy
- The quantity, unit and total price of the goods, services, or property provided to Olmsted Parks Conservancy matching the contractual amounts.
- No shipping costs or fuel surcharges unless permitted in the solicitation;
- Applicable discount terms.

Defective invoices will be returned to Supplier/Contractor and must be updated with the correction information and revised invoice date

B. Invoice Submittal

The Olmsted Parks now accepts E-Invoices. The electronic submission of invoices expedites review and payment processing. Invoices are currently accepted in .PDF, .XLS, .XLSX, .DOC, .DOCX, and .TXT file formats.

Please email invoices to:

Major.Waltman@olmstedparks.org

If unable to send invoices electronically, please mail or deliver invoice to:

Major Waltman
Project Director -Olmsted Parks Conservancy
1299 Trevilian Way, Louisville, KY 40213

To avoid processing delay vendors must choose either electronic or standard mail method for invoice submittal upon award of bid.

SECTION III

BIDDER INFORMATION AND BID SIGNATURE PAGE

COMPETITIVE SEALED BID
SUBMITTED BY:

By signing below, Bidder agrees that it binds itself unconditionally to all requirements in this Bid.
Include this page in your response to this Bid.

I acknowledge receipt of the following Addenda:

Addendum #1: ____

Addendum #2: ____

Addendum #3: ____

Any Additional Addendum (write in numbers): _____

Full Legal Name of Bidder: _____

Authorized Agent Name: _____

Title: _____

E-Mail Address: _____

Address: _____

_____

Telephone _____

Fax: _____

Authorized Agent Signature: _____

Date: _____

Metro Louisville
Revenue Commission Number:_____

Federal ID Number: _____

Please include a copy of your W-9 with your submitted Bid.
This must be submitted prior to the award of a contract.

The section below will be completed by the Olmsted Parks Conservancy only if Bidder is awarded a contract under this Bid.

Olmsted Parks Conservancy

_____
Major Waltman, Project Director

Date: _____

Contract Term:

Effective: _____

Expires: _____

SECTION IV

HOLD HARMLESS AGREEMENT AND INDEMNIFICATION CLAUSE AND INSURANCE REQUIREMENTS

Hold Harmless and Indemnification Clause

All insurance requirements including performance and payment bonds shall be furnished the day a contract issued pursuant to this Bid is awarded.

The Contractor shall indemnify, hold harmless, and defend the Olmsted Parks Conservancy, employees, agents and successors in interest from all claims, damages, losses and expenses including attorneys' fees, arising out of or resulting, directly or indirectly, from the Contractor's (or Contractor's Subcontractors, if any) performance or breach of the contract provided that such claim, damage, loss, or expense is: (1) attributable to personal injury, bodily injury, sickness, death, or to injury to or destruction of property, including the loss of use resulting therefrom, or breach of contract, and (2) not caused by the negligent act or omission or willful misconduct of the Olmsted Parks Conservancy or its employees acting within the scope of their employment. This Hold Harmless and Indemnification Clause shall in no way be limited by any financial responsibility or insurance requirements and shall survive the termination of this Contract.

Insurance Requirements:

- Commercial General Liability $1,000,000 Per Occurrence, $2M Aggregate
- Commercial Umbrella/Excess Liability $5,000,000 Per Occurrence
- Commercial Auto $1,000,000 Per Occurrence
- Workers Comp Statutory limits set by state

SECTION V

GENERAL SPECIFICATIONS

NOTE: PRECEDENCE SHALL BE GIVEN TO THE GENERAL PROVISIONS SHOULD ANY PORTION OF THESE GENERAL CONDITIONS CONFLICT.

A. EXECUTION, CORRELATION, INTENT AND INTERPRETATIONS

1. General Conditions apply with equal force to Contractor's Subcontractor's work, extra work, and the like that may be specified herein or performed under this Contractor.
2. If work is required in a manner to make it impossible to produce first-class work, or should discrepancies appear among Contract Documents, request interpretation before proceeding with work. If Contractor fails to make such request, no excuse will thereafter be entertained for failure to carry out work in satisfactory manner. Should conflict occur in or between Drawings and Specifications, Contractor is deemed to have estimated on more expensive ways of doing work unless it shall have asked for and obtained written decision from Olmsted Parks Conservancy before submission of Proposal as to which method or materials will be required.
3. Unless otherwise specified, all materials and equipment shall be of brand, type, or character specified (unless otherwise approved) and of best quality or respective kind. Where a particular make, brand, or type of material or equipment is mentioned in these Specifications, it is to denote a quality standard of article desired, but does not restrict Contractor to brand specified; however, any substitution must meet with the approval of Olmsted Parks Conservancy. Proposed substitutions, which the Responder wishes Olmsted Parks Conservancy to consider in evaluation of this proposal, shall be listed where provided for in the Bid Form indicating the amount to be added or deducted from the Base Price Proposal. The burden of proof of the merit of the proposed substitution is upon the proposer.
4. Written interpretations necessary for the proper execution or progress of the Work, in the form of drawings or otherwise, will be issued with reasonable promptness by Olmsted Parks Conservancy and in accordance with any schedule agreed upon. Either party to the Contract may make written request for such interpretations. Such interpretations shall be considered with and reasonably inferable from the Contract Documents, and may be effected by Field Order.

B. ADMINISTRATION OF THE CONTRACT

1. Olmsted Parks Conservancy, or its designee, shall at all times have access to the Work wherever it is in preparation and progress. The Contractor shall provide facilities for such access so Olmsted Parks Conservancy may perform its functions under the Contract Documents.
2. Olmsted Parks Conservancy will make periodic visits to the site to observe the progress and quality of the Work and to determine in general if the Work is proceeding in accordance with the Contract Documents. The Contractor shall notify the Olmsted Parks Conservancy Project Manager to identify upcoming work that may require observation and/or review.
3. Olmsted Parks Conservancy will have authority to reject work that does not conform to the Contract Documents or does not meet acceptable construction standards. Whenever

Olmsted Parks Conservancy, in its reasonable opinion, considers it necessary or advisable to insure the proper implementation of the intent of the Contract Documents, it will have the authority to require special inspection or testing of the Work.

4. Olmsted Parks Conservancy will review Shop Drawings and Samples as provided.
5. Olmsted Parks Conservancy will prepare Change Orders, and will have authority to order minor changes in the Work per Section IV, Q.
6. If the Contractor fails to correct defective Work or persistently fails to supply materials or equipment in accordance with the Contract Documents, Olmsted Parks Conservancy may order the Contractor to stop the Work, or any portion thereof, until the cause for such order has been eliminated.
7. Substantial Completion and Final Payment.
    a. The Contractor shall notify Olmsted Parks Conservancy to perform a walk-thru and develop a Punch-list once the project, in his assessment, has reached Substantial Completion. The Punch-list will identify items to be remedied prior to awarding Substantial Completion. Failure to include any items on such list does not alter the responsibility of the Contractor to complete all work in accordance with the Contract Documents.
    b. Olmsted Parks Conservancy will receive and review written guarantees and related documents required by the Contract and assembled by the Contractor prior to release of final payment.
    c. Neither the final payment nor the remaining retained percentage shall become due until the Contractor submits to Olmsted Parks Conservancy:
        (1) An Operations Manual which contains all information pertinent to the ongoing operations and maintenance of the equipment. Examples of information include:
            (a) Manufacturer/Vendor information and product codes for:
                (i) All Equipment and fixtures;
                (ii) Playground Surfacing; and
                (iii) Light Fixtures, etc.
            (b) Mechanical, Electrical, and Plumbing cut-sheets, user guides and other product information.
            (c) Any special care or maintenance instructions.
        (2) An Affidavit that all payrolls, bills for materials and equipment, and other indebtedness connected with the Work for which Olmsted Parks Conservancy or its property might in any way be responsible, have been paid or otherwise satisfied.
        (3) Consent of surety, if any, to final payment and, if required by Olmsted Parks Conservancy, other date establishing payment or satisfaction of all such obligations, such as receipts, releases and waivers of liens arising out of the Contract, to the extent and in such form as may be designated by Olmsted Parks Conservancy. If any Subcontractor refuses to furnish a release or waiver required by Olmsted Parks Conservancy, the Contractor may furnish a bond satisfactory to Olmsted Parks Conservancy to indemnify him against any such lien. If any such lien remains unsatisfied after all payments are made, the Contractor shall refund to Olmsted

Parks Conservancy all moneys that the latter may be compelled to pay in discharging such lien, including all costs and reasonable attorney's fees.

d. The making of final payment shall constitute a waiver of all claims by Olmsted Parks Conservancy except those arising from:

(1) Unsettled liens.

(2) Faulty or defective Work appearing after Substantial Completion.

(3) Failure of the Work to comply with the requirements of the Contract Documents.

(4) Terms of any special guarantee required by the Contract Documents.

e. The acceptance of final payment shall constitute a waiver of all claims by the Contractor except those previously made in writing and still unsettled.

8. The Contractor, immediately after being awarded the Contract, shall prepare and submit for Olmsted Parks Conservancy approval an estimated progress schedule for the Work. The progress schedule shall be related to the entire Project to the extent required by the Contract Documents. This schedule shall indicate the dates for the starting and completion of the various stages of construction and shall be revised as required by the conditions of the Work, subject to Olmsted Parks Conservancy' approval.

C. SUPERVISION AND CONSTRUCTION PROCEDURES

1. The Contractor shall supervise and direct all Work, including sub-contracted work, using its best skill and attention. It shall be solely responsible for all construction means, methods, techniques, sequences and procedures and for coordinating all portions of the Work under the Contract.

a. Field layout work – Layout project per drawings with respect to locations on property and elevations in relation to grade. Field establish, maintain grades, lines, levels, locations required for work on the site; be responsible for accuracy of same. Verify grades, lines, levels, locations, and dimensions as indicated. Report any errors or inconsistencies in above to Olmsted Parks Conservancy' Project Manager before commencing Work.

b. Provide and maintain layout grade stakes. Establish and safeguard benchmarks in at least two widely separated places. As work progresses, establish new benchmarks as required.

2. The Contractor shall employ a competent superintendent and necessary assistants who shall be in attendance at the Project site during the progress of the Work, including sub-contracted work. The Superintendent shall be pre-qualified and satisfactory to Olmsted Parks Conservancy, and shall not be changed except with the consent of Olmsted Parks Conservancy, unless the superintendent proves to be unsatisfactory to the Contractor and ceases to be in its employ. The superintendent shall represent the Contractor and all communications given to the superintendent shall be as binding as if given to the Contractor. Important communications will be so confirmed on written request in each case.

3. The Contractor shall be responsible to Olmsted Parks Conservancy for the acts and omissions of all its employees and all Subcontractors, their agents and employees, and all other persons performing any of the Work under a contract with the Contractor.

4. The Contractor shall maintain at the site for Olmsted Parks Conservancy one copy of all Drawings, Specifications, Addenda, approved Shop Drawings, Change Orders and other Modifications, in good order and marked to record all changes made during construction.

The Drawings, marked to record all changes made during construction (As-builts), shall be delivered to Olmsted Parks Conservancy upon completion of the Work.

5. The Contractor shall confine operations at the site to areas shown on the Drawings and as permitted by law, ordinances, permits and the Contract Documents and shall not unreasonably encumber the site with any materials or equipment.
6. The Contractor shall do all cutting, fitting or patching of work as may be required to make its parts fit together properly, and shall not endanger any Work by cutting, excavating or otherwise altering the Work or any part of it.
7. The Contractor shall forward all communications to Olmsted Parks Conservancy' Project Manager.

D. LABOR AND MATERIALS

1. Unless otherwise specifically noted, the Contractor shall provide and pay for all labor, materials, equipment, tools, construction equipment and machinery, water, heat, utilities, transportation, and other facilities and services necessary for the proper execution and completion of the work.
2. The Contractor shall at all times enforce strict discipline and good order among its employees and shall not employ on the Work any unfit person or anyone not skilled in the task assigned to him.
3. Labor: performed in best, most workmanlike manner by mechanics skilled in their respective trades. Standards of work required throughout at such grade as will bring results of first class only.
4. Mechanics whose work is unsatisfactory to Olmsted Parks Conservancy or are considered to be careless, incompetent, unskilled, otherwise objectionable shall be dismissed from work upon notice from Olmsted Parks Conservancy.

E. WARRANTY

1. The Contractor warrants to Olmsted Parks Conservancy that all materials and equipment furnished under this Contract will be new unless otherwise specified, and that all Work will be of good quality, free from faults and defects and in conformance with the Contract Documents. All Work not conforming to these standards may be considered defective. As directed by Olmsted Parks Conservancy, the Contractor shall furnish satisfactory evidence as to the kind and quality of materials and equipment.
2. The Contractor and through him each subcontractor is accepting contract for its respective portion of the work agrees to replace and make good, without any expense to Olmsted Parks Conservancy, any work or material which may be found to be defective within one year from date of Certificate of Substantial Completion for that part of the Work. This warranty does not relieve Contractor from any obligation assumed under any other provision of the Contract.
3. The Contractor shall warrant and guarantee that the quality of its work to be performed by its agents, employees, or subcontractors, shall be on par or equal to the standards set by the relevant industry conditions. Should it be found that the Contractor's work does not conform to such standards, Olmsted Parks Conservancy shall have the right to hold the contractor in default, and to proceed against the contractor for any damages or costs sustained due to the performance of services by the contractor, its agents, employees, or subcontractors.

F. PERMITS, FEES AND NOTICES

1. The Contractor shall secure and pay for all permits, utility connection services, fees or charges including but not limited to electric service, water service, governmental fees and licenses necessary for the proper execution and completion of the Work, which are applicable at the time responses are received.
2. The Contractor shall give all notices and comply with all laws, ordinances, rules, regulations and orders of any public authority bearing on the performance of the Work. If the Contractor observes that any of the Contract Documents are at variance therewith in any respect, it shall promptly notify Olmsted Parks Conservancy in writing, and any necessary changes shall be adjusted by appropriate Modification. If the Contractor performs any Work contrary to such laws, ordinances, rules and regulations, it shall assume full responsibility thereto.
    a. Secure; pay all fees required by public and utility agencies.
    b. The Work shall be subject to requirements of codes and regulations having jurisdiction and applicable to the Work.
    c. Pay costs incurred for repairing damages to sidewalks, streets, or other public or private property or to any public utilities.
    d. Secure certificates of inspection and occupancy that may be required by authorities having jurisdiction over work; deliver same to Olmsted Parks Conservancy upon completion of Work.
3. The Contractor shall at all times observe and comply with all laws, ordinances and regulations of the federal, state, and local government, which may in any manner affect the preparation of proposals or the performance of the contract. This includes, but is not limited to, the applicable regulations of the Kentucky and United States Departments of Labor; Title VII of the 1972 Civil Rights Act (EEOC); and the Occupational Safety and Hazards Act (OSHA); and Workmen's Compensation Insurance coverage for all employees, agents or subcontractors.

G. SHOP DRAWINGS AND SAMPLES

1. Shop Drawings are drawings, diagrams, illustrations, schedules, performance charts, brochures and other data which are prepared by the Contractor or any subcontractor, manufacturer, supplier, or distributor, and which illustrate some portion of the Work.
2. Samples are physical examples furnished by the Contractor to illustrate materials, equipment or workmanship, and to establish standards by which the Work will be judged.
3. The Contractor shall review, stamp with its approval and submit, with reasonable promptness and in orderly sequence so as to cause no delay in the Work or in the work of any other contractor, all Shop Drawings and Samples required by the Contract Documents or subsequently by Olmsted Parks Conservancy as covered by Modifications. Shop Drawings and Samples shall be properly identified as specified, or as Olmsted Parks Conservancy may require. At the time of submission the Contractor shall inform Olmsted Parks Conservancy in writing of any deviation in the Shop Drawings or Samples from the requirements of the Contract Documents.
4. By approving and submitting Shop Drawings and Samples, the Contractor thereby represents that it has determined and verified all field measurements, field construction criteria, materials, catalog numbers and similar data, or will do so, and that it has checked each Shop Drawing and Sample with the requirements of the Work and of the Contract Documents.

5. Olmsted Parks Conservancy will review Shop Drawings and Samples with reasonable promptness so as to cause no delay, but only for conformance with the design concept of the Project and with the information given in the Contract Documents. Olmsted Parks Conservancy' acceptance of a separate item shall not indicate acceptance of an assembly in which the item functions.
6. The Contractor shall make any corrections required by Olmsted Parks Conservancy and shall resubmit the required number of corrected copies of Shop Drawings or new samples until accepted. The Contractor shall direct specific attention in writing or on resubmitted Shop Drawings to revisions other than the corrections requested by Olmsted Parks Conservancy on previous submissions.
7. Olmsted Parks Conservancy' acceptance of shop drawings or samples shall not relieve the Contractor of responsibility for any deviation from the requirements of the Contract Documents unless the Contractor has informed Olmsted Parks Conservancy in writing of such deviation at the time of submission and Olmsted Parks Conservancy has given written approval to the specific deviation, nor shall acceptance relieve the Contractor from responsibility for errors or omissions in the Shop Drawings or Samples.
8. No portion of the Work requiring a shop drawing or sample submission shall be commenced until the submission has been accepted by Olmsted Parks Conservancy. All such portions of the Work shall be in accordance with approved Shop Drawings and Samples.

H. CLEANING UP

1. The Contractor at all times shall keep the promises free from accumulation of waste materials or rubbish caused by its operations. At the completion of the Work it shall remove all its waste materials and rubbish from and about the Project as well as all its tools, construction equipment, machinery and surplus materials, and shall clean all glass surfaces and leave the Work "broomclean" or its equivalent, except as otherwise specified.
2. If the Contractor fails to clean up, Olmsted Parks Conservancy may do so and the cost thereof shall be charged to the Contractor.
3. The Contractor shall, at all times, keep all streets clear of dirt, mud, and debris.
4. The contractor shall note heavy public usage of the Park. The Contractor shall make every effort to secure the site and minimize disturbance to Park patrons.

I. SUBCONTRACTORS

1. A Subcontractor is a person or organization that has a direct contract with the Contractor to perform any of the Work at the site. A Sub-Subcontractor is a person or organization that has a direct or indirect contract with a Subcontractor to perform any of the Work at the site.
2. Subcontractors and Sub-Subcontractors shall be identified in the bid form. Any deviation from the original listing on the bid shall be presented in writing to, and approved by, Olmsted Parks Conservancy prior to change.
3. Nothing contained in the Contract Documents shall create any contractual relation between Olmsted Parks Conservancy and any Subcontractor or Sub-Subcontractor.
4. The Contractor shall furnish to Olmsted Parks Conservancy as part of the response a list of the names and properly completed qualification forms of the subcontractors proposed for the principal portions of the Work.

5. The Contractor shall not contract with any Subcontractor or any person or organization (including those who are to furnish materials or equipment fabricated to a special design) proposed for portions of the Work designated in the Contract Documents or in the Instructions to Responders to Request for Proposal or, if none is so designated, with any Subcontractor proposed for the principal portions of the Work who has been rejected by Olmsted Parks Conservancy. The Contractor will not be required to contract with any Subcontractor or person or organization against which it has a reasonable objection.
6. If Olmsted Parks Conservancy requires a change of any proposed Subcontractor or person or organization previously deemed to be pre-qualified by them, the Contract Sum shall be increased or decreased by the difference in cost occasioned by such change and an appropriate Change Order shall be issued.
7. The Contractor shall not make any substitutions for any pre-qualified Subcontractor or person or organization, unless the substitution is accepted in writing by Olmsted Parks Conservancy.
8. All work performed for the Contractor by a Subcontractor shall be pursuant to an appropriate agreement between the Contractor and the Subcontractor (and where appropriate between Subcontractors and Sub-subcontractor) which shall contain provisions that:
    a. Preserve and protect the rights of Olmsted Parks Conservancy under the Contract with respect to the Work to be performed under the subcontract so that the subcontracting thereof will not prejudice such rights;
    b. Require that such Work be performed in accordance with the requirements of the Contract Documents and Section IV.F;
    c. Require submission to the Contractor of application for payment under each subcontract to which the Contractor is a party, in reasonable time to enable the Contractor to apply for payment;
    d. Require that all claims for additional costs, extensions of time, damages for delays or otherwise with respect to subcontracted portions of the Work shall be submitted to the Contractor (via any Subcontractor or Sub-subcontractor where appropriate) in sufficient time so that the Contractor may comply in the manner in the Contract Documents for like claims by the Contractor upon Olmsted Parks Conservancy;
    e. Waive all rights the contracting parties may have against one another for damages caused by fire or other perils covered by the property insurance;
    f. Obligate such Subcontractor specifically to consent to the provisions of this Paragraph 8.
9. The Contractor shall pay each Subcontractor, upon receipt of payment from Olmsted Parks Conservancy, an amount equal to the percentage of completion allowed to the Contractor on account of such Subcontractor's work, less the percentage retained from payments to the Contractor. The Contractor shall also require each Subcontractor to make similar payments to its subcontractors.
10. Olmsted Parks Conservancy shall not have any obligation to pay or to see to the payment of any moneys to any Subcontractor except as may otherwise be required by law.

J. OLMSTED PARKS CONSERVANCY' RIGHT TO AWARD SEPARATE CONTRACTS

1. Olmsted Parks Conservancy reserves the right to award other contracts in connection with other portions of the Project under these or similar Conditions of the Contract. When

separate contracts are awarded for different portions of the Project, “the Contractor” in the Contract Documents in each case shall be the Contractor who signs with separate contract.

2. The Contractor shall afford other Contractors reasonable opportunity for the introduction and storage of their materials and equipment and the execution of their work and shall properly connect and coordinate its Work with theirs.
3. If any part of the Contractor’s Work depends for proper execution or results upon the work of any other separate contractor, the Contractor shall inspect and promptly report to Olmsted Parks Conservancy any apparent discrepancies or defects in such work that render it unsuitable for such proper execution and results. Failure of the Contractor to so inspect and report shall constitute an acceptance of the other Contractor’s work as fit and proper to receive its Work, except as to defects that may develop in the other separate contractor’s work after the execution of the Contractor’s Work.
4. The Contractor shall be responsible for any cutting, fitting and patching that may be required to complete its' Work except as otherwise specifically provided in the Contract Documents. The Contractor shall not endanger any work of any other contractors by cutting, excavating or otherwise altering the work and shall not cut or alter the work of any other contractor except with the written consent of Olmsted Parks Conservancy.
5. Any costs caused by defective or ill-timed work shall be borne by the party responsible therefore.
6. If a dispute arises between the separate contractors as to their responsibility for cleaning up as required by Section IV-H, Olmsted Parks Conservancy may clean up and charge the cost thereof to the contractors as Olmsted Parks Conservancy shall determine to be just.

K. TESTING

1. If the Contract Documents, laws, ordinances, rules, regulations or orders of any public authority having jurisdiction require any Work to be inspected, tested or approved, the Contractor shall give Olmsted Parks Conservancy timely notice of its readiness and of the date arranged so Olmsted Parks Conservancy may observe such inspection, testing or approval. The Contractor shall bear all costs of such inspections, tests, and approvals unless otherwise provided.
2. If after the commencement of the Work Olmsted Parks Conservancy determines that any Work requires special inspection, testing or approval it will instruct the Contractor to order such special inspection, testing or approval, and the Contractor shall give notice. If such special inspection testing reveals a failure of the Work to comply (1) with the requirements of the Contract Documents or (2), with respect to the performance of the Work, with laws, ordinances, rules, regulations or orders of any public authority having jurisdiction, the Contractor shall bear all costs thereof, otherwise Olmsted Parks Conservancy shall bear such costs, and an appropriate Change Order shall be issued.
3. Required certificates of inspection, testing or approval shall be secured by the Contractor and promptly delivered to Olmsted Parks Conservancy.
4. If Olmsted Parks Conservancy wishes to observe the inspections it will do so promptly and, where practical, at the source of supply.
5. Neither the observations of Olmsted Parks Conservancy in its Administration of the Construction Contract, nor inspections, tests or approvals by persons other than the Contractor shall relieve the Contractor from its obligations to perform the Work in accordance with the Contract Documents.

6. Olmsted Parks Conservancy shall have a right to inspect any material to be used in carrying out this contract. Olmsted Parks Conservancy does not assume any responsibility for the availability of any controlled materials or other materials and equipment required under this contract. The Contractor shall be responsible for the contracted quality and standards of all materials, components or completed work finished under this contract up to the time of final acceptance (12 months from the date of substantial completion) by Olmsted Parks Conservancy. Materials, components or completed work not complying therewith may be rejected by Olmsted Parks Conservancy and shall be replaced by the Contractor at no cost to Olmsted Parks Conservancy. Any materials or components rejected shall be removed within reasonable time from the premises of Olmsted Parks Conservancy at the entire expense of the Contractor, after written notice has been mailed by Olmsted Parks Conservancy to the Contractor that such materials or components have been rejected.

L. TIME

1. Definitions:

a. The Contract Time is the period of time allocated in the Contract Documents for completion for completion of the Work.

b. The date of commencement of the Work is the date established in a Notice to Proceed. If there is not notice to proceed, it shall be the date of the Agreement or such other date as may be established therein.

c. The Date of Substantial Completion of the Work or designated portions thereof is the Date certified by Olmsted Parks Conservancy when construction is sufficiently complete, in accordance with the Contract Documents, so that Olmsted Parks Conservancy may occupy the Work or designated portion thereof for the use for which it is intended.

d. The term day as used in the Contract Documents shall mean calendar day, a period of 24 hours beginning at 12:00 midnight.

2. All time limits stated in the Contract Documents are of the essence of the Contract.

3. The Contractor shall begin the Work on the date of commencement as defined. He shall carry the Work forward expeditiously with adequate forces and shall complete it within the Contract Time.

4. If the Contractor is delayed at any time in the progress of the Work by an act or neglect of Olmsted Parks Conservancy, or by any separate contractor employed by Olmsted Parks Conservancy, or by changes ordered in the Work, or by labor disputes, fire, unusual delay in transportation, unavoidable casualties, or any causes beyond the Contractor's control, or by delay authorized by Olmsted Parks Conservancy pending arbitration, or by any cause which Olmsted Parks Conservancy determines may justify the delay, then the Contract Time shall be extended by Change Order for such reasonable time as determined by Olmsted Parks Conservancy.

5. All claims for extension of time shall be made in writing to Olmsted Parks Conservancy no more than ten (10) days after the occurrence of the delay; otherwise such claims shall be waived. In the case of a continuous cause of delay only one claim is necessary.

M. SCHEDULE OF VALUES

1. Before the first Application for Payment, the Contractor shall submit to Olmsted Parks Conservancy a schedule of values – standard AIA format – following Master Spec Division Breakdown of the various portions of the Work including Division Amount, Contractor's

contract amount, and quantities if requested by Olmsted Parks Conservancy, aggregating the total Contract Sum, divided so as to facilitate payments to Subcontractors in accordance with Section IV.I., prepared in such form as specified or as Olmsted Parks Conservancy and the Contractor may agree upon, and supported by such data to substantiate its correctness as Olmsted Parks Conservancy may require. Each item in the schedule of values shall include its proper share of overhead and profit. This schedule, when approved by Olmsted Parks Conservancy, shall be used only as a basis for the Contractor's Application for Payment.

2. At least ten days before each progress payment falls due, the Contractor shall submit to Olmsted Parks Conservancy an itemized Application for Payment, supported by such data substantiating the Contractor's right to payment as Olmsted Parks Conservancy may require.
3. If payments are to be made on account of materials or equipment not incorporated in the work but delivered and suitably stored at the site, or at some other location agreed upon in writing, such payments shall be conditioned upon submission by the Contractor of bills of sale or such other procedures satisfactory to Olmsted Parks Conservancy.
4. The Contractor warrants and guarantees that title to all work, materials, and equipment covered by an Application for Payment, whether incorporated in the Project or not, will pass to Olmsted Parks Conservancy upon the receipt of such payment by the Contractor, free and clear of all liens, claims, security interests or encumbrances, and that no Work, materials or equipment covered by an Application for Payment will have been acquired by the Contractor; or by any other person performing the Work at the site or furnishing materials and equipment for the Project, subject to an agreement under which an interest therein or an encumbrance thereon is retained by the seller or otherwise imposed by the Contractor or such other person.
5. Progress Payments will not relieve the Contractor of his obligation to maintain the safety and security of the project site, nor will it relieve any obligation to complete the Project as specified by the Contract Documents.
6. Payments will be made in the amount of 90% of value of work performed and of materials stored on site up to first of month, as estimated by Olmsted Parks Conservancy, less aggregate of previous payments. The remaining 10% is to be payable after the final completion and acceptance of the Work by Olmsted Parks Conservancy.
7. Olmsted Parks Conservancy may decline to approve an Application for Payment and may withhold its Certificate in whole or in part, to the extent necessary reasonably to protect Olmsted Parks Conservancy from loss because of:
    a. Defective Work not remedied.
    b. Third party claims filed or reasonable evidence indicating probable filing of such claims.
    c. Failure of the Contractor to make payments properly to subcontractors or for labor, materials or equipment.
    d. Reasonable doubt that the Work can be completed for the unpaid balance of the contract sum.
    e. Damage to another Contractor.
    f. Reasonable indication that the Work will not be completed within the Contract Time, or
    g. Unsatisfactory prosecution of the Work by the Contractor.

When the above grounds are removed, payment shall be made for amounts withheld because of them.

N. PROTECTION OF PERSONS AND PROPERTY

1. The Contractor shall be responsible for initiating, maintaining, and supervising all safety precautions and programs in connection with the Work.
2. The Contractor shall take all reasonable precautions for the safety of and shall provide all reasonable protection to prevent damage, injury or loss to:
   a. All park patrons and the general public;
   b. All employees on the Work and all other persons who may be affected thereby;
   c. All the Work and all materials and equipment to be incorporated therein, whether in storage on or off the site, under the care, custody or control of the Contractor or any of its subcontractors or Sub-subcontractors; and
   d. Other property at the site or adjacent thereto, including trees, shrubs, lawns, walks, pavements, roadways, structures and utilities not designated for removal, relocation or replacement in the course of construction.
3. The Contractor shall comply with all applicable laws, ordinances, rules, regulations and lawful orders of any public authority having jurisdiction for the safety of persons or property or to protect them from damage, injury or loss. It shall erect and maintain as required by existing conditions and progress of the Work, all reasonable safeguards for safety and protection, including posting danger signs and other warnings against hazards, promulgating safety regulations and notifying Olmsted Parks Conservancy and Park users of adjacent utilities. Provide and maintain guard lights at barricades, obstructions in streets, roads or sidewalks, at trenches or pits adjacent to public or roads per Public Works Regulations.
4. All damage or loss to any property whole or in part by the Contractor, any subcontractor, and Sub-sub-contractor, or anyone directly or indirectly employed by any of them, or by anyone for whose acts any of them may be liable, shall be remedied by the Contractor, except damage or loss attributable to faulty Drawings or Specifications or to the acts or omissions of Olmsted Parks Conservancy.
5. The Contractor shall designate a responsible member of its organization at the site whose duty shall be the prevention of accidents. This person shall be the Contractor's superintendent unless otherwise designated in writing by the Contractor to Olmsted Parks Conservancy.
6. The Contractor shall not load or permit any part of the Work to be loaded so as to endanger its safety.
7. The Contractor shall comply with all regulations as specified by the Occupational Safety and Health Standards.
8. In any emergency affecting the safety of persons or property, the Contractor shall act, at its discretion, to prevent threatened damage, injury or loss.

O. ADDITIONAL CONDITIONS

1. Contractor and Subcontractors shall coordinate their work with adjacent work and cooperate with other trades so as to facilitate general progress of Work. Each trade shall afford other trades every reasonable opportunity for installation of their work and for storage of their materials.

2. If in performance of Contract, subsurface or latent conditions at site are found to be materially different from those indicated by the Drawings and Specifications, or -unknown conditions of an unusual nature are disclosed differing materially from conditions usually inherent in Work of character shown and specified, attention of Olmsted Parks Conservancy shall be called immediately to such conditions before they are disturbed. Olmsted Parks Conservancy will promptly make such changes in Drawings and Specifications as they find necessary to conform to the different conditions, and any decrease or increase in the cost of the Work resulting from such changes shall be adjusted via Change Order.
3. Manufactured articles materials, equipment shall be applied, installed, connected, erected, used, cleaned, conditioned as per manufacturer's printed directions, unless specified or directed to the contrary by Olmsted Parks Conservancy.
4. The Contractor and each Subcontractor shall take all necessary precautions to protect other contractors and subcontractors work and materials from damage resulting from its work. Correction of any all damages occurring from Contractor's or Subcontractor's work will be made at no cost to damaged party or Olmsted Parks Conservancy.

P. CHANGES IN THE WORK

1. Change Orders:
   a. A Change Order is a written order to the Contractor signed by Olmsted Parks Conservancy, issued after the execution of the Contract, authorizing a Change in the Work or an adjustment in the Contract Sum or the Contract Time. The Contract Sum and the Contract Time may only be changed by Change Order.
   b. Olmsted Parks Conservancy, without invalidating the Contract, may order Changes in the Work within the general scope of the Contract consisting of additions, deductions or other revisions, the Contract Sum and the Contract Time being adjusted accordingly. All such changes in the work shall be authorized by Change Order, and shall be executed under the applicable conditions of the Contract Documents.
   c. The cost or credit to Olmsted Parks Conservancy resulting from a Change in the Work shall be determined in one or more of the following ways:
      (1) By mutual acceptance of a lump sum properly itemized.
      (2) By unit prices stated in the Contract Documents or subsequently agreed upon; or
      (3) By cost and a mutually acceptable fixed or percentage fee.
   d. Under methods (1) and (3) above, for extra Work performed, allowance for overhead and profit combined, included in total cost to Olmsted Parks Conservancy, shall be based upon the following schedule:
      (1) To Contractor, for work which it performs with its own forces, not to exceed 15% of its net additional cost.
      (2) To Subcontractor, for work which it performs with its own forces, not to exceed 15% of its net additional cost.
      (3) To the Contractor for work performed by its subcontractor not to exceed 7-1/2% of the amount due to the subcontractor.
   e. The percentage shall be applied to net additional cost as defined. If net cost value or change results in credit from Contractor or Subcontractor, credit given shall be net cost without overhead or profit included.

(1) "Net Cost" as used herein shall mean difference between proper cost additions deductions, Cost shall include such items as material used, labor, common and skilled, or foremen, trucks, and a fair rental of machinery used upon work, after extra work is done. If said work requires use of machinery not already upon work or to be otherwise used upon work, then cost of transportation of such machinery to and from work shall be added to fair rental. Among items to be considered as overhead are rental of small tools, supervision, superintendents, time-keepers, clerks, watchmen, insurance, bond premium, or any job of office overhead not previously mentioned. Payroll taxes and insurance shall be added to cost after overhead and profit has been applied.

f. In all cases where extra work or changes are covered by unit prices that have been accepted by Olmsted Parks Conservancy, value of such extra work or changes shall be determined only upon basis of such unit prices.

g. Contractor's itemized estimate for charges or credits for additions to or deductions from work required by Contract shall be submitted and approved by Olmsted Parks Conservancy when requested.

h. If none of the above methods are agreed upon, the Contractor, provided it receives a Change Order, shall promptly proceed with the Work involved. Olmsted Parks Conservancy shall then determine the cost of such Work on the basis of the Contractor's reasonable allowance for overhead and profit. In such cases the Contractor shall keep and present in such form as Olmsted Parks Conservancy may prescribe, and itemized accounting together with appropriate supporting data. The amount of credit to be allowed by the Contractor to Olmsted Parks Conservancy for any deletion or change that results in a net decrease in cost will be the amount of the actual net decreases as confirmed by Olmsted Parks Conservancy. When both additions and credits are involved in any one change, the allowance for overhead and profit shall be figured on the basis of net increase, if any.

i. If unit prices are stated in the Contract Document or subsequently agreed upon, and if the quantities originally contemplated are so changed in a proposed Change Order that application of the agreed unit prices to the quantities of Work proposed will create a hardship on Olmsted Parks Conservancy or the Contractor, the applicable unit prices shall be equitably adjusted to prevent such hardship.

j. Should concealed conditions encountered in the performance of the Work below the surface of the ground be at variance with the conditions indicated by the Contract Documents or should unknown physical conditions below the surface of the ground of an unusual nature, differing materially from those ordinarily encountered and generally recognized as inherent in work of the character provided for in this Contract, be encountered, the Contractor shall notify Olmsted Parks Conservancy' Project Manager for evaluation and documentation of the occurrence. Upon agreement of both parties the Contractor may submit a request for Change.

k. If the Contractor claims that additional cost is involved because of:

(1) Any written interpretation issued;

(2) Any order by Olmsted Parks Conservancy to stop the work where the Contractor was not at fault; or

(3) Any written order for a minor change in the Work issued to the Contractor shall make such claim.

2. Claims for Additional Cost

   a. If the Contractor wishes to make a claim for an increase in the Contract Sum, it shall give Olmsted Parks Conservancy written notice thereof within ten (10) days after the occurrence of the event giving rise to such claim. This notice shall be given by the Contractor before proceeding to execute the Work, except in an emergency endangering life or property in which case the Contractor shall proceed in accordingly. No such claim shall be valid unless so made. If Olmsted Parks Conservancy and the Contractor cannot agree on the amount of the adjustment in the Contract Sum, it shall be determined by Olmsted Parks Conservancy. Any change in the Contract Sum resulting from such claim shall be authorized by Change Order. No bill for extra work will be approved unless Contractor has received written authorization from Olmsted Parks Conservancy for performance of said work and the Contract Sum is adjusted accordingly.

3. Minor Changes in the Work

   a. Olmsted Parks Conservancy shall have authority to order minor changes in the Work not involving an adjustment in the Contract Sum or an extension of the Contract Documents. Such changes may be affected by Field Order or by other written order. Such changes shall be binding on Olmsted Parks Conservancy and the Contractor.

   b. Olmsted Parks Conservancy may issue written Field Orders which interpret the Contract Documents, or which order minor changes in the Work without change in Contract Sum or Contract Time. The Contractor shall carry out such Field Orders promptly.

Q. UNCOVERING AND CORRECTION OF WORK

1. If any Work should be covered or performed contrary to the request of Olmsted Parks Conservancy, it must, if required by Olmsted Parks Conservancy, be uncovered for its observation and replaced if defective, at the Contractor's expense.

   a. If any other Work has been covered which Olmsted Parks Conservancy has not specifically requested to observe prior to being covered, Olmsted Parks Conservancy may request to see such Work and it shall be uncovered by the Contractor. If such work is found to be in accordance with the Contract Documents, the cost of uncovering and replacement shall be charged, by appropriate Change Order, to Olmsted Parks Conservancy. If such Work is found not to be in accordance with the Contract Documents, the Contractor shall pay such costs.

   b. The Contractor shall promptly correct all Work rejected by Olmsted Parks Conservancy as defective or as failing to conform to the Contract Documents whether observed before or after Substantial Completion and whether or not fabricated, installed or completed. The Contractor shall bear all cost of correcting such rejected work. Work found to be defective during one year from the date of the Certificate of Substantial Completion or within the warranty period for a specific part of the Work shall be promptly corrected by the Contractor without additional cost to Olmsted Parks Conservancy.

   c. If, within one year after the Date of Substantial Completion or within such longer period of time as may be prescribed by law or by the terms of any applicable special guarantee required by the Contract Documents, any of the work is found to be defective or not in accordance with the Contract Documents, the Contractor shall correct it promptly after receipt of a written notice from Olmsted Parks Conservancy to do so unless Olmsted

Parks Conservancy has previously given the Contractor a written acceptance of such condition.

d. All such defective or non-conforming work shall be removed from the site if necessary, and the work shall be corrected to comply with the Contract Documents without cost to Olmsted Parks Conservancy.

e. The Contractor shall bear the cost of making good all work of separate contractors destroyed or damaged by such removal or correction.

f. If the Contractor does not remove such defective or non-conforming Work within a reasonable time fixed by written notice from Olmsted Parks Conservancy, Olmsted Parks Conservancy may remove it and may store the materials or equipment at the expense of the Contractor. If the Contractor does not pay the cost of such removal and storage within ten days thereafter, Olmsted Parks Conservancy may upon ten additional days' written notice sell such Work at auction or at private sale and shall account for the net proceeds thereof, after deducting all the costs that should have been borne by the Contractor including compensation for additional architectural-engineering services. If such proceeds of sale do not cover all costs that the Contractor should have borne, the difference shall be issued. If the payments then or thereafter due the Contractor are not sufficient to cover such amount, the Contractor shall pay the difference to Olmsted Parks Conservancy.

g. If the Contractor fails to correct such defective or non-conforming Work, Olmsted Parks Conservancy may correct, the Contractor shall bear the costs of correcting defective work.

2. Acceptance of Defective or Non-Conforming Work

a. If Olmsted Parks Conservancy prefers to accept defective or nonconforming Work, it may do so instead of requiring its removal and correction, in which case, a Change Order will be issued to reflect an appropriate reduction the Contract Sum, or if the amount is determined after final payment, it shall be paid by the Contractor.

R. VOLUNTARY ALTERNATE PROCEDURE

1. Contractor shall submit base bid with plans and specifications found within the bid documents. No substitutions shall be included in the base bid price.

2. Contractor wishing to submit Voluntary Alternate items as "approved equal" shall submit information with bid documents including but not limited to:

Vendor	Shop Drawings
Manufacturer	Installation Details
Model #	2-D/3-D Renderings
Specifications	Photographs

3. Olmsted Parks Conservancy bid evaluation committee will determine if submitted request for approved equal status is granted. Contractor shall note that there must be adequate detail and information included with bid documents in order for an approved equal status to be considered.

4. Olmsted Parks Conservancy reserves the right to disqualify any and all voluntary alternates that do not have adequate supporting data.

5. Contractor shall list all voluntary alternates with detailed descriptions including but not limited to: model #, material, vendor, manufacturer, etc. in section “VIII” of the Project Bid Items (pages 50 & 51) section. Contractor shall also include an adjustment made to the base bid contract price (Add/Deduct/No Change). Additional prices may be added to bid document if the space provided is not adequate.

6. Contractors failing to supply adequate and sufficient information on those items specified as “Voluntary Alternates” will have only those items disqualified from the bid.

Bidder shall provide prices for goods as FOB Delivered, unless allowance for shipping, handling, or any associated charge is specified in this section or on the price sheet.

SECTION VI

EVALUATION CRITERIA

1. Olmsted Parks Conservancy seeks equity and diversity in all aspects of our work and recognizes our responsibility to help address systemic inequities in our community. "Participation by certified female-owned, certified disabled-owned, or certified minority-owned business entities or subcontractors is strongly encouraged and will be a consideration in determining the award of this contract."

2. All bids will be evaluated by a committee based on the following criteria and scored out of 100 possible points.

a. Qualifications: **40 points**

   1. Bidders shall submit references for consideration. Each reference must include type and size of project, budget, company name, address, contact person, and phone number. Photographs will also aid in determining reference experience. All references and current information must be furnished.
   2. Contractor must submit verification of successfully completing three (3) projects of similar size and scope within the last three (5) years.
   3. References and past performance with Olmsted Park Conservancy will be considered in vendor selection for contract. **Bidders shall provide resumes and certifications of key personnel that will be performing services for Olmsted Park Conservancy.**
   4. Contractor must demonstrate that he has adequate equipment, personnel, experience and understanding of the Tyler Park Music Stage Plans and Specifications to perform the scope of work outlined.

b. Planning: **10 points**

   1. Demonstrate a clear plan for who will work on contract, supervision, quality control plan, etc.
   2. Submit a timeline for completion of the project.

c. Diversity: **10 points**

   1. Indicate if the contractor is registered through state/ local disadvantaged/ woman-owned/ minority-owned business enterprise database.
   2. Describe policies/ practices that align with OPC values for diversity.
   3. Is the contractor a MBW/WBE/DisBE
   4. Indicate if the contractor is local.

d. Price: **40 points**

Proposals will be reviewed by a committee consisting of representatives from: **Olmsted Parks Conservancy and Louisville Parks and Recreation.**

SECTION VII

OLMSTED PARKS CONSERVANCY

BID FORM

TYLER PARK STAGE CONSTRUCTION

TO: Major Waltman
Project Director -Olmsted Parks Conservancy
1299 Trevilian Way, Louisville, KY 40213
Major.Waltman@olmstedparks.org
502-338-4913

I. BID CONDITIONS

The undersigned, having familiarized himself with the local conditions affecting the cost of work, and with the Request for Bids, General Provisions, Specifications and the Drawings, hereby proposes to furnish all materials and labor for the job described above in strict accordance with the Drawings and Specifications, including:

Addendum No. _____ Dated_____

Addendum No. _____ Dated_____

II. EVALUATION CRITERIA

It is the intent of the Owner to award a contract based upon the following rating system, and not necessarily upon the Bidder with the lowest Bid. Bids will be evaluated based on the Contractor's qualifications, references, and price. Each of these factors will be considered in making a final recommendation. Points will be awarded as follows:

References & Experience	50	Points Maximum
Price	50	Points Maximum
Total	100	Points Possible

Scores for each Bid will be tallied and the Bid with the highest score will be recommended for award of contract.

III. COMPLETION OF WORK AND PAYMENTS TO CONTRACTOR

If undersigned is notified of Bid acceptance within ninety (90) days after the Bid date, he/she agrees to execute a contract for work as awarded for the stated compensation. The undersigned agrees, if awarded Contract, to begin work within ten (10) calendar days from the notice to begin work. Upon award of contract, contractor shall submit to Owner a Schedule of Values for review and approval. Contractor shall submit invoices monthly based on work completed in accordance with the approved Schedule of Values. Owner shall withhold a Retainage of 10% on all invoices until satisfactory completion of project.

IV. SUBCONTRACTORS

The following is a list of subcontractors for work to be performed directly upon which this Bid is based. It is understood that the Subcontractors listed below will actually be used in executing the work and that no changes will be made in this list without written approval of the Owner.

Earth Work:_____

Asphalt:_____

Concrete :_____

Masonry:_____

Electrical:_____

Landscape Material:_____

Other:_____

V. SUBSTITUTES

The following substitutes are proposed for consideration. It is understood that the Bid is to be based on the items specified and any substitute items listed in this Section of the Bid are subject to approval by the Owner.

Item Specified	Proposed Substitution (Include Manufacturer)
_____	_____
_____	_____
_____	_____

VI. STIPULATED SUMS

A. BASE BID

The undersigned agrees to fulfill the terms of the contract to perform work for the stipulated lump sum of:

(Written)_____

(Numeric)_____ ($ _____)

B. TIME (Required but not part of bid evaluation)

The undersigned agrees to fulfill the terms of the contract within _____ days of the Notice to Proceed.

C. Bid Breakdown (This is a bid requirement and may be provided up to 24 hours after receipt of the bid opening)

Site work/earthwork, excavation, back-fill,	$_____
Rough and finish grading	$_____
Base material (gravel and DGA)	$_____
Concrete	$_____
Stonework	$_____
Unit Pavers	$_____
Utilities	$_____
Permits	$_____
General Conditions	$_____
Overhead & Profit	$_____
Other	$_____

D. ALTERNATES

The owner reserves the right to select alternates in any manner beneficial to the project.

a. Additive Alternate #1 - $_____
New light post to match existing light posts.

E. UNIT PRICES

The following unit prices shall apply to either additional work or deletions from the Contract. Unit prices shall include all labor and materials complete and in place and all other items of cost including removal of excess materials from the site, overhead and profit and shall constitute complete reimbursement to the contractor for additional work or for credit to the Owner for work omitted, as the case may be.

	ITEM	UNIT OF MEASURE	UNIT PRICE
1.	Silt Fencing	Per Lin. Ft.	_____
2.	Fiber Rolls	Per Lin. Ft.	_____
3.	Tree Removal	Per Lin. Ft.	_____

4. Tree Protection Fencing	Per Lin. Ft.	_____
5. Minor Excavation (Earth, with haul off)	< 50 C.Y	_____
6. Major Excavation (Earth, with haul off)	> 50 C.Y	_____
7. Minor Excavation (Rock, with haul off)	<25 C.Y.	_____
8. Major Excavation (Rock, with haul off)	> 25 C.Y.	_____
9. Backfill & Compaction (material on site)	Per C.Y.	_____
10. Earthwork (mass grading)	Per C.Y.	_____
11. Earthwork (finish grading)	Per C.Y.	_____
12. Trenching (utility)	Per C.Y.	_____
13. #57 Stone (placed & compacted)	Per Ton	_____
14. DGA (placed & compacted)	Per Ton	_____
15. Concrete Paving 6"/6" Historic Mix	Per S.Y.	_____
16. Concrete Paving 6"/6"	Per S.Y.	_____
17. Asphalt Paving	Per S.Y.	_____
18. Top Soil (delivered and placed)	Per C.Y.	_____
19. Sodding	Per S.Y.	_____
20. Seeding	Per S.Y.	_____
21. Unit Pavers	Per S.Y.	_____

F. ACKNOWLEDGMENT OF REQUIRED SUBMITTALS AND MOCKUPS

1. UNIT PAVER SAMPLES FOR APPROVAL
2. STONE VENEER SAMPLES FOR APPROVAL
3. BOULDER SAMPLE FOR APPROVAL
4. MOCK-UP OF STONE VENEER WALL
5. MOCK-UP OF INSTALLED UNIT PAVERS

G. CERTIFICATION

I hereby certify that all price information proposed in this Bid is accurate and that I am familiar with the project scope and conditions and terms of the bid.

_____
FIRM NAME

_____ AUTHORIZED OFFICIAL FOR FIRM
DATE

OLMSTED PARKS CONSERVANCY
TYLER PARK CONSTRUCTION

FORM A:
FIRM BACKGROUND

FIRM NAME: _____

ADDRESS: _____

_____

TELEPHONE NUMBER: _____ FAX: _____

AUTHORIZED OFFICIAL: _____

TITLE: _____
(Authorized official must have authority to negotiate and contractually bind the company.)

Federal Identification Number _____
KY Unemployment Insurance Number _____
Kentucky State Remittance Number _____

How many years has your organization been in business? _____

How many years experience in the type of work associated with the proposed project has your organization had? a. As a General Contractor _____
b. As a Subcontractor _____

List of related experience of the principal individuals of your organization:
_____
_____
_____
_____
_____
_____

List references of similar projects:
_____
_____
_____
_____
_____
_____

TECHNICAL SPECIFICATIONS - TABLE OF CONTENTS

DIVISION 00 - PROCUREMENT AND CONTRACTING REQUIREMENTS

DIVISION 03 - CONCRETE

DIVISION 04 - MASONRY

DIVISION 31 - EARTHWORK

DIVISION 32 - EXTERIOR IMPROVEMENTS

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 01 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, for the following:

1. Footings.
2. Foundation walls.
3. Slabs-on-grade.
4. Suspended slabs.
5. Concrete toppings.
6. Building walls.

B. Related Sections include the following:
1. Division 31 Section "Earth Moving" for drainage fill under slabs-on-grade.
2. Division 32 Section "Concrete Paving" for concrete pavement and walks.

1.3 DEFINITIONS

A. Cementitious Materials: Portland cement alone or in combination with one or more of the following: blended hydraulic cement, fly ash and other pozzolans, ground granulated blast-furnace slag, and silica fume; subject to compliance with requirements.

1.4 ACTION SUBMITTALS

A. Product Data with Shop Drawings:

1. Product Data: For each type of product indicated.
2. Shop Drawings:

a. Steel Reinforcement Shop Drawings: Placing drawings that detail fabrication, bending, and placement. Include bar sizes, lengths, material, grade, bar schedules, stirrup spacing, bent bar diagrams, bar arrangement, splices and laps, mechanical connections, tie spacing, hoop spacing, and supports for concrete reinforcement.
b. Formwork Shop Drawings: Prepared by or under the supervision of a qualified professional engineer detailing fabrication, assembly, and support of formwork.

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.

1.5 INFORMATIONAL SUBMITTALS

A. Welding certificates.

B. Qualification Data: For Installer.

C. Material Test Reports: For the following, from a qualified testing agency, indicating compliance with requirements:

1. Aggregates. Include service record data indicating absence of deleterious expansion of concrete due to alkali aggregate reactivity.

D. Material Certificates: For each of the following, signed by manufacturers:

1. Cementitious materials.
2. Form materials and form-release agents.
3. Steel reinforcement and accessories.
4. Curing compounds.
5. Bonding agents.
6. Adhesives.
7. Vapor barriers.
8. Semirigid joint filler.
9. Joint-filler strips.
10. Repair materials.

E. Floor surface flatness and levelness measurements to determine compliance with specified tolerances.

F. Field quality-control test and inspection reports.

G. Minutes of preinstallation conference.

1.6 QUALITY ASSURANCE

A. Installer Qualifications: A qualified installer who employs on Project personnel qualified as ACI-certified Flatwork Technician and Finisher and a supervisor who is an ACI-certified Concrete Flatwork Technician.

B. Manufacturer Qualifications: A firm experienced in manufacturing ready-mixed concrete products and that complies with ASTM C 94/C 94M requirements for production facilities and equipment.

1. Manufacturer certified according to NRMCA's "Certification of Ready Mixed Concrete Production Facilities."

C. Source Limitations: Obtain each type or class of cementitious material of the same brand from the same manufacturer's plant, obtain aggregate from one source, and obtain admixtures through one source from a single manufacturer.

D. Welding: Qualify procedures and personnel according to AWS D1.4, "Structural Welding Code--Reinforcing Steel."

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

1. ACI 301, "Specification for Structural Concrete," Sections 1 through 5 and Section 7, "Lightweight Concrete."
2. ACI 117, "Specifications for Tolerances for Concrete Construction and Materials."

F. Concrete Testing Service: Engage a qualified independent testing agency to perform material evaluation tests and to design concrete mixtures.

G. Preinstallation Conference: Conduct conference at Project site to comply with requirements in Division 01 Section "Project Management and Coordination."

1. Before submitting design mixtures, review concrete design mixture and examine procedures for ensuring quality of concrete materials. Require representatives of each entity directly concerned with cast-in-place concrete to attend, including the following:

a. Contractor's superintendent.
b. Independent testing agency responsible for concrete design mixtures.
c. Ready-mix concrete manufacturer.
d. Concrete subcontractor.

2. Review special inspection and testing and inspecting agency procedures for field quality control, construction contraction and isolation joints, and joint-filler strips, steel reinforcement installation, and concrete protection.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Steel Reinforcement: Deliver, store, and handle steel reinforcement to prevent bending and damage.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. In other Part 2 articles where titles below introduce lists, the following requirements apply to product selection:

1. Products: Subject to compliance with requirements, provide one of the products specified.
2. Manufacturers: Subject to compliance with requirements, provide products by one of the manufacturers specified.

2.2 FORM-FACING MATERIALS

A. Rough-Formed Finished Concrete: Plywood, lumber, metal, or another approved material. Provide lumber dressed on at least two edges and one side for tight fit.

B. 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.

C. 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. Furnish ties that, when removed, will leave holes no larger than 1 inch in diameter in concrete surface.
3. Furnish ties with integral water-barrier plates to walls indicated to receive dampproofing or waterproofing.

2.3 STEEL REINFORCEMENT

A. Reinforcing Bars: ASTM A 615/A 615M, Grade 60, deformed.

B. Plain-Steel Welded Wire Reinforcement: ASTM A 185, plain, fabricated from as-drawn steel wire into flat sheets.

2.4 REINFORCEMENT ACCESSORIES

A. Joint Dowel Bars: ASTM A 615/A 615M, Grade 60, plain-steel bars, cut bars true to length with ends square and free of burrs.

B. Bar Supports: Bolsters, chairs, spacers, and other devices for spacing, supporting, and fastening reinforcing bars and welded wire reinforcement in place. Manufacture bar supports from steel wire, plastic, or precast concrete according to CRSI's "Manual of Standard Practice," of greater compressive strength than concrete and as follows:

2.5 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.

a. Fly Ash: ASTM C 618, Class C.
b. Ground Granulated Blast-Furnace Slag: ASTM C 989, Grade 100 or 120.

B. Normal-Weight Aggregates: ASTM C 33, Class 3S 3M coarse aggregate or better, graded. Provide aggregates from a single source with documented service record data of at least 10 years' satisfactory service in similar applications and service conditions using similar aggregates and cementitious materials.

1. Maximum Coarse-Aggregate Size: 1 inch nominal.
2. Fine Aggregate: Free of materials with deleterious reactivity to alkali in cement.

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

2.6 VAPOR BARRIERS

A. Plastic Vapor Barrier: ASTM E 1745, Class A with a permeance of 0.01 as tested before and after mandatory conditioning (ASTM E 1745 Section 7.1 and subparagraph 7.1.1-7.1.5) less than 0.01 perms (grains/(ft2 hr in Hg)). Include manufacturer's recommended adhesive or pressure-sensitive tape.

2.7 CURING MATERIALS

A. Evaporation Retarder: Waterborne, monomolecular film forming, manufactured for application to fresh concrete.

1. Products:

a. Axim Concrete Technologies; Cimfilm.
b. Burke by Edoco; BurkeFilm.
c. ChemMasters; Spray-Film.
d. Conspec Marketing & Manufacturing Co., Inc., a Dayton Superior Company; Aquafilm.
e. Dayton Superior Corporation; Sure Film.
f. Euclid Chemical Company (The); Eucobar.
g. Kaufman Products, Inc.; Vapor Aid.
h. Lambert Corporation; Lambco Skin.
i. L&M Construction Chemicals, Inc.; E-Con.
j. MBT Protection and Repair, Div. of ChemRex; Confilm.
k. Meadows, W. R., Inc.; Sealtight Evapre.
l. Metalcrete Industries; Waterhold.
m. Nox-Crete Products Group, Kinsman Corporation; Monofilm.
n. Sika Corporation, Inc.; SikaFilm.
o. Symons Corporation, a Dayton Superior Company; Finishing Aid.
p. Unitex; Pro-Film.
q. US Mix Products Company; US Spec Monofilm ER.
r. Vexcon Chemicals, Inc.; Certi-Vex EnvioAssist.

B. Absorptive Cover: AASHTO M 182, Class 2, burlap cloth made from jute or kenaf, weighing approximately 9 oz./sq. yd. when dry.

C. Moisture-Retaining Cover: ASTM C 171, polyethylene film or white burlap-polyethylene sheet.

D. Water: Potable.

E. Clear, Waterborne, Membrane-Forming Curing Compound: ASTM C 309, Type 1, Class B, dissipating.

1. Products:

a. Anti-Hydro International, Inc.; AH Curing Compound #2 DR WB.
b. Burke by Edoco; Aqua Resin Cure.
c. ChemMasters; Safe-Cure Clear.
d. Conspec Marketing & Manufacturing Co., Inc., a Dayton Superior Company; W.B. Resin Cure.
e. Dayton Superior Corporation; Day Chem Rez Cure (J-11-W).
f. Euclid Chemical Company (The); Kurez DR VOX.
g. Kaufman Products, Inc.; Thinfilm 420.
h. Lambert Corporation; Aqua Kure-Clear.
i. L&M Construction Chemicals, Inc.; L&M Cure R.
j. Meadows, W. R., Inc.; 1100 Clear.
k. Nox-Crete Products Group, Kinsman Corporation; Resin Cure E.
l. Symons Corporation, a Dayton Superior Company; Resi-Chem Clear Cure.
m. Tamms Industries, Inc.; Horncure WB 30.
n. Unitex; Hydro Cure 309.
o. US Mix Products Company; US Spec Maxcure Resin Clear.
p. Vexcon Chemicals, Inc.; Certi-Vex Enviocure 100.

F. Clear, Waterborne, Membrane-Forming Curing and Sealing Compound: ASTM C 1315, Type 1, Class A.

1. Products:
a. .

2.8 RELATED MATERIALS

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

B. Semirigid Joint Filler: Two-component, semirigid, 100 percent solids, epoxy resin with a Type A shore durometer hardness of 80 per ASTM D 2240.

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

D. Epoxy Bonding Adhesive: ASTM C 881, two-component epoxy resin, capable of humid curing and bonding to damp surfaces, of class suitable for application temperature and of grade to suit requirements, and as follows:

1. Types I and II, non-load bearing, for bonding hardened or freshly mixed concrete to hardened concrete.

2.9 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. 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.
6. 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**] [**0.15**] [**0.30**] [**1.00**] percent by weight of cement.

2.10 CONCRETE MIXTURES FOR BUILDING ELEMENTS

A. Footings: Proportion normal-weight concrete mixture as follows:

1. Minimum Compressive Strength: 4000 psi at 28 days.
2. Maximum Water-Cementitious Materials Ratio: 0.45.
3. Slump Limit: 5 inches 8 inches for concrete with verified slump of 2 to 4 inches before adding high-range water-reducing admixture or plasticizing admixture, plus or minus 1 inch.

B. Foundation Walls: Proportion normal-weight concrete mixture as follows:

1. Minimum Compressive Strength: 4000 psi at 28 days.
2. Maximum Water-Cementitious Materials Ratio: 0.45.
3. Slump Limit: 5 inches 8 inches for concrete with verified slump of 2 to 4 inches before adding high-range water-reducing admixture or plasticizing admixture, plus or minus 1 inch.

C. Slabs-on-Grade: Proportion normal-weight concrete mixture as follows:

1. Minimum Compressive Strength: 4000 psi at 28 days.
2. Minimum Cementitious Materials Content: 520 lb/cu. yd..
3. Slump Limit: 5 inches, plus or minus 1 inch.

2.11 FABRICATING REINFORCEMENT

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

2.12 CONCRETE MIXING

A. Ready-Mixed Concrete: Measure, batch, mix, and deliver concrete according to ASTM C 94/C 94M and ASTM C 1116, 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. Limit concrete surface irregularities, designated by ACI 347R as abrupt or gradual, as follows:

1. Class B, 1/4 inch for rough-formed finished surfaces.

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

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

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

F. Set edge forms, bulkheads, and intermediate screed strips for slabs to achieve required elevations and slopes in finished concrete surfaces. Provide and secure units to support screed strips; use strike-off templates or compacting-type screeds.

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

H. Form openings, chases, offsets

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.

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.

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 75 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.

1.

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.

1. Weld reinforcing bars according to AWS D1.4, where indicated.

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

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

3.5 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 Architect.

1. Place joints perpendicular to main reinforcement. Continue reinforcement across construction joints, unless otherwise indicated. Do not continue reinforcement through sides of strip placements of floors and slabs.
2. Locate horizontal joints in walls and columns at underside of floors, slabs, beams, and girders and at the top of footings or floor slabs.
3. Space vertical joints in walls as indicated. Locate joints beside piers integral with walls, near corners, and in concealed locations where possible.
4. Use a bonding agent at locations where fresh concrete is placed against hardened or partially hardened concrete surfaces.
5. Use epoxy-bonding adhesive at locations where fresh concrete is placed against hardened or partially hardened concrete surfaces.

C. Contraction Joints in Slabs-on-Grade: Form weakened-plane contraction joints, sectioning concrete into areas as indicated. Construct contraction joints for a depth equal to at least one-fourth of concrete thickness as follows:

1. Sawed Joints: Form contraction joints with power saws equipped with shatterproof abrasive or diamond-rimmed blades. Cut 1/8-inch- wide joints into concrete when cutting action will not tear, abrade, or otherwise damage surface and before concrete develops random contraction cracks.

D.

3.6 CONCRETE PLACEMENT

A. Before placing concrete, verify that installation of formwork, reinforcement, and embedded items is complete and that required inspections have been performed.

B. Do not add water to concrete during delivery, at Project site, or during placement unless approved by Architect.

C. Before test sampling and placing concrete, water may be added at Project site, subject to limitations of ACI 301.

1. Do not add water to concrete after adding high-range water-reducing admixtures to mixture.

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

1. Deposit concrete in horizontal layers of depth 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 floors and slabs in a continuous operation, within limits of construction joints, until placement of a panel or section is complete.

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

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

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

G. Hot-Weather Placement: Comply with ACI 301 and as follows:

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

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. 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 FLOORS AND SLABS

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

B. Scratch Finish: While still plastic, texture concrete surface that has been screeded and bull-floated or darbied. Use stiff brushes, brooms, or rakes to produce a profile amplitude of 1/4 inch in 1 direction.

1. Apply scratch finish to surfaces indicated and to receive concrete floor toppings to receive mortar setting beds for bonded cementitious floor finishes.

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 or darbying concrete, but before float finishing.

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

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

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

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

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

2. 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 indicated 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 one 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 FIELD QUALITY CONTROL

A. Testing and Inspecting: Owner will engage a special inspector qualified testing and inspecting agency to perform field tests and inspections and prepare test reports.

B. Inspections:

1. Steel reinforcement placement.
2. Headed bolts and studs.
3. Verification of use of required design mixture.
4. Curing procedures and maintenance of curing temperature.
5. Verification of concrete strength before removal of shores and forms from beams and slabs.

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

1. Testing Frequency: Obtain one composite sample for each day's pour of each concrete mixture exceeding 5 cu. yd. (4 cu. m), but less than 25 cu. yd. (19 cu. m), plus one set for each additional 50 cu. yd. (38 cu. m) or fraction thereof.
2. Testing Frequency: Obtain at least one composite sample for each 100 cu. yd. (76 cu. m) or fraction thereof of each concrete mixture placed each day.

    a. When frequency of testing will provide fewer than five compressive-strength tests for each concrete mixture, testing shall be conducted from at least five randomly selected batches or from each batch if fewer than five are used.

3. Slump: ASTM C 143/C 143M; 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.
4. Concrete Temperature: ASTM C 1064/C 1064M; 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. Unit Weight: ASTM C 567, fresh unit weight of structural lightweight concrete; one test for each composite sample, but not less than one test for each day's pour of each concrete mixture.
6. Compression Test Specimens: ASTM C 31/C 31M.

a. Cast and laboratory cure two sets of two standard cylinder specimens for each composite sample.
b. Cast and field cure two sets of two standard cylinder specimens for each composite sample.

7. Compressive-Strength Tests: ASTM C 39/C 39M; test one set of two laboratory-cured specimens at 7 days and one set of two specimens at 28 days.

a. Test one set of two field-cured specimens at 7 days and one set of two specimens at 28 days.
b. A compressive-strength test shall be the average compressive strength from a set of two specimens obtained from same composite sample and tested at age indicated.

8. When strength of field-cured cylinders is less than 85 percent of companion laboratory-cured cylinders, Contractor shall evaluate operations and provide corrective procedures for protecting and curing in-place concrete.
9. Strength of each concrete mixture will be satisfactory if every average of any three consecutive compressive-strength tests equals or exceeds specified compressive strength and no compressive-strength test value falls below specified compressive strength by more than 500 psi.
10. Test results shall be reported in writing to Architect, concrete manufacturer, and Contractor within 48 hours of testing. Reports of compressive-strength tests shall contain Project identification name and number, date of concrete placement, name of concrete testing and inspecting agency, location of concrete batch in Work, design compressive strength at 28 days, concrete mixture proportions and materials, compressive breaking strength, and type of break for both 7- and 28-day tests.
11. Nondestructive Testing: Impact hammer, sonoscope, or other nondestructive device may be permitted by Architect but will not be used as sole basis for approval or rejection of concrete.
12. Additional Tests: Testing and inspecting agency shall make additional tests of concrete when test results indicate that slump, air entrainment, compressive strengths, or other requirements have not been met, as directed by Architect. Testing and inspecting agency may conduct tests to determine adequacy of concrete by cored cylinders complying with ASTM C 42/C 42M or by other methods as directed by Architect.
13. Additional testing and inspecting, at Contractor's expense, will be performed to determine compliance of replaced or additional work with specified requirements.
14. Correct deficiencies in the Work that test reports and inspections indicate does not comply with the Contract Documents.

D. Measure floor and slab flatness and levelness according to ASTM E 1155 within 24 hours of finishing.

END OF SECTION

SECTION 044200 - EXTERIOR STONE CLADDING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. This Section includes the following types of dimension stone:

1. Natural Stone Veneer
2. Natural Stone copings

1.3 DEFINITIONS

A. Definitions contained in ASTM C 119 apply to this Section.

B. Dimension Stone Cladding System: An exterior wall covering system consisting of dimension stone panels and trim together with anchors, fasteners, and sealants used to secure the stone to building structure and to produce a weather-resistant covering.

1.4 PERFORMANCE REQUIREMENTS

A. General: Design stone anchors and anchoring systems according to ASTM C 1242.

B. Structural Performance: Provide dimension stone cladding system capable of withstanding the effects of gravity loads

C. Thermal Movements: Provide dimension stone cladding system that allows for thermal movements resulting from the following maximum change (range) in ambient and surface temperatures by preventing displacement of stone, opening of joints, overstressing of components, failure of joint sealants, failure of connections, and other detrimental effects. Base engineering calculation on surface temperatures of materials due to both solar heat gain and nighttime-sky heat loss.

1. Temperature Change (Range): 120 deg F, ambient; 180 deg F, material surfaces.

D. Safety Factors for Stone: Design dimension stone cladding system to withstand loads indicated without exceeding allowable working stress of stone determined by dividing stone's average ultimate strength, as established by testing, by the following safety factors:

1. Safety Factor for Oolitic Limestone: 8.
2. Safety Factor for Concentrated Stresses: 10 for stone varieties other than granite.

E. Control of Corrosion and Staining: Prevent galvanic and other forms of corrosion as well as staining by isolating metals and other materials from direct contact with incompatible materials. Use materials that do not stain exposed surfaces of stone and joint materials.

1.5 ACTION SUBMITTALS

A. Product Data with Shop Drawings:

1. Product Data: For each variety of stone, stone accessory, and other manufactured products indicated.
2. Shop Drawings: Show fabrication and installation details for dimension stone cladding system, including dimensions and profiles of stone units.

    a. Show locations and details of joints both within dimension stone cladding system and between dimension stone cladding system and other construction.
    b. Show locations and details of anchors.
    c. 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.

B. Samples for Verification:

1. Sets for each color, grade, finish, and variety of stone required; not less than 12 inches square.

    a. Sets shall consist of at least five Samples, exhibiting extremes of the full range of color and other visual characteristics expected and will establish the standard by which stone will be judged.

2. Colored Pointing Mortar: For each color required, showing the full range of exposed color and texture expected in the completed Work.

1.6 INFORMATIONAL SUBMITTALS

A. Cold-Weather Procedures: Detailed description of methods, materials, and equipment to be used to comply with cold-weather requirements.

1.7 QUALITY ASSURANCE

A. Installer Qualifications: A firm or individual experienced in installing dimension stone cladding systems similar in material, design, and extent to that indicated for this Project, whose work has a record of successful in-service performance.

B. Fabricator Qualifications: Shop that employs skilled workers who custom-fabricate dimension stone cladding systems similar to that required for this Project and whose products have a record of successful in-service performance.

1. Fabricator's responsibilities include fabricating dimension stone cladding and providing professional engineering services needed to assume engineering responsibility.

C. Source Limitations for Stone: Obtain stone, from a single quarry with resources to provide materials of consistent quality in appearance and physical properties.

1. For stone types that include same list of varieties and sources, provide same variety from same source for each.
2. Make quarried blocks available for examination by Architect for appearance characteristics.

D. Source Limitations for Other Materials: Obtain each stone accessory l from a single manufacturer for each product.

E. Preconstruction Field Testing of Sealants: Before installing joint sealants, field test their adhesion to joint substrates per requirements specified in Division 07 Section "Joint Sealants."

F. Mockups: Build mockups to verify selections made under sample submittals and to demonstrate aesthetic effects and set quality standards for materials and execution.

1. Build mockup of typical wall area as shown on Drawings.
2. Build mockups of typical exterior wall with dimension stone cladding, approximately 72 inches long by 48 inches high.

a. Show typical components, and methods of installation.

3. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless such deviations are specifically approved by Architect in writing.
4. Approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

G. Damaged Stone: Installed damaged stone is not acceptable and shall be removed and replaced with new undamaged stone as determined by Architect.

1.8 DELIVERY, STORAGE, AND HANDLING

A. Store and handle stone and related materials to prevent deterioration or damage due to moisture, temperature changes, contaminants, corrosion, breaking, chipping, and other causes.

1. Lift stone with wide-belt slings; do not use wire rope or ropes that might cause staining. Move stone, if required, using dollies with cushioned wood supports.
2. Store stone on wood skids or pallets with nonstaining, waterproof covers. Arrange to distribute weight evenly and to prevent damage to stone. Ventilate under covers to prevent condensation.

B. Mark stone units, on surface that will be concealed after installation, with designations used on Shop Drawings to identify individual stone units. Orient markings on vertical panels so that they are right side up when units are installed.

1.9 PROJECT CONDITIONS

A. Protect dimension stone cladding during erection as follows:

1. Cover tops of dimension stone cladding installation with nonstaining, waterproof sheeting at end of each day's work. Cover partially completed structures when work is not in progress. Extend cover a minimum of 24 inches down both sides and hold securely in place.
2. Prevent staining of stone from mortar, grout, sealants, and other sources. Immediately remove such materials without damaging stone.
3. Protect base of walls from rain-splashed mud and mortar splatter by coverings spread on ground and over wall surface.
4. Protect sills, ledges, and projections from mortar and sealant droppings.

B. Cold-Weather Requirements: Do not use frozen materials or materials mixed or coated with ice or frost. Remove and replace dimension stone cladding damaged by frost or freezing conditions.

1. Comply with cold-weather construction and protection requirements for masonry contained in ACI 530.1/ASCE 6/TMS 602.
2. Cold-Weather Construction: When ambient temperature is within limits indicated, use the following procedures:

    a. At 40 deg F and below, produce mortar temperatures between 40 and 120 deg F by heating mixing water, sand, or both. Do not heat water to above 160 deg F.
    b. At 32 deg F and below, maintain temperature of mortar on boards above freezing. Heat stone and substrates so they are above 32 deg F at time of installation.
    c. At 25 to 20 deg F, heat both sides of walls under construction. Use windbreaks or enclosures when wind velocity exceeds 15 mph.
    d. At 20 deg F and below, provide enclosure and auxiliary heat to maintain air temperature above 32 deg F within enclosure.

3. Cold-Weather Protection: When mean daily temperature is within limits indicated, provide the following protection for 48 hours after construction:

    a. 40 to 25 Deg F: Cover dimension stone cladding with a weather-resistant membrane.
    b. 25 to 20 Deg F: Cover dimension stone cladding with weather-resistant, insulating blankets or provide enclosure and heat to maintain air temperature above 32 deg F within enclosure. Use windbreaks or enclosures when wind velocity exceeds 15 mph.
    c. 20 Deg F and below: Provide enclosure and heat to maintain air temperature above 32 deg F within enclosure.

C. Hot-Weather Requirements: Comply with hot-weather construction and protection requirements for masonry contained in ACI 530.1/ASCE 6/TMS 602.

1.10 COORDINATION

A. Coordinate installation of inserts that are to be embedded in concrete or masonry, flashing reglets, and similar items to be used by dimension stone cladding Installer for anchoring, supporting, and flashing of dimension stone cladding system. Furnish setting drawings, templates, and directions for installing such items and deliver to Project site in time for installation.

B. Time delivery and installation of dimension stone cladding to avoid extended on-site storage and to coordinate with work adjacent to dimension stone cladding.

PART 2 - PRODUCTS

A. LIMESTONE Limestone: Comply with ASTM C 568.

1. Classification: II Medium-Density.
2. Description: Oolitic limestone.

B. Variety and Sources: Basis of Design: Flatrock Buff Rubble as sourced by Estes Material Sales, Hope Indiana or approved equivalent Indiana oolitic limestone quarried in Lawrence, Monroe, or Owen Counties, Indiana.

C. Indiana Oolitic Limestone Grade and Color: Rustic, buff, according to grade and color classification established by ILI.

D. Stone to be natural quarried rectangular blocks with irregular faces. Match Architect's samples for color, finish, and other stone characteristics relating to aesthetic effects.

E. Thickness: Not less than 4 inches for Veneer and 2" for wall coping material unless otherwise indicated.

2.2 STONE ACCESSORIES

A. Sealants for Joints in Dimension Stone Cladding: Manufacturer's standard chemically curing, elastomeric sealants of base polymer and characteristics indicated below that comply with applicable requirements in Division 07 Section "Joint Sealants" and do not stain stone.

1. Colors: Provide colors of exposed sealants to comply with the following requirement:

a. Provide color as selected by Architect from manufacturer's full range.

2.3 STONE FABRICATION

A. General: Fabricate stone units in sizes and shapes required to comply with requirements indicated, including details on Drawings and Shop Drawings.

B. Control depth of stone and back check to maintain minimum clearance of 1 inch between backs of stone units and surfaces or projections of structural members, fireproofing (if any), backup walls, and other work behind stone.

C. Dress joints (bed and vertical) straight and at right angle to face, unless otherwise indicated. Shape beds to fit supports.

D. Cut and drill sinkages and holes in stone for anchors, fasteners, supports, and lifting devices as indicated or needed to set stone securely in place.

E. Finish exposed faces and edges of stone to comply with requirements indicated for finish and to match approved samples and mockups.

F. Cut stone to produce uniform joints 3/8 inch (10 mm) wide and in locations indicated.

1. If joints are not indicated, lay out joints in an economical fashion with the least amount of waste and the fewest joints required. The Architect will review the quantity/locations of proposed joints during Submittals.

2. Nearest head joint in unit masonry.
   a. Nearest bed joint in unit masonry.

G. Clean backs of stone to remove rust stains, iron particles, and stone dust.

H. Inspect stone units for compliance with requirements for appearance, material, and fabrication. Replace defective units.

1. Grade and mark stone for overall uniform appearance when assembled in place. Natural variations in appearance are acceptable if installed stone units match range of colors and other appearance characteristics represented in approved samples and mockups.

2.4 MORTAR MIXES

A. General: Comply with referenced standards and with manufacturers' written instructions for mix proportions, mixing equipment, mixer speeds, mixing containers, mixing time, and other procedures needed to produce mortar of uniform quality and with optimum performance characteristics.

1. Do not use admixtures, including pigments, air-entraining agents, accelerators, retarders, water-repellent agents, antifreeze compounds, or other admixtures, unless otherwise indicated. Do not use calcium chloride.
2. Combine and thoroughly mix cementitious materials, water, and aggregates in a mechanical batch mixer, unless otherwise indicated. Discard mortar when it has reached initial set.

B. Pointing Mortar: Comply with ASTM C 270, Proportion Specification, for types of mortar indicated. Provide pointing mortar mixed to match Architect's sample and complying with the following:

1. Point limestone with Type N mortar.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine surfaces to receive dimension stone cladding and conditions under which dimension stone cladding will be installed, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance.

1. For the record, prepare written report, endorsed by Installer, listing conditions detrimental to performance of dimension stone cladding.
2. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 SETTING DIMENSION STONE CLADDING, GENERAL

A. Before setting stone clean surfaces that are dirty or stained by removing soil, stains, and foreign materials. Clean stone by thoroughly scrubbing with fiber brushes and then drenching with clear water. Use only mild cleaning compounds that contain no caustic or harsh materials or abrasives.

B. Coat limestone with dampproofing to extent indicated below:

1. Stone at Grade: Beds, joints, and back surfaces to at least 12 inches above finish-grade elevations.
2. Stone Extending below Grade: Beds, joints, back surfaces, and face surfaces below grade.

C. Execute dimension stone cladding installation by skilled mechanics and employ skilled stone fitters at Project site to do necessary field cutting as stone is set.

1. Use power saws with diamond blades to cut stone. Produce lines cut straight and true, with edges eased slightly to prevent snipping.

D. Contiguous Work: Provide reveals, reglets, and openings as required to accommodate contiguous work.

E. Set stone to comply with requirements indicated on Drawings and Shop Drawings. Install anchors, supports, fasteners, and other attachments indicated or necessary to secure dimension stone cladding in place. Shim and adjust anchors, supports, and accessories to set stone accurately in locations indicated with uniform joints of widths indicated and with edges and faces aligned according to established relationships and indicated tolerances.

F. Keep cavities open where unfilled space is indicated between back of stone units and backup wall; do not fill cavities with mortar or grout.

1. Place weep holes in joints where moisture may accumulate, including base of cavity walls, above shelf angles, and flashing. Locate weep holes at intervals not exceeding 24 inches. Use .
2. Place vents in cavity walls at tops of cavities, below shelf angles and flashing, and at intervals not exceeding 20 feet vertically. Locate vents in joints at intervals not exceeding 60 inches horizontally. Use .

3.3 INSTALLATION TOLERANCES

A. Variation from Plumb: Vary to achieve a natural rustic look.

B. Variation in Cross-Sectional Dimensions: Vary to achieve a natural rustic look.

C. |Variation in Joint Width: Vary to achieve a natural rustic look.

D. Variation in Plane between Adjacent Stone Units (Lipping): Vary to achieve a natural rustic look.

3.4 ADJUSTING AND CLEANING

A. Remove and replace broken, chipped, stained, or otherwise damaged stone, defective joints, and dimension stone cladding that does not match approved samples and mockups. Damaged stone may be repaired if Architect approves methods and results.

B. Replace in a manner that results in dimension stone cladding's matching approved samples and mockups, complying with other requirements, and showing no evidence of replacement.

C. In-Progress Cleaning: Clean dimension stone cladding as work progresses. Remove excess sealant and smears as sealant is installed.

D. Final Cleaning: Clean dimension stone cladding no fewer than six days after completion of pointing and sealing, using clean water and stiff-bristle fiber brushes. Do not use wire brushes, acid-type cleaning agents, cleaning agents containing caustic compounds or abrasives, or other materials or methods that could damage stone.

END OF SECTION

SECTION 31 20 00 - EARTHWORK

PART 1 - GENERAL

1.1 SUMMARY

A. The extent of earthwork excavation, filling and grading which is shown on the Drawings, includes but is not limited to, the following:

1. Preparing and grading subgrades for slabs-on-grade, walks, pavements, and landscaping.
2. Excavating and backfilling for all site utilities.
3. Provide and compact drainage fill material for interior slabs on grade and exterior concrete stoops to bottom of concrete.
4. Grading of areas to receive topsoil is included as part of this Work.
5. Contractor shall review, understand and follow the recommendations of the Geotechnical Engineering Report by ECS Southeast, LLP. for Midwest Gun Co – Electron Drive. Project #61-2689 dated 3/22/20222.
6. Site Preparation including interim drainage, Clearing and Grubbing and Subgrade Stabilization as delineated in Section 6 of the Geotechnical Report.

1.2 DEFINITIONS

A. Excavation consists of the removal of material encountered to subgrade elevations and the reuse or disposal of materials removed.

B. Subgrade: The uppermost surface of an excavation or the top surface of a fill or backfill immediately below subbase, drainage fill, or topsoil materials.

C. Chemical Stabilization: Chemical stabilization of the soil subgrade shall be performed in accordance with Section 208, Kentucky Department of Highways Standard Specifications.

D. Shot Rock: By-product generated from blasting techniques used to excavate rock.

E. Borrow: Soil material obtained off-site when sufficient approved soil material is not available from excavations.

F. Subbase Course: The layer placed between the subgrade and base course in a paving system or the layer placed between the subgrade and surface of a pavement or walk.

G. Base Course: The layer placed between the subbase and surface pavement in a paving system.

H. Drainage Fill: Course of washed granular material supporting slab-on-grade placed to cut off upward capillary flow of pore water.

I. Unauthorized excavation consists of removing materials beyond indicated subgrade elevations or dimensions without direction by the Architect. Unauthorized excavation, as well as remedial work directed by the Architect, shall be at the Contractor's expense.

J. Structures: Buildings, footings, foundations, retaining walls, slabs, tanks, curbs, mechanical and electrical appurtenances, or other man-made stationary features constructed above or below ground surface.

K. Pavements: Concrete or Asphalt / Bituminous paving

L. Utilities include on-site underground pipes, conduits, ducts, and cables, as well as underground services within building lines.

1.3 SUBMITTALS

A. Submit in accordance with local jurisdictional requirements.

1.4 QUALITY ASSURANCE

A. The owner will employ the services of a testing firm. The contractor is responsible for the coordination of when the testing firm is needed on site to test all fills, lifts and subgrade conditions.

B. Codes and Standards: Perform earthwork complying with requirements of OSHA and other authorities having jurisdiction.

1.5 PROJECT CONDITIONS

A. Site Information: No geotechnical report will be provided for this site. The owner/contractor is responsible for characterizing existing site conditions and utilizing sound construction practices including, but not limited to, engagement of a geotechnical engineer if soil conditions are found to be unsatisfactory.

B. Existing Utilities: Contractor shall employ an independent utility locator to locate existing underground utilities in the areas of work. If utilities are to remain in place, provide adequate means of protection during earthwork operations.

1. Should uncharted or incorrectly charted piping or other utilities be encountered during excavation, consult the Architect immediately for directions as to procedure. Cooperate with Owner and utility companies in keeping respective services and facilities in operation. Repair damaged utilities to satisfaction of utility owner.
2. Do not interrupt existing utilities serving facilities occupied and used by Owner or others, during occupied hours, except when permitted in writing by the Engineer, and then only after acceptable temporary utility services have been provided.

    a. Provide minimum of 48-hour notice to the Engineer, and receive written notice to proceed before interrupting utilities.

C. Protection of Persons and Property. Barricade open excavations occurring as part of this work and post with warning lights. Operate warning lights during hours from dusk to dawn each day and as otherwise required.

D. Demolish and completely remove from site existing underground utilities indicated to be removed. Coordinate with utility companies to shutoff services if lines are active.

1.6 SOIL COMPACTION TESTING

A. The earthwork contractor shall cooperate and coordinate with the soil testing and inspection service for quality control testing during earthwork operations as follows:

1. Field density test reports: Perform one in-place density test in every 5000 square feet for each one-foot thick fill.

2. Arrange for Soils Engineer to be on site for observation and testing during times when the following operations are being performed.

   a. Proofrolling
   b. Compaction of subgrades and fill. During compaction operations, the Soils Engineer shall carefully monitor existing foundations to detect possible foundation movements. If movement is detected, Work shall be stopped and the Engineer immediately notified.

B. Percentage of Maximum Density Requirements: Provide not less than following percentages of maximum density of soil material compacted at optimum moisture content, for the actual density of each layer of soil material in place.

1. Foundations: Compact top 12 inches of subgrade and each 8 inch layer of backfill or fill material to 98 percent Standard Proctor maximum dry density (ASTM D-698).
2. Building Slabs, Steps all concrete stoops and aprons: Compact top 12 inches of subgrade and each 8 inch layer of backfill or fill material to 98 percent Standard Proctor maximum dry density (ASTM D-698).
3. Lawn or Unpaved Areas: Compact top 6 inches of subgrade and 8 inch layer of backfill or fill material to 92 percent Standard Proctor maximum dry density (ASTM D-698).
4. Asphalt Pavements and Walkways: Compact top 8 inches of subgrade and each 8 inch layer of backfill or fill material to 95 percent Standard Proctor maximum dry density (ASTM D-698).
5. Underground Utilities: Provide the preceding requirements for the respective utility location(s).

C. Quality Control Testing During Construction: Testing service must inspect and approve subgrades and fill layers before further construction work is performed thereon. Tests of subgrades and fill layers will be taken as follows:

1. One field density test per maximum loose lift of 8 inches for each 5000 square feet of fill placed.
2. Refer to the Geotechnical Exploration Report for additional field quality control requirements.

D. If, in the opinion of the Engineer, based on reports of testing service and inspection, subgrade or fills which have been place are below specified density, additional compaction work and testing shall be provided by the Contractor for the Section of Work involved at no additional expense, until subgrades or fills meet or exceed specified density.

PART 2 - PRODUCTS

2.1 SOIL MATERIALS

A. Provide approved borrow soil materials from off-site when sufficient approved soil materials are not available from excavations.

B. Satisfactory Soil Materials: ASTM D 2487 soil classification groups CL, CH (if approved by Geotechnical Engineer for the intended use), ML, GW, GM, GC, GP, SW, SP, SM, SC if free of rock or gravel larger than 3 inches in any dimension, debris, waste, frozen materials, vegetation and other deleterious matter. Additionally follow the Geotechnical Engineers recommendations outlined in the report dated March 22,2023.

C. Unsatisfactory Soil Materials: ASTM D 2487 soil classification groups CH (if not specifically approved by Geotechnical Engineer for the intended use), MH, OL, OH, and PT.

D. Backfill and Fill Materials: Provide soil materials for backfill and fill, free of rock or gravel larger than 1 inch in any dimension, debris, waste, frozen materials, vegetable, and other deleterious matter. Material shall be as acceptable to the Soils Engineer.

1. Excavated material meeting the above requirements may be used for fill, subject to approval by the Soils Engineer.

E. Granular Backfill Material:

1. Granular material for trench backfill above pipe embedment and below structures or pavements shall be KTC #57.

F. Topsoil: Shall be fertile, friable, natural loam, surface soil, reasonably free of subsoil, clay lumps, brush, weeds, and other litter or stones larger than 1/2 inch. Source of topsoil shall be approved by the Architect prior to delivery of any topsoil on the job site.

1. Provide 6 inches minimum topsoil in lawn areas surrounding buildings.

2. Topsoil will be stockpiled for reuse in lawn work. If quantity of stockpiled topsoil is insufficient, provide additional topsoil to complete landscape work. If amount of stockpiled topsoil exceeds quantity required, spread excess on the site where directed by Architect and as shown on drawings.

G. Sand: Clean, general purpose sand, free of organic and deleterious materials.

H. Subbase and Base Material: Artificially graded mixture of crushed stone KTC # 57, KTC # 3 and DGA as indicated on the drawings.

I. Engineered Fill: Chemically Stabilized fill or Shot Rock fill as delineated in the Geotechnical Report.

J. Bedding Material: Subbase or base materials KTC # 57.

K. Drainage Fill: Washed, evenly graded mixture of crushed stone, or crushed or uncrushed gravel, ASTM D 448, coarse aggregate grading size 57, with 100 percent passing a 1-1/2-inch sieve and not more than 5 percent passing a No. 200 sieve. See requirements for sand cushion immediately under building slabs in Execution Section.

L. Filtering Material: Evenly graded mixture of natural or crushed gravel or crushed stone KTC # 9 stone.

M. Impervious Fill: Clayey gravel and sand mixture capable of compacting to a dense state.

2.2 ACCESSORIES

A. Filter Fabric: Manufacturer's standard nonwoven pervious geotextile fabric of polypropylene, nylon or polyester fibers, or a combination.

1. Provide filter fabrics that meet or exceed the listed minimum physical properties determined according to ASTM D 4759 and the referenced standard test method in parentheses:

a. Grab Tensile Strength (ASTM D 4632): 100 lb.
b. Apparent Opening Size (ASTM D 4751): #100 U.S. Standard sieve.
c. Permeability (ASTM D 4491): 150 gallons per minute per sq. ft.

PART 3 - EXECUTION

3.1 INSPECTION

A. Examine the areas and conditions under which excavating, filling, and grading are to be performed and notify the Architect in writing of conditions detrimental to the proper and timely completion of the Work. Do not proceed with the Work until unsatisfactory conditions have been corrected in an acceptable manner.

B. Proofrolling: After topsoil has been stripped and excavation made to required subgrade elevations, proofroll areas to be occupied by the new buildings and paved surface areas using a medium weight roller. A representative from the Owner, Engineer and the Soil Testing and Inspection Laboratory shall be present during all proofrolling operations. Soft of yielding pockets shall be cut out and replaced with a compactible fill.

3.2 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. Protect subgrades and foundation soils against freezing temperatures or frost. Provide protective insulating materials as necessary.

C. Provide erosion control measures to prevent erosion or displacement of soils and discharge of soil-bearing water runoff or airborne dust to adjacent properties and walkways.

3.3 DEWATERING

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

B. Protect subgrades and foundation soils from softening and damage by rain or water accumulation.

C. Refer to Section 31 23 19 for additional requirements.

3.4 EXCAVATION

A. All excavation is Unclassified Excavation

3.5 STABILITY OF EXCAVATIONS

A. Comply with local codes, ordinances, and requirements of authorities having jurisdiction to maintain stable excavations.

B. Stability of Excavations: Slope sides of excavations to comply with codes and ordinances having jurisdiction and OSHA. Shore and brace where sloping is not possible either because of space restriction or stability of material excavated.

1. Maintain sides and slopes of excavations in a safe condition until completion of backfilling.

C. Shoring and Bracing: Provide materials for shoring and bracing such as sheet piling, uprights, stringers, and cross-braces in good serviceable condition.

1. Provide minimum requirements for trench shoring and bracing to complete with local codes and authorities having jurisdiction.

2. Maintain shoring and bracing in excavations regardless of time period excavations will be open. Carry down shoring and bracing as excavation progresses.

3.6 EXCAVATION FOR STRUCTURES

A. Excavate to indicated elevations and dimensions within a tolerance of plus or minus 0.10 foot. Extend excavations a sufficient distance from structures for placing and removing concrete formwork, installing services and other construction, and for inspections.

1. Excavations for Footings and Foundations: Do not disturb bottom of excavation. Excavate by hand to final grade just before placing concrete reinforcement. Trim bottoms to required lines and grades to leave solid base to receive other work.

2. Pile Foundations: Stop excavations from 6 inches to 12 inches above bottom of footing before piles are placed. After piles have been driven, remove loose and displaced material. Excavate to final grade, leaving solid base to receive concrete pile caps.

3. Excavation for Underground Tanks, Basins, and Mechanical or Electrical Appurtenances: Excavate to elevations and dimensions indicated within a tolerance of plus or minus 0.10 foot. Do not disturb bottom of excavations intended for bearing surface.

3.7 EXCAVATION FOR WALKS AND PAVEMENTS

A. Excavate surfaces under walks and pavements to indicated cross sections, elevations, and grades.

3.8 EXCAVATION FOR UTILITY TRENCHES

A. Excavate trenches to indicated slopes, lines, depths, and invert elevations.

1. Beyond building perimeter, excavate trenches to depth as indicated on the plans.

B. Excavate trenches to uniform widths to provide a working clearance on each side of pipe or conduit. Excavate trench walls vertically from trench bottom to 12 inches higher than top of pipe or conduit, unless otherwise indicated.

1. Clearance: As indicated

C. Trench Bottoms: Excavate and shape trench bottoms to provide uniform bearing and support of pipes and conduit. Shape subgrade to provide continuous support for bells, joints, and barrels of pipes and for joints, fittings, and bodies of conduits. Remove stones and sharp objects to avoid point loading.

1. For pipes or conduit less than 6 inches in nominal diameter and flat-bottomed, multiple-duct conduit units, hand-excavate trench bottoms and support pipe and conduit on an undisturbed subgrade.
2. For pipes and conduit 6 inches or larger in nominal diameter, shape bottom of trench to support bottom 90 degrees of pipe circumference. Fill depressions with tamped sand backfill.
3. Where encountering rock or another unyielding bearing surface, carry trench excavation 6 inches below invert elevation to receive bedding course.

3.9 APPROVAL OF SUBGRADE

A. Notify Geotechnical Engineer when excavations have reached required subgrade.

B. When Geotechnical Engineer determines that unforeseen unsatisfactory soil is present, continue excavation and replace with compacted backfill or fill material as directed.

1. Unforeseen additional excavation and replacement material will be paid according to the Contract provisions for changes in work as directed by the Geotechnical Engineer

C. Reconstruct subgrades damaged by freezing temperatures, frost, rain, accumulated water, or construction activities, as directed by the Geotechnical Engineer.

3.10 UNAUTHORIZED EXCAVATION

A. Fill unauthorized excavation under foundations or wall footings by extending indicated bottom elevation of concrete foundation or footing to excavation bottom, without altering required top elevation. Lean concrete fill may be used to bring elevations to proper position when acceptable to the Geotechnical Engineer.

1. Fill unauthorized excavations under other construction as directed by the Geotechnical Engineer.

B. Where indicated widths of utility trenches are exceeded, provide stronger pipe, or special installation procedures, as required by the Geotechnical Engineer.

3.11 STORAGE OF SOIL MATERIALS

A. Stockpile excavated materials acceptable for backfill and fill soil materials, including acceptable borrow materials. Stockpile soil materials without intermixing. Place, grade, and shape stockpiles to drain surface water. Cover to prevent wind-blown dust.

1. Stockpile soil materials away from edge of excavations. Do not store within drip line of remaining trees.

3.12 BACKFILL

A. Backfill excavations promptly, but not before completing the following:

1. Acceptance of construction below finish grade including, where applicable, dampproofing, waterproofing, and perimeter insulation.

2. Surveying locations of underground utilities for record documents.
3. Testing, inspecting, and approval of underground utilities.
4. Concrete formwork removal.
5. Removal of trash and debris from excavation.
6. Removal of temporary shoring and bracing, and sheeting.
7. Installing permanent or temporary horizontal bracing on horizontally supported walls.

3.13 UTILITY TRENCH BACKFILL

A. Place and compact bedding course on rock and other unyielding bearing surfaces and to fill unauthorized excavations. Shape bedding course to provide continuous support for bells, joints, and barrels of pipes and for joints, fittings, and bodies of conduits.

B. Concrete backfill trenches that carry below or pass under footings and that are excavated within 18 inches of footings. Place concrete to level of bottom of footings.

C. Provide 4-inch-thick concrete base slab support for piping or conduit less than 2'-6" below surface of roadways. After installation and testing, completely encase piping or conduit in a minimum of 4 inches of concrete before backfilling or placing roadway subbase.

D. Place and compact initial backfill of satisfactory soil material or subbase material free of particles larger than 1 inch, to a height of 12 inches over the utility pipe or conduit.

1. Carefully compact material under pipe haunches and bring backfill evenly up on both sides and along the full length of utility piping or conduit to avoid damage or displacement of utility system.

E. Coordinate backfilling with utilities testing.

F. Fill voids with approved backfill materials as shoring and bracing, and sheeting is removed.

G. Place and compact final backfill of satisfactory soil material to final subgrade.

H. Install warning tape directly above utilities, 12 inches below finished grade, except 6 inches below subgrade under pavements and slabs.

3.14 SUBSURFACE DRAINAGE BACKFILL

A. Subsurface Drain: Place a layer of filter fabric around perimeter of drainage trench or at footing, as indicated. Place a 6-inch compacted course of filtering material on filter fabric to support drainage pipe. After installing and testing, encase drainage pipe in a minimum of 6 inches of compacted filtering material and wrap in filter fabric, overlapping edges at least 6 inches.

B. Drainage Backfill: Place and compact drainage backfill of filtering material over subsurface drain, in width indicated, to within 12 inches of final subgrade. Overlay drainage backfill with one layer of filter fabric, overlapping edges at least 6 inches.

C. Impervious Fill: Place and compact impervious fill material over drainage backfill to final subgrade.

3.15 FILL

A. Preparation: Remove vegetation, topsoil, debris, wet, and unsatisfactory soil materials,

obstructions, and deleterious materials from ground surface prior to placing fills.

1. Plow strip, or break up sloped surfaces steeper than 1 vertical to 4 horizontal so fill material will bond with existing surface.

B. When subgrade or existing ground surface to receive fill has a density less than that required for fill, break up ground surface to depth required, pulverize, moisture-condition or aerate soil and recompact to required density.

C. Place fill material in layers to required elevations for each location listed below.

1. Under grass, use satisfactory excavated or borrow soil material.
2. Under walks and pavements, use engineered fill.
3. Under steps and ramps, use engineered fill.
4. Under building slabs, use engineered fill material.
5. Under footings and foundations, use engineered fill.

3.16 MOISTURE CONTROL

A. Uniformly moisten or aerate subgrade and each subsequent fill or backfill layer before compaction to within 2 percent of optimum moisture content.

1. Do not place backfill or fill material on surfaces that are muddy, frozen, or contain frost or ice.

2. Remove and replace, or scarify and air-dry satisfactory soil material that is too wet to compact to specified density.

a. Stockpile or spread and dry removed wet satisfactory soil material.

3.17 COMPACTION

A. Place backfill and fill materials in layers not more than 8 inches in loose depth for material compacted by heavy compaction equipment, and not more than 4 inches in loose depth for material compacted by hand-operated tampers.

B. Place backfill and fill materials evenly on all sides of structures to required elevations. Place backfill and fill uniformly along the full length of each structure.

C. Percentage of Maximum Density Requirements: Refer to Paragraph 1.7 of this Section.

3.18 GRADING

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

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

B. Site Grading: Slope grades to direct water away from buildings and to prevent ponding. Finish subgrades to required elevations within the following tolerances:

1. Lawn or Unpaved Areas: Plus or minus 0.10 foot.
2. Walks: Plus or minus 1/4 inch.
3. Pavements: Plus or minus 1/2 inch.

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

D. Grading Outside Building Lines: Grade areas adjacent to building to drain away from structures and to prevent ponding. Finish surfaces free from irregular surface changes and as follows:

1. Grassed Areas: Finish areas to receive topsoil to within not more than 0.10 foot above or below the required subgrade elevations.
2. Walks: Shape surface of areas under walks to line, grade, and cross-section with finish surface not more than 0.05 foot above or below the required subgrade elevation.
3. Paved Areas: Shape surface of areas under paved areas to line, grade, and cross-section with finish surface not more than 1/4 inch above or below the required subgrade elevation.

E. Grading Surface of Fill Under Building Slabs and Footings: Grade smooth and even, free of voids, compacted as specified, and to required elevation. Provide final grades within a tolerance of 1/4 inch when tested with a 10 foot straightedge.

F. Topsoil Spreading: Stripped and stockpiled topsoil shall be uniformly spread on areas indicated on the Drawings to be seeded, to a minimum thickness of 6 inches. Finish elevation of topsoil shall be as indicated on the Drawings. Topsoil shall be a minimum thickness of 9 inches directly surrounding the building to allow drainage away form the building.

3.19 SUBBASE AND BASE COURSES

A. Under pavements and walks, place subbase course material on prepared subgrades. Place base course material over subbases to pavements.

1. Compact subbase and base courses at optimum moisture content to required grades, lines, cross sections and thickness to not less than 95 percent of ASTM D-698 relative density.
2. Shape subbase and base to required crown elevations and cross-slope grades.
3. When thickness of compacted subbase or base course is 6 inches or less, place materials in a single layer.
4. When thickness of compacted subbase or base course exceeds 6 inches, place materials in equal layers, with no layer more than 6 inches thick or less than 3 inches thick when compacted.

3.20 ENGINEERED FILL

A. Under slabs-on-grade, place engineered / chemically stabilized fill or Shot Rock course on prepared subgrade.

1. Compact minimum of 4 inches of well graded crushed stone or angular sand (e.g., Kentucky DGA or manufactured sand.
2. When compacted thickness of crushed stone of angular sand fill is 6 inches or less, place materials in a single layer.

3. When compacted thickness of crushed stone or angular sand fill exceeds 6 inches thick place materials in equal layers, with no layer more than 6 inches thick nor less than 3 inches thick when compacted.

3.21 FIELD QUALITY CONTROL

A. Testing Agency Services: Allow testing agency to inspect and test each subgrade and each fill or backfill layer. Do not proceed until test results for previously completed work verify compliance with requirements.

1. When field in-place density tests are performed using nuclear methods, make calibration checks of both density and moisture gages at beginning of work, on each different type of material encountered, and at intervals as directed by the Architect.
2. Footing Subgrade: At footing subgrades, perform at least one test of each soil stratum to verify design bearing capacities. Subsequent verification and approval of other footing subgrades may be based on a visual comparison of each subgrade with related tested strata when acceptable to the Architect.
3. Paved and Building Slab Areas: At subgrade and at each compacted fill and backfill layer, perform at least one field in-place density test for every 5,000 sq. ft. or less of paved area or building slab, but in no case fewer than three tests.
4. Foundation Wall Backfill: In each compacted backfill layer, perform at least one field in-place density test for each 100 feet or less of wall length, but no fewer than two tests along a wall face.
5. Trench Backfill: In each compacted initial and final backfill layer, perform at least one field in-place density test for each 150 feet or less of trench, but no fewer than two tests.

B. When testing agency reports that subgrades, fills, or backfills are below specified density, scarify and moisten or aerate, or remove and replace soil to the depth required, re-compact and retest until required density is obtained.

3.22 PROTECTION

A. Protecting Graded Areas: Protect newly graded areas from traffic, freezing, and erosion. Keep free of trash and debris.

B. Repair and re-establish grades to specified tolerances where completed or partially completed surfaces become eroded, rutted, settled, or lose compaction due to subsequent construction operations or weather conditions.

1. Scarify or remove and replace material to depth directed by the Architect; reshape and recompact at optimum moisture content to the required density.

C. Settling: Where settling occurs during the Project correction period, remove finished surfacing, backfill with additional approved material, compact, and reconstruct surfacing.

1. Restore appearance, quality, and condition of finished surfacing to match adjacent work, and eliminate evidence of restoration to the greatest extent possible.

3.23 DISPOSAL OF EXCESS AND WASTE MATERIALS

A. Disposal: Remove waste material, including unsatisfactory soil, trash, and debris, and

legally dispose of it off the Owner's property.

END OF SECTION 31 20 00

SECTION 31 22 00 EROSION CONTROL

PART 1 - GENERAL

1.1 SUMMARY

A. All erosion, sedimentation and water pollution control features shall be in place or relocated as designated on the plans prior to the start of any clearing, grubbing, grading or construction. Contractor shall be responsible for the installation and maintenance of all temporary erosion control features

B. Location of the control features shall be in accordance with the Drawings to facilitate drainage and control erosion and sedimentation within and adjacent to the site.

C. Control features are defined as, but not limited to, temporary sediment basin, reinforced silt fences, headwall and inlet protection.

D. Related Work Specified Elsewhere:

1. Earthwork, Section 312000
2. Site Clearing, Section 311000
3. Stormwater Pollution Prevention Plan (Attached)

1.2 PERMITS

A. The Owner will apply for the permits listed below for the construction of the project. The Contractor shall be responsible for complying with the terms of the permit and for securing any other permits that may be required for the project.

1. Kentucky Pollutant Discharge Elimination System (KPDES) Notice of Intent (NOI) for Storm Water Discharges Associated with Industrial Activity Under the KDPES General Permit.
2. Approval by the Metropolitan Sewer District – Site Disturbance Permit.

1.3 CONTROL OF CONTRACTOR'S OPERATIONS WHICH MAY RESULT IN WATER POLLUTION

A. Take sufficient precautions to prevent pollution of streams, ditches, wetlands and other sensitive areas with silt, sediment, fuels, oils, bitumens, calcium chloride, or other harmful materials. Conduct and schedule operations so as to avoid or otherwise minimize pollution or siltation of such streams, etc. and to avoid interference with movement of migratory fish. Do not dump the residue from dust collectors or washers into any water body.

B. Construction operations in swales, ditches and streams shall be restricted to those areas where it is necessary to perform filling or excavation to accomplish the work shown in the Contract Documents and to those areas which must be entered to construct temporary or permanent structures. As soon as conditions

permit, promptly clear these areas of all obstructions placed therein or caused by construction operations.

C. Except as necessary for construction, do not deposit excavated material in ditches, swales or streams, or in a position close enough thereto, to be washed away by high water or run-off.

D. Do not disturb lands or waters outside the limits of construction, unless approved in advance and in writing by the Owner.

PART 2 – PRODUCTS

2.1 MATERIALS

A. Soil Erosion and Sedimentation Control:

1. Erosion Control Blanket: North American Green C125 (Class II, Type B).
2. Sediment Traps and Silt Fence: As indicated on the Drawings.
3. Rip Rap: Refer to Section 02720 or as indicated on the Drawings.
4. Temporary seeding shall be one of the following seed types according to date of installation:

Seed Species	Rate/Acre	Planting Depth	Optimum Planting Dates
Seed oats	100 lbs.	1"	3/1 - 4/15
Annual rye grass	40 lbs.	1/4"	3/1 - 5/1 & 8/1 - 9/1

Under no circumstances shall the dry basin area be stabilized with winter rye, grain rye or winter wheat. These plants produce toxins that inhibit native plant growth.

5. Mulch shall be one of the following:

a. Straw to be dry, unchopped, free of undesirable seeds.

6. Sod: Lawns shall be covered with sod to prevent erosion as indicated on drawings. Refer to specification Section 02930 for further information.

PART 3 - EXECUTION

3.1 GENERAL

A. Temporary erosion control features shall consist of, but not be limited temporary sediment basin, temporary grassing, temporary sodding, artificial coverings, berms, staked silt barriers and staked silt fences.

B. Incorporate permanent erosion control features into the project at the earliest

practical time. Correct conditions, using temporary measures that develop during construction to control erosion prior to the time it is practical to construct permanent control features.

C. Construct temporary and permanent erosion and sediment control measures and maintain them to prevent the pollution of adjacent water ways in conformance with the laws, rules and regulations of Federal, State and local agencies and the approved erosion control plan.

3.2 INSTALLATION

A. The following items shall be installed in accordance with the KYDOT Standard Specification. The procedures are only generally described herein.

1. Temporary Grassing: This work shall consist of furnishing and placing grass seed.
2. Sod: This work shall consist of furnishing and placing sod.
3. Artificial Coverings: This work shall consist of furnishing and applying fiber mats, netting, plastic sheeting, or other approved covering to the earth surfaces.

3.3 SILT BARRIERS

A. Silt barriers shall be installed and maintained at the locations shown on the plans. The Contractor is required to prevent the possibility of silting onto any adjacent parcel.

B. Silt barriers shall be of the steel post type and post shall be installed as indicated in the drawings.

B. The height of the silt barrier fabric shall be a minimum of 24 inches above grade.

D. The post shall be 1.33 lb. /linear ft steel post and shall be spaced a maximum of 6 feet apart at the barrier location and driven securely into the ground (12 in minimum).

E. Fasten the 6-inch by 6-inch 14 gage wire mesh to the upslope side of the posts using heavy duty wire staples at least 1-inch long, tie wires or hog rings. Extend the mesh 6-inches into the trench.

F. A flat bottom trench shall be excavated approximately 4 inches wide by 8 inches deep or a V-shaped trench of 8-inch depth should be excavated along the line of post. The filter fabric shall be attached to the steel post and 12 inches of fabric shall be extended into the trench. Extend the remaining 4-inches toward the upslope side. The trench shall then be backfilled and the soil compacted over the filter fabric.

3.5 TEMPORARY FENCE

A. Furnish, install and maintain as shown on plans. Attach silt barrier (fabric) to the temporary 2 in by 2 in hardwood posts that are on 6 ft spacing. Not when joints are necessary 6-inch overlap required.

B. Follow manufacturer's installation recommendations.

3.6 EROSION CONTROL BLANKET_

A. Follow manufacturer's installation recommendations.

3.7 MAINTENANCE OF CONTROLS AND PERFORMANCE

A. Inspect inlet protection for damage and sediment accumulation every seven (7) days and after each rainfall that equals or exceeds ½ inch. Make repairs immediately. Remove sediment before it has accumulated to 1/3 the height of the stone bags or filter fabric. Maintain the downstream pool area, always providing adequate sediment storage volume for the next storm. Take care not to damage or under cut the inlet protection when removing sediment. Remove all inlet protection and stakes from the inlet after its drainage area has been permanently stabilized and approved by the County Engineer’s office. Dispose of all materials properly. Bring the disturbed area to the grade of the inlet, make sure the fill is compacted properly and the soil surface is smooth. Use appropriate permanent stabilization methods to stabilize all bare areas around the inlet.

B. Inspect silt fence for damage every seven (7) days and after every storm event that equals or exceeds one (1) inch. Make all repairs immediately. Remove sediment from the upslope face of the fence before it accumulates to a height equal to 1/3 the height of the fence. If fence fabric tears, begins to decompose, or in any way becomes ineffective, replace the affected section of fence immediately. Take care to avoid undermining or damaging the fence when cleaning out sediment. Remove the fence after its contributing drainage area has been permanently stabilized. Remove the fence and sediment deposits, bring the disturbed area to grade, and stabilize it using the appropriate permanent stabilization method.

C. Inspect down-stream silt basins every seven (7) days and after each rainfall. Remove sediment as needed to allow for the proper function of each basin.

D. Regularly inspect water quality being discharged for suspended sediment and color and perform necessary repairs. Remove accumulated sediment whenever it reaches the designated cleanout level.

E. Remove all temporary erosion and sedimentation controls only after landscaping is completed and lawns are established and accepted by the Architect and

Owner.

F. Upon final approval and release from MSD, the Contractor shall remove all silt control structures, clean silt from pipes, basins, inlets and ditches. Seed all disturbed areas. The Contractor shall perform the removal and cleaning within 30 days of notice from the Owner.

3.8 PROTECTION DURING SUSPENSION OF CONTRACT TIME

A. In the event that it is necessary that the construction operations be suspended for any appreciable length of time, shape the top of the earthwork in such a manner as to permit run-off of rainwater and construct earth berms along the top edges of embankments to intercept run-off water. Provide temporary slope drains to carry run-off from cuts and embankments, which are located in the vicinity of rivers, streams, canals, lakes and impoundments. Should such preventative measures fail, immediately take such other action as necessary to effectively prevent erosion and siltation.

END OF SECTION 31 22 00

SECTION 32 12 16 - ASPHALT PAVING

PART 1 - GENERAL

1.1 SUMMARY

A. Provide labor, materials, services, and equipment necessary to provide and install asphalt paving work as specified herein.

B. The extent of asphalt paving and subbase work is shown on the Drawings.

C. Parking lot paving is included under the Work of this Section.

1.2 SUBMITTALS

A. Submit in accordance with Division 1 requirements.

1.3 QUALITY ASSURANCE

A. Codes and Standards: Comply with State highway or transportation department standard specifications, latest edition, and with local governing regulations if more stringent than herein specified.

B. Testing Agency: Testing agency shall perform density and thickness test.

C. Contractor shall remove, replace or install additional asphalt to areas that test results indicate non-compliance to drawings and specifications.

1.4 BITUMINOUS PAVING TESTING

A. Field quality control testing shall be performed by the owner during paving operations. The following sampling and testing will be preformed on asphalt concrete mixtures for quality control during paving operations. Record the locations where samples are taken to correlate with subsequent testing.

B. Test in-place, compacted pavement for density and thickness will be performed. Perform one test for each 500 sq.yds. but not less than one test per day, unless otherwise specified or directed.

C. The Contractor shall pay for and perform additional Work and testing as may be required if any of the previous tests indicate insufficient values. Continue Work and testing until specified values have been attained.

D. Asphalt concrete material not complying with specified requirements will not be acceptable. The Contractor shall repair or remove and replace defective paving as directed by the Architect, at no additional cost to the Owner.

1.5 PROJECT CONDITIONS

A. Weather Limitations: Apply tack coats when ambient temperature is above 60 deg F and when temperature has not been below 45 deg F for 12 hours immediately prior to

application. Do not apply when base is wet or contains an excess of moisture.

B. Construct hot-mixed asphalt surface course when atmospheric temperature is above 60 deg F and when base is dry. Base course may be placed when air temperature is above 40 deg F and rising.

C. Grade Control: Establish and maintain required lines and elevations.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Use locally available materials and gradations that exhibit a satisfactory record of previous installations. Conform to Kentucky Highway Specifications for hot asphalt concrete.

B. Course Aggregate: ASTM D692, sound angular crushed stone.

C. Fine Aggregate: ASTM D 1073 or AASHTO M 29, sharp-edged natural or sand prepared from stone or gravel.

D. Binder Course: Shall be compacted hot mix bituminous binder or base course class 2, 0.75D, PG64-22.

E. Surface Course: Shall be compacted hot mix bituminous surface course, class 2, 0.38D, PG 64-22.

F. Mineral Filler: Limestone dust, portland cement, or other inert material, ASTM D242 or AASHTO M 17.

G. Asphalt Cement: Comply with Type AE-60.

H. Tack Coat: Emulsified asphalt Type AE-150 or as specified by protective membrane manufacturer.

I. Herbicide Treatment: Commercial chemical for weed control, registered by Environmental Protection Agency. Provide granular, liquid, or wettable powder form.

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

a. Ciba-Geigy Corp.
b. Dow Chemical U.S.A.
c. E.I. Du Pont de Nemours & Co., Inc.
d. FMC Corp.
e. Thompson-Hayward Chemical Co.
f. U.S. Borax and Chemical Corp.

J. Lane Marking Paint: Alkyd-resin type, chlorinated rubber, ready-mixed complying with AASHTO M 248, (FS-TT-P-115) Type II.

1. Color: White and blue as indicated on drawings.

2.2 ASPHALT-AGGREGATE MIXTURE

A. Provide plant-mixed, hot-laid asphalt-aggregate mixture complying with ASTM D 3515.

PART 3 - EXECUTION

3.1 INSPECTION

A. The Contractor for Work under this Section must examine areas and subgrade conditions where paving and surfacing work is to be performed. Notify the Architect in writing of subgrade conditions detrimental to the proper and timely completion of the Work.

B. Do not begin Work until deficient subgrade conditions have been corrected. Starting of the work shall constitute acceptance of the subgrade conditions, and the installation and warranty of the finished paving become the responsibility of the Contractor for this Section of the Work at this time.

3.2 INSTALLATION OF COMPACTED AGGREGATE SUBBASE

A. Install aggregate material in accordance with KDOH Specifications, and as hereinafter specified.

B. Aggregate material shall be compacted in thicknesses indicated on the Drawings. Place material in 4 inch maximum course (lift). Each lift shall be compacted with approved rollers to no less than 100 percent for type P material and 95 percent for type O material of the maximum dry density as determined by Method C of AASHTO T99, as modified in Article 2.03.24.

C. Grade Control: During construction maintain lines and grades, including crown and cross-slope of aggregate subbase course.

D. Proof Rolling of crushed stone aggregate shall be witnessed by the owner, Geotechnical Engineer and Civil Engineer prior to placement of concrete or asphalt. Proof roll shall be accomplished with the use of a fully loaded tri-axle dump truck (55 tons total). Areas failing proof-roll shall be removed and repaired as directed by the geotechnical Engineer. All areas must pass inspection prior to proceeding with the work.

E. Tolerances: Top of crushed stone surface shall be plus or minus ¼" from required elevations as shown on the construction documents.

F. Compaction Densities shall be in accordance with the Geotechnical Exploration Report.

G. Do not commence placement of asphalt concrete materials when the atmospheric temperature is below 50 degrees F, nor during fog, rain or other unsuitable conditions.

3.3 SURFACE PREPARATION FOR ASPHALT PAVING

A. Remove loose material from compacted subbase surface immediately before applying herbicide treatment or tack coat.

B. Seal cracks up to 1/4 inch in width completely with asphalt emulsion. Fill cracks larger than 1/4 inch with hot asphaltic concrete and compact with vibratory compactor. All areas where existing pavement is to receive new surface shall have cracks sealed/filled as specified.

C. Proof-roll prepared subbase surface to check for unstable areas and areas requiring additional compaction.

D. Notify Architect of unsatisfactory conditions. Do not begin paving work until deficient subbase areas have been corrected and are ready to receive paving.

E. Herbicide Treatment: Apply chemical weed control agent in strict compliance with manufacturer's recommended dosages and application instructions. Apply to compacted, dry subbase prior to application of prime coat.

F. Tack Coat: Apply to contact surfaces of previously constructed asphalt or Portland cement concrete and surfaces abutting or projecting into hot-mixed asphalt pavement. Distribute at rate of 0.05 to 0.15 gal. per sq. yd. of surface.

G. Allow to dry until at proper condition to receive paving.

H. Exercise care in applying bituminous materials to avoid smearing of adjoining concrete surfaces. Remove and clean damaged surfaces.

3.4 PLACING MIX

A. Place hot-mixed asphalt mixture on prepared surface, spread, and strike off. Spread mixture at minimum temperature of 225 deg F (107 deg C). Place areas inaccessible to equipment by hand. Place each course to required grade, cross-section, and compacted thickness.

B. Pavement Placing: Place in strips not less than 10 feet wide, unless otherwise acceptable to Architect. After first strip has been placed and rolled, place succeeding strips and extend rolling to overlap previous strips. Complete base course for a section before placing surface course.

C. Immediately correct surface irregularities in finish course behind paver. Remove excess material forming high spots with shovel or lute.

D. Joints: Make joints between old and new pavements, or between successive days' work, to ensure continuous bond between adjoining work. Construct joints to have same texture, density, and smoothness as other sections of hot-mixed asphalt course. Clean contact surfaces and apply tack coat.

3.5 ROLLING

A. Conform to Kentucky State Highway Specifications for compaction. Begin rolling when mixture will bear roller weight without excessive displacement. Equipment performing the rolling shall be a minimum of a 10 ton roller.

B. Compact mixture with hot hand tampers or vibrating plate compactors in areas inaccessible to rollers.

C. Breakdown Rolling: Accomplish breakdown or initial rolling immediately following rolling of joints and outside edge. Check surface after breakdown rolling and repair displaced areas by loosening and filling, if required, with hot material.

D. Second Rolling: Follow breakdown rolling as soon as possible, while mixture is hot. Continue second rolling until mixture has been evenly compacted.

E. Finish Rolling: Perform finish rolling while mixture is still warm enough for removal of roller marks. Continue rolling until roller marks are eliminated and course has attained not greater the 100% but not less than 95 percent of laboratory density per ASTM D-1559.

F. Patching: Remove and replace paving areas mixed with foreign materials and defective areas. Cut out such areas and fill with fresh, hot hot-mixed asphalt. Compact by rolling to specified surface density and smoothness.

G. Protection: After final rolling, do not permit vehicular traffic on pavement until it has cooled and hardened for a minimum of 3 days. Erect barricades to prohibit traffic.

3.6 TRAFFIC AND LANE MARKINGS

A. Curing: Allow the paving to cure 30 days before starting pavement marking.

B. Cleaning: Sweep and clean surface to eliminate loose material and dust.

C. Striping: Use chlorinated-rubber base traffic lane-marking paint, factory-mixed, quick-drying, and nonbleeding.

D. Include in addition to traffic and lane markings all parking lot stripes, numbers, lettering and handicap symbols. Do not apply traffic and lane marking paint until layout and placement have been verified with Architect.

E. Apply paint with mechanical equipment to produce uniform straight edges. Apply 2 coats to provide minimum 24 to 30 mils dry thickness.

3.7 FIELD QUALITY CONTROL

A. Refer to Division 1 for additional requirements.

B. General: Testing in-place hot-mixed asphalt courses for compliance with requirements for thickness and surface smoothness will be done by Owner's testing laboratory. Repair or remove and replace unacceptable paving as directed by Architect.

C. Thickness: In-place compacted thickness tested in accordance with ASTM D 3549 will not be acceptable if exceeding following allowable variations:

1. Base Course: Plus or minus 1/2 inch.
2. Surface Course: Plus or minus 1/4 inch.

D. Surface Smoothness: Test finished surface of each hot-mixed asphalt course for smoothness, using 10-foot straightedge applied parallel with and at right angles to centerline of paved area. Surfaces will not be acceptable if exceeding the following tolerances for smoothness:

1. Base Course Surface: 1/4 inch.
2. Wearing Course Surface: 3/16 inch.
3. Crowned Surfaces: Test with crowned template centered and at right angle to crown. Maximum allowable variance from template is 1/4 inch.

E. Check surface areas at intervals as directed by Architect.

3.8 FLOOD TEST

A. Schedule: After pavement is complete, perform a flood test in the presence of the Architect.

B. Method: Perform the flooding by use of water tank truck or available water.

C. If depressions exist where water is ponding to a depth of more than 1/8 inch, fill with fresh hot asphalt concrete to provide proper drainage. Feather and smooth the edges of fill so that the joint to original surface is not visible.

END OF SECTION 32 12 16

SECTION 32 13 13 - CONCRETE PAVING

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes exterior portland cement concrete paving for the following:

1. Integral Curb and walks.
2. Sidewalks.
3. Ramps.
4. Detectable Surfaces on Ramps.

B. Related Work Specified Elsewhere:

1. Prepared subbase is included under Section 31 20 00.

1.2 SUBMITTALS

A. Submit in accordance with Division 1 requirements.

1.3 QUALITY ASSURANCE

A. Concrete Standards: Comply with provisions of the following standards, except where more stringent requirements are indicated.

1. American Concrete Institute (ACI) 330.1 published by the American Concrete Institute, Farmington Hill, Michigan, except as modified by these contract documents.
2. ACI 318, "Building Code Requirements for Reinforced Concrete."
3. Concrete Reinforcing Steel Institute (CRSI) "Manual of Standard Practice."

B. Concrete Manufacturer Qualifications: Manufacturer of ready-mixed concrete products complying with ASTM C 94 requirements for production facilities and equipment.

C. Concrete Testing Service: Engage a qualified independent testing agency to perform materials evaluation tests concrete mix designs.

D. Maintain filed records of time, date of placing, curing, and removal of forms of concrete in each portion of work.

E. Do not change source of brands of cement and aggregate materials during the course of the work.

1.4 PROJECT CONDITIONS

A. Traffic Control: Maintain access for vehicular and pedestrian traffic for construction activities.

B. Coordinate with Section 31 20 00 requirements.
C. Do not install concrete work over wet, saturated, muddy, or frozen subgrade.

D. Do not install concrete when air temperature is below 40 degrees F. Use of calcium chloride, salt, or any other admixture to prevent concrete from freezing is prohibited.

PART 2 - PRODUCTS

2.1 FORMS

A. Form Materials: Plywood, metal, metal-framed plywood, or other acceptable panel-type materials to provide full-depth, continuous, straight, smooth exposed surfaces.

1. Use flexible or curved forms for curves of a 100-foot or less radius.

B. Form Release Agent: Provide commercial formulation form-release agent with a maximum of 350 mg/l volatile organic compounds (VOCs) that will not bond with, stain, or adversely affect concrete surfaces and will not impair subsequent treatments of concrete surfaces.

2.2 REINFORCING MATERIALS

A. Reinforcing Bars and Tie Bars: ASTM A 615, Grade 60, deformed.

B. Welded wire mesh: ASTM 185, sheet goods only.

2.3 MIXES

A. Sidewalks and Concrete Pavement: Provide concrete ready mixed, complying with AASHTO requirements and containing an approved air entraining and water reducing admixture.

1. Strength: 4,500 psi minimum at 28 days.
2. Slump Range: 4 inch +/– 1 inch.
3. Air Content: 4 to 6 percent.

B. Indicate water under run on each delivery ticket. Water may only be added to concrete as indicated by under run on delivery ticket. Site water tempered mixes exceeding specified slump range will be rejected as not complying with specification requirements.

2.4 CONCRETE MATERIALS – SIDEWALKS & PAVING

A. Portland Cement: ASTM C 150, Type I.

1. All exposed concrete shall be Historical Mix with Grit supplied by Ernst Concrete as follows:

Mix Code: **40HISTG** **HISTORICAL MIX W/ GRIT** Mix Code must be used when ordering concrete.
Customer: E Z CONSTRUCTION Plant: DOWNTOWN
Project Name: TYLER PARK
Application: Chute

Material Type	Source Supplier	Description	ASTM	Specific Gravity	Volume ft^3	Weight (lbs/cy)
Coarse Aggregate	Nugent	3/8" GRAVEL		2.66	4.82	800 lb
Fine Aggregate	Nugent	SAND		2.61	12.16	1983 lb
Cement	Buzzi	CEM T I/II - BUZZI		3.15	2.87	564 lb
Fly Ash	Charah	FLYASH - TYPE F		2.58	0.58	94 lb
Admixture	Euclid Chemical	EUCLID AIR PERF		-	-	3 lq oz
Admixture	Euclid Chemical	EUCLID WR91		-	-	26 lq oz
Water	LWC	WATER		1.00	4.95	37 gal
			Air:	6.00%	1.62	–
			Totals	Yield:	27.00	3750 lb

Designed Strength: 4000 PSI
Designed Air: 6 % 4-8 Designed Unit Weight 138.90 lb/ft3
Designed Slump 5 2-5 Designed W/ C Ratio 0.47

B. Fly Ash: ASTM C 618, Type F. 15% maximum.

C. Normal-Weight Aggregates: ASTM C 33, Class 4, and as follows. Provide aggregates from a single source.

1. Maximum Aggregate Size: 1-1/2 inches.
2. Do not use fine or coarse aggregates that contain substances that cause spalling.
3. Local aggregates not complying with ASTM C 33 that have been shown to produce concrete of adequate strength and durability by special tests or actual service may be used when acceptable to Architect.

D. Water: Potable.

2.5 ADMIXTURES

A. Provide concrete admixtures that contain not more than 0.1 percent chloride ions.

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

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

D. High-Range Water-Reducing Admixture: ASTM C 494, Type F or Type G.

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

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

G. Available Products: Subject to compliance with requirements, products that may be incorporated in the Work include the following:

H. Products: Subject to compliance with requirements, provide one of the following:

1. Air-Entraining Admixture:

   a. Air-Mix or Perma-Air; Euclid Chemical Co.
   b. Darex AEA or Daravair; W.R. Grace & Co.
   c. Micro-Air; Master Builders, Inc.
   d. Sealtight AEA; W.R. Meadows, Inc.

2. Water-Reducing Admixture:

   a. Chemtard; ChemMasters Corp.
   b. Eucon WR-75; Euclid Chemical Co.
   c. WRDA; W.R. Grace & Co.
   d. Pozzolith Normal or Polyheed; Master Builders, Inc.
   e. Plastocrete 161; Sika Corp.

3. High-Range Water-Reducing Admixture:

   a. Eucon 37; Euclid Chemical Co.
   b. WRDA 19 or Daracem; W.R. Grace & Co.
   c. Rheobuild or Polyheed; Master Builders, Inc
   d. Sikament 300; Sika Corp.

4. Water-Reducing and Accelerating Admixture:

   a. Accelguard 80; Euclid Chemical Co.
   b. Daraset; W.R. Grace & Co.
   c. Pozzutec 20; Master Builders, Inc.

5. Water-Reducing and Retarding Admixture:

   a. Dayton Superior Top-Cast Surface Retarder Product Code 309056, Item No. 05, Light Blue package, sandblast finish.

2.6 CURING MATERIALS

A. Absorptive Cover: Burlap cloth made from jute or kenaf, weighing approximately 9 oz. per sq. yd., complying with AASHTO M 182, Class 2.

B. Moisture-Retaining Cover: One of the following, complying with ASTM C 171.

1. Waterproof paper.
2. Polyethylene film.
3. White burlap-polyethylene sheet.

C. Clear Solvent-Borne Liquid Membrane-Forming Curing Compound: ASTM C 309, Type I, Class A or B, wax free.

D. Clear Waterborne Membrane-Forming Curing Compound: ASTM C 309, Type I, Class B.

1. Provide material that has a maximum volatile organic compound (VOC) rating of 350 mg per liter.

E. Evaporation Control: Monomolecular film-forming compound applied to exposed concrete slab surfaces for temporary protection from rapid moisture loss.

F. Available Products: Subject to compliance with requirements, products that may be incorporated in the Work include the following:

1. Clear Solvent-Borne Liquid Membrane-Forming Curing Compound:

a. Spartan-Cote; The Burke Co.
b. Day-Chem Cure and Seal; Dayton Superior Corp.
c. Diamond Clear; Euclid Chemical Co.
d. L&M Cure R; L&M Construction Chemicals, Inc.
e. Masterkure; Master Builders, Inc.
f. 3100 Series; W.R. Meadows, Inc.
g. Kure-N-Seal; Sonneborn-Chemrex.

2. Clear Waterborne Membrane-Forming Curing Compound:

a. Spartan Cote WB; The Burke Co.
b. Safe Cure and Seal (J-18); Dayton Superior Corp.
c. Diamond Clear VOX; Euclid Chemical Co.
d. Dress & Seal #22 WB; L&M Construction Chemicals, Inc.
e. Masterkure 100W; Master Builders, Inc.
f. 1100 Clear Series; W.R. Meadows, Inc.
g. Kure-N-Seal WB; Sonneborn-Chemrex.

3. Evaporation Control:

a. Eucobar; Euclid Chemical Co.
b. E-Con; L&M Construction Chemicals, Inc.
c. Confilm; Master Builders, Inc.

2.7 RELATED MATERIALS

A. Boiled Linseed Oil Mixture: Combination of boiled linseed oil and mineral spirits, complying with AASHTO M-233.

B. Traffic Paint: Alkyd-resin ready-mixed, complying with AASHTO M 248, Type S.

1. Color: White.

C. Bonding Agent: Acrylic or styrene butadiene.

D. Products: Subject to compliance with requirements, provide one of the following:

1. Bonding Agent:

a. Acrylic Bondcrete; The Burke Co.
b. Day-Chem Ad Bond (J-40); Dayton Superior Corp.
c. SBR Latex; Euclid Chemical Co.
d. Daraweld C; W.R. Grace & Co.
e. Everbond; L&M Construction Chemicals, Inc.
f. Acryl-Set; Master Builders Inc.
g. Intralok; W.R. Meadows, Inc.

h. Sonocrete; Sonneborn-Chemrex.

2. Epoxy Adhesive:

a. Burke Epoxy M.V.; The Burke Co.
b. Resi-Bond (J-58); Dayton Superior.
c. Euco Epoxy System #452 or #620; Euclid Chemical Co.
d. Concresive Standard Liquid; Master Builders, Inc.
e. Rezi-Weld 1000; W.R. Meadows, Inc.
f. Sikadur 32 Hi-Mod; Sika Corp.

2.8 CONCRETE DELIVERY

A. Ready-Mixed Concrete: Comply with requirements and with ASTM C 94.

1. When air temperature is between 85 deg F (30 deg C) and 90 deg F (32 deg C), reduce mixing and delivery time from 1-1/2 hours to 75 minutes; when air temperature is above 90 deg F (32 deg C), reduce mixing and delivery time to 60 minutes.

2.9 DETECTABLE WARNINGS

A. Detectable Warnings shall consist of raised truncated domes with a diameter of nominal 0.9 inches, a height of nominal 0.2 inches and a center to center spacing nominal 2.35 inches and shall contrast visually with the adjoining surfaces either light on dark or dark on light.

1. Use accessible concrete or brick pavers such as Whitaker Greer custom series ADA 4 x 8 x 3 paver. Brick pavers or similar product in a contrasting color shall be selected by the landscape architect.

PART 3 - EXECUTION

3.1 SURFACE PREPARATION

A. Proof roll the subgrade and do all necessary rolling and compacting to obtain firm, even subgrade surface. Fill and consolidate depressed areas. Remove un-compactible materials, replace with clean fill and compact to 100 percent of the maximum dry density in accordance with ASTM D 698 Standard Proctor Method.

B. Provide minimum 4 inch depth of compacted granular base material at walks and minimum 8 inch depth at paving. Compact granular base to 100 percent of the maximum dry density in accordance with ASTM D 693 Standard Proctor Method.

C. Remove loose material and debris from base surface before placing concrete.

D. Set forms to the required grades and lines, rigidly braced and secured. Install sufficient quantity of forms to allow continuous progress of work.

E. Sleeving: Provide and install pipe sleeves for other sections of work as noted on Drawings. Provide temporary caps and stake locations. Sleeves to be installed at 18 inches deep minimum unless noted otherwise.

3.2 EDGE FORMS AND SCREED CONSTRUCTION

A. Set, brace, and secure edge forms, bulkheads, and intermediate screed guides for paving to required lines, grades, and elevations. Install forms to allow continuous progress of work and so that forms can remain in place at least 24 hours after concrete placement.

B. Check completed formwork and screeds for grade and alignment to following tolerances:

1. Top of Forms: Not more than 1/8 inch in 10 feet.
2. Vertical Face on Longitudinal Axis: Not more than 1/4 inch in 10 feet.

C. Clean forms after each use and coat with form release agent to ensure separation from concrete without damage.

3.3 PLACING REINFORCEMENT

A. Comply with Concrete Reinforcing Steel Institute's recommended practice for "Placing Reinforcing Bars" for placing and supporting reinforcement.

B. Clean reinforcement of loose rust and mill scale, earth, ice, or other bond-reducing materials.

3.4 JOINTS

A. Construct contraction, construction, and isolation joints true to line with faces perpendicular to surface plane of concrete. Construct transverse joints at right angles to the centerline, unless indicated otherwise.

1. When joining existing paving, place transverse joints to align with previously placed joints, unless indicated otherwise.

B. Contraction Joints: Provide weakened-plane contraction joints, sectioning concrete into areas as shown on Drawings. Construct contraction joints for a depth equal to at least 1/4 of the concrete thickness, as follows:

1. Tooled Joints: Form contraction joints in fresh concrete by grooving and finishing each edge of joint with a radiused jointer tool.

C. Construction Joints: Set construction joints at side and end terminations of paving and at locations where paving operations are stopped for more than 1/2 hour, unless paving terminates at isolation joints.

1. Provide preformed galvanized steel or plastic keyway-section forms or bulkhead forms with keys, unless indicated otherwise. Embed keys at least 1-1/2 inches into concrete.
2. Continue reinforcement across construction joints unless indicated otherwise. Do not continue reinforcement through sides of strip paving unless indicated.
3. Provide tie bars at sides of paving strips where indicated.
4. Use bonding agent on existing concrete surfaces that will be joined with fresh concrete.

D. Isolation Joints: Form isolation joints of preformed joint filler strips abutting concrete curbs, catch basins, manholes, inlets, structures, walks, and other fixed objects.

1. Locate expansion joints at intervals of 100 feet, unless indicated otherwise.

2. Extend joint fillers full width and depth of joint, not less than 1/2 inch or more than 1 inch below finished surface. Joint sealant is required at all expansion joints.
3. Furnish joint fillers in one-piece lengths for full width being placed wherever possible. Where more than one length is required, lace or clip joint filler sections together.
4. Protect top edge of joint filler during concrete placement with a metal, plastic, or other temporary preformed cap. Remove protective cap after concrete has been placed on both sides of joint and install joint sealer at all isolation / expansion joints.

E. Installation of joint fillers and sealants shall be followed by manufacturer's specifications.

3.5 CONCRETE PLACEMENT

A. Inspection: Before placing concrete, inspect and complete formwork installation, reinforcing steel, and items to be embedded or cast in. Notify other trades to permit installation of their work.

B. Protect concrete from physical damage or reduced strength due to weather extremes during mixing, placing, and curing. In cold weather comply with ACI 306R "Recommended Practice for Cold Weather Concreting." In hot weather comply with ACI 305R, "Recommended Practice for Hot Weather Concreting."

C. Remove snow, ice, or frost from subbase surface and reinforcing before placing concrete. Do not place concrete on surfaces that are frozen.

D. Moisten subbase to provide a uniform dampened condition at the time concrete is placed. Do not place concrete around manholes or other structures until they are at the required finish elevation and alignment.

E. Comply with requirements and with ACI 304 for measuring, mixing, transporting, and placing concrete.

F. Deposit and spread concrete in a continuous operation between transverse joints. Do not push or drag concrete into place or use vibrators to move concrete into place.

1. When concrete placing is interrupted for more than 1/2 hour, place a construction joint.
2. Pull wire mesh up into the concrete at the proper depth.

G. Use a bonding agent at locations where fresh concrete is placed against hardened or partially hardened concrete surfaces.

H. Consolidate concrete by mechanical vibrating equipment supplemented by hand-spading, rodding, or tamping. Use equipment and procedures to consolidate concrete complying with ACI 309R.

1. Consolidate concrete along face of forms and adjacent to transverse joints with an internal vibrator. Keep vibrator away from joint assemblies, reinforcement, or side forms. Use only square-faced shovels for hand-spreading and consolidation. Consolidate with care to prevent dislocating reinforcing, dowels, and joint devices.

I. Screed paved surfaces with a straightedge and strike off. Use bull floats or darbies to form a smooth surface plane before excess moisture or bleed water appears on the

surface. Do not further disturb concrete surfaces prior to beginning finishing operations.

J. Place concrete in two operations; strike off initial pour for entire width of placement and to the required depth below finish surface. Lay welded wire fabric or fabricated bar mats immediately in final position. Place top layer of concrete, strike off, and screed.

1. Remove and replace portions of bottom layer of concrete that have been placed more than 15 minutes without being covered by top layer or use bonding agent if acceptable to Architect.

K. When adjoining pavement lanes are placed in separate pours, do not operate equipment on concrete until pavement has attained 85 percent of its 28-day compressive strength.

L. Cold-Weather Placement: Comply with provisions of 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 air temperature has fallen to or is expected to fall below 40 deg F (4 deg C), uniformly heat water and aggregates before mixing to obtain a concrete mixture temperature of not less than 50 deg F (10 deg C) and not more than 80 deg F (27 deg C) at point of placement.
2. Do not use frozen materials or materials containing ice or snow.
3. Do not use calcium chloride, salt, or other materials containing antifreeze agents or chemical accelerators unless otherwise accepted in mix designs.

M. Hot-Weather Placement: Place concrete complying with ACI 305R and as specified when hot weather conditions exist.

1. Cool ingredients before mixing to maintain concrete temperature at time of placement to below 90 deg F (32 deg C). Mixing water may be chilled 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. Cover reinforcing steel with water-soaked burlap if it becomes too hot, so that steel temperature will not exceed the ambient air temperature immediately before embedding in concrete.
3. Fog spray forms, reinforcing steel, and subgrade just before placing concrete. Keep subgrade moisture uniform without standing water, soft spots, or dry areas.

3.6 CONCRETE FINISHING

A. Float Finish: Begin floating when bleed water sheen has disappeared and the concrete surface has stiffened sufficiently to permit operations. Float surface with power-driven floats, or by hand-floating if area is small or inaccessible to power units. Finish surfaces to true planes within a tolerance of 1/4 inch in 10 feet as determined by a 10-foot-long straightedge placed anywhere on the surface in any direction. Cut down high spots and fill low spots. Allow no ponding of water. Refloat surface immediately to a uniform granular texture.

B. Final Tooling: Tool edges of paving, gutters, curbs, and joints formed in fresh concrete with a jointing tool to the following radius. Repeat tooling of edges and joints after applying surface finishes. Eliminate tool marks on concrete surfaces.

1. Radius: ½ inch.

C. Perform concrete finishing using mechanical or hand methods.

D. After striking off and consolidating concrete, smooth the surface by screeding and floating. Adjust the floating to compact the surface and produce a uniform texture.

E. After floating, test surface finish with a 10 foot straightedge. Provide and distribute concrete to remove surface irregularities, and refloat repaired areas to provide a continuous smooth finish.

F. Upon completion of floating, and after bleed water has disappeared and concrete can sustain foot pressure with nominal indentation, cut concrete away from forms. Work edges with an edging tool. Round edges to 1/2 radius.

G. Provide sidewalk and pavement surfaces with light broom finish. Edge outside edges and all joints with a radius edging tool.

H. Curbs: Provide smooth light broom finish. Curb line shall be straight without undulation. Curbs and flat work poorly finished or out of line shall be rejected and replaced.

I. Do not remove forms until concrete has cured sufficiently for rubbing. After form removal, clean ends of joints and point up any minor honeycombed areas. Remove and replace areas or sections with major defects or vandalized, as directed by the Engineer.

3.7 SPECIAL FINISHES

A. Detectable Warning Surfaces: Install brick pavers in strict compliance with manufacturer’s recommendations.

3.8 CONCRETE PROTECTION AND CURING

A. Protect freshly placed concrete from premature drying and excessive cold or hot temperatures. Comply with the recommendations of ACI 306.1 for cold weather protection and ACI 305R for hot weather protection during curing.

B. Evaporation Control: In hot, dry, and windy weather, protect concrete from rapid moisture loss before and during finishing operations with an evaporation-control material. Apply according to manufacturer's instructions after screeding and bull floating, but before floating.

C. Begin curing after finishing concrete but not before free water has disappeared from concrete surface.

D. Curing Methods: Cure concrete by moisture curing, moisture-retaining-cover curing, curing compound, or a combination of these as follows:

1. Moisture Curing: Keep surfaces continuously moist for not less than 7 days with the following materials:
   a. Water.
   b. Continuous water-fog spray.
   c. Absorptive cover, water saturated, and kept continuously wet. Cover concrete surfaces and edges with a 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. Immediately repair any holes or tears during curing period using cover material and waterproof tape.

3. Curing Compound: Apply uniformly in continuous operation by power spray or roller according to manufacturer's directions. Recoat areas subjected to heavy rainfall within 3 hours after initial application. Maintain continuity of coating and repair damage during curing period.

3.9 TRAFFIC PAINT

A. Traffic Paint: Apply traffic paint for striping and other markings with mechanical equipment to produce uniform straight edges. Apply at rates to provide a 24-mil minimum wet film thickness.

3.10 FIELD QUALITY CONTROL TESTING

A. The Owner will employ a qualified testing and inspection agency to sample materials, perform tests, and submit test reports during concrete placement. Sampling and testing for quality control may include the following:

1. Sampling Fresh Concrete: ASTM C 172, except modified for slump to comply with ASTM C 94.

a. Slump: ASTM C 143; one test at point of placement for each compressive-strength test but no less than one test for each day's pour of each type of concrete. Additional tests will be required when concrete consistency changes.
b. Air Content: ASTM C 231, pressure method; one test for each compressive-strength test but no less than one test for each day's pour of each type of air-entrained concrete.
c. Concrete Temperature: ASTM C 1064; one test hourly when air temperature is 40 deg F (4 deg C) and below and when 80 deg F (27 deg C) and above, and one test for each set of compressive-strength specimens.
d. Compression Test Specimens: ASTM C 31; one set of four standard cylinders for each compressive-strength test, unless directed otherwise. Mold and store cylinders for laboratory-cured test specimens except when field-cured test specimens are required.
e. Compressive-Strength Tests: ASTM C 39; one set for each day's pour of each concrete class exceeding 5 cu. yd. but less than 25 cu. yd., plus one set for each additional 50 cu. yd. Test one specimen at 7 days, test two specimens at 28 days, and retain one specimen in reserve for later testing if required.

2. When frequency of testing will provide fewer than five strength tests for a given class of concrete, conduct testing from at least five randomly selected batches or from each batch if fewer than five are used.
3. When strength of field-cured cylinders is less than 85 percent of companion laboratory-cured cylinders, evaluate current operations and provide corrective procedures for protecting and curing the in-place concrete.
4. Strength level of concrete will be considered satisfactory if averages of sets of three consecutive strength test results equal or exceed specified compressive strength and no individual strength test result falls below specified compressive

strength by more than 500 psi.

B. Test results will be reported in writing to Architect, concrete manufacturer, and Contractor within 24 hours of testing. Reports of compressive strength tests shall contain the Project identification name and number, date of concrete placement, name of concrete testing agency, concrete type and class, location of concrete batch in paving, design compressive strength at 28 days, concrete mix proportions and materials, compressive breaking strength, and type of break for both 7-day and 28-day tests.

C. Nondestructive Testing: Impact hammer, sonoscope, or other nondestructive device may be permitted but shall not be used as the sole basis for acceptance or rejection.

D. Additional Tests: The testing agency will make additional tests of the concrete when test results indicate slump, air entrainment, concrete strengths, or other requirements have not been met, as directed by Architect. Testing agency may conduct tests to determine adequacy of concrete by cored cylinders complying with ASTM C 42, or by other methods as directed. These additional tests will be at the contractor's expense.

E. Refer to Division 1 for additional requirements.

3.11 REPAIRS AND PROTECTION

A. Remove and replace concrete paving that is broken, damaged, or defective, or does not meet the requirements of this Section.

B. Drill test cores where directed by Architect when necessary to determine magnitude of cracks or defective areas. Fill drilled core holes in satisfactory pavement areas with portland cement concrete bonded to paving with epoxy adhesive.

C. Protect concrete from damage. Exclude traffic from paving for at least 14 days after placement. When construction traffic is permitted, maintain paving as clean as possible by removing surface stains and spillage of materials as they occur.

D. Maintain concrete paving free of stains, discoloration, dirt, and other foreign material. Sweep concrete paving not more than 2 days prior to date scheduled for Substantial Completion inspections.

END OF SECTION 32 13 13

SECTION 32 13 73 - CONCRETE PAVING JOINT SEALANTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section Includes:
1. Cold-applied joint sealants.
2. Hot-applied joint sealants.
3. Cold-applied, fuel-resistant joint sealants.
4. Hot-applied, fuel-resistant joint sealants.
5. Joint-sealant backer materials.
6. Primers.

B. Related Requirements:
1. Section 07 92 00 "Joint Sealants" for sealing nontraffic and traffic joints in locations not specified in this Section.

1.3 PREINSTALLTION MEETINGS – [NOT USED]

1.4 ACTION SUBMITTALS

A. Submit in accordance with Division 1 requirements.

1.5 INFORMATION SUBMITTALS – [NOT USED]

1.6 QUALITY ASSURANCE

A. Installer Qualifications: An entity that employs installers and supervisors who are trained and approved by manufacturer.

B. Product Testing: Test joint sealants using a qualified testing agency.

1.7 FIELD CONDITIONS

A. Do not proceed with installation of joint sealants under the following conditions:
1. When ambient and substrate temperature conditions are outside limits permitted by joint-sealant manufacturer[**or are below 40 deg F**].
2. When joint substrates are wet.
3. Where joint widths are less than those allowed by joint-sealant manufacturer for applications indicated.
4. Where contaminants capable of interfering with adhesion have not yet been removed from joint substrates.

PART 2 - PRODUCTS

2.1 MATERIALS, GENERAL

A. Compatibility: Provide joint sealants, backing materials, and other related materials that are compatible with one another and with joint substrates under conditions of service and application, as demonstrated by joint-sealant manufacturer, based on testing and field experience.

2.2 COLD-APPLIED JOINT SEALANTS

A. Single-Component, Nonsag, Silicone Joint Sealant: ASTM D5893/D5893M, Type NS.
   1. DOWSIL™ 888 Silicone Joint Sealant or Approved Equal
   2. Approved Equal

B. Single-Component, Self-Leveling, Silicone Joint Sealant: ASTM D5893/D5893M, Type SL.
   1. DOWSIL™ 890-SL Silicon Joint Sealant or Approved Equal

2.3 HOT-APPLIED JOINT SEALANTS – [NOT USED]

2.4 COLD-APPLIED, FUEL-RESISTANT JOINT SEALANTS – [NOT USED]

2.5 HOT-APPLIED, FUEL-RESISTANT JOINT SEALANTS– [NOT USED]

2.6 JOINT-SEALANT BACKER MATERIALS

A. Joint-Sealant Backer Materials: Nonstaining; compatible with joint substrates, sealants, primers, and other joint fillers; and approved for applications indicated by joint-sealant manufacturer, based on field experience and laboratory testing.

B. Round Backer Rods for Cold- and Hot-Applied Joint Sealants: ASTM D5249, Type 1, of diameter and density required to control sealant depth and prevent bottom-side adhesion of sealant.

C. Round Backer Rods for Cold-Applied Joint Sealants: ASTM D5249, Type 3, of diameter and density required to control joint-sealant depth and prevent bottom-side adhesion of sealant.

D. Backer Strips for Cold- and Hot-Applied Joint Sealants: ASTM D5249; Type 2; of thickness and width required to control joint-sealant depth, prevent bottom-side adhesion of sealant, and fill remainder of joint opening under sealant.

2.7 PRIMERS

A. Primers: Product recommended by joint-sealant manufacturer where required for adhesion of sealant to joint substrates indicated.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine joints to receive joint sealants, with Installer present, for compliance with requirements for joint configuration, installation tolerances, and other conditions affecting joint-sealant performance.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Surface Cleaning of Joints: Before installing joint sealants, clean out joints immediately to comply with joint-sealant manufacturer's written instructions.
   1. Remove all foreign material from joint substrates that could interfere with adhesion of joint sealant, including dust, old joint sealants, oil, grease, waterproofing, water repellents, water, surface dirt, and frost.

B. Joint Priming: Prime joint substrates where indicated or where recommended in writing by joint-sealant manufacturer, based on preconstruction joint-sealant-substrate tests or prior experience. Apply primer to comply with joint-sealant manufacturer's written instructions. Confine primers to areas of joint-sealant bond; do not allow spillage or migration onto adjoining surfaces.

3.3 INSTALLATION OF JOINT SEALANTS

A. Comply with joint-sealant manufacturer's written installation instructions for products and applications indicated unless more stringent requirements apply.

B. Joint-Sealant Installation Standard: Comply with recommendations in ASTM C1193 for use of joint sealants as applicable to materials, applications, and conditions.

C. Install joint-sealant backings to support joint sealants during application and at position required to produce cross-sectional shapes and depths of installed sealants relative to joint widths that allow optimum sealant movement capability.
   1. Do not leave gaps between ends of joint-sealant backings.
   2. Do not stretch, twist, puncture, or tear joint-sealant backings.
   3. Remove absorbent joint-sealant backings that have become wet before sealant application and replace them with dry materials.

D. Install joint sealants immediately following backing installation, using proven techniques that comply with the following:
   1. Place joint sealants so they fully contact joint substrates.
   2. Completely fill recesses in each joint configuration.
   3. Produce uniform, cross-sectional shapes and depths relative to joint widths that allow optimum sealant movement capability.

E. Tooling of Nonsag Joint Sealants: Immediately after joint-sealant application and before skinning or curing begins, tool sealants according to the following requirements to form smooth, uniform beads of configuration indicated; to eliminate air pockets; and to ensure contact and adhesion of sealant with sides of joint:

1. Remove excess joint sealant from surfaces adjacent to joints.
2. Use tooling agents that are approved in writing by joint-sealant manufacturer and that do not discolor sealants or adjacent surfaces.

F. Provide joint configuration to comply with joint-sealant manufacturer's written instructions unless otherwise indicated.

3.4 CLEANING AND PROTECTION

A. Clean off excess joint sealant as the Work progresses, by methods and with cleaning materials approved in writing by joint-sealant manufacturers.

B. Protect joint sealants, during and after curing period, from contact with contaminating substances and from damage resulting from construction operations or other causes so sealants are without deterioration or damage at time of Substantial Completion. If, despite such protection, damage or deterioration occurs, cut out and remove damaged or deteriorated joint sealants immediately and replace with joint sealant so installations in repaired areas are indistinguishable from the original work.

3.5 PAVING-JOINT-SEALANT SCHEDULE

A. Joint-Sealant Application: Joints within concrete paving.
1. Joint Location:
   a. Expansion and isolation joints in concrete paving.
   b. Contraction joints in concrete paving.
   c. Other joints as indicated.
2. Joint Sealant: [**Single-component, nonsag, silicone joint sealant**] [**Single-component, self-leveling, silicone joint sealant**] [**Multicomponent, nonsag, urethane, elastomeric joint sealant**]
3. Joint-Sealant Color: Gray

END OF SECTION 32 13 73

SECTION 321400 - UNIT PAVING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. This Section includes the following:

1. Rough-stone pavers set in sand setting beds.
2. Landscape Boulders

B. Related Sections include the following:
1. Division 31 Section "Earth Moving" for excavation and compacted subgrade.

1.3 QUALITY ASSURANCE

A. Source Limitations: Obtain each type of unit paver, and setting material from one source with resources to provide materials and products of consistent quality in appearance and physical properties.

B. Preinstallation Conference: Conduct conference at Project site to comply with requirements in Division 01 Section "Project Management and Coordination."

1.4 DELIVERY, STORAGE, AND HANDLING

A. Store pavers on elevated platforms in a dry location. If units are not stored in an enclosed location, cover tops and sides of stacks with waterproof sheeting, securely tied.

B. Store cementitious materials on elevated platforms, under cover, and in a dry location. Do not use cementitious materials that have become damp.

C. Store aggregates where grading and other required characteristics can be maintained and contamination avoided.

1.5 PROJECT CONDITIONS

A. Cold-Weather Protection: Do not use frozen materials or materials mixed or coated with ice or frost. Do not build on frozen subgrade or setting beds. Remove and replace unit paver work damaged by frost or freezing.

B. Weather Limitations for Mortar and Grout:

a.

PART 2 - PRODUCTS

2.1 ROUGH-STONE PAVERS

A. Rough-Stone Pavers: Rectangular tumbled paving stones, with split faces and edges, made from sandstone complying with ASTM C 615.

1. Varieties and Sources: Subject to compliance with requirements, provide the following or equal:

Indian Sandstone Dimensional Pavers, as distributed by Estes Material Sales, Hope, Indiana

2. Sandstone Color and Grain: Chestnut with medium grain.
3. Thickness: 15/16"
4. Face Sizes - 6 Sizes Size 1: 12x12, Size 2: 12x18, Size 3: 12x30, Size 4: 24x24, Size 5: 18x24, Size 6: 18x30.

2.2 LANDSCAPE BOULDERS

A. Large SC Limestone Chunks as supplied by Estes Material Sales, Hope Indiana, or approved equal. See drawings for general size. Verify size requirements in field to ensure adequate height and width to satisfy wall and step termination requirements.

2.3 AGGREGATE SETTING-BED MATERIALS

A. Sand for Leveling Course: Sound, sharp, washed, natural sand or crushed stone complying with gradation requirements in ASTM C 33 for fine aggregate.

B. Sand for Joints: Polymeric Fine, sharp, washed, natural sand or crushed stone with 100 percent passing No. 16 sieve and no more than 10 percent passing No. 200 sieve. Basis of Design: Alliance Gator G2 Sand.

1. Provide sand of color needed to produce required joint color as reviewed with designer and owner

2.4 GROUT MATERIALS

A. Sand-Portland Cement Grout: ANSI A108.10, composed of white or gray cement, unfading mineral pigments and white or colored sand as required to produce required color.

1. Latex Additive: Manufacturer's standard water emulsion, serving as replacement for part or all of gaging water, of type specifically recommended by latex-additive manufacturer for use with field-mixed sand-portland cement grout.

a. Available Manufacturers: Subject to compliance with requirements, manufacturers offering latex additives that may be incorporated into the Work include, but are not limited to, the following:

1) Laticrete International, Inc.
2) MAPEI Corp.
3) TEC Incorporated; H. B. Fuller Company.

2.5 MORTAR AND GROUT MIXES

A. General: Comply with referenced standards and with manufacturers' written instructions for mix proportions, mixing equipment, mixer speeds, mixing containers, mixing times, and other procedures needed to produce setting-bed and joint materials of uniform quality and with optimum performance characteristics. Discard mortars and grout if they have reached their initial set before being used.

B. Job-Mixed Portland Cement Grout: Proportion and mix job-mixed portland cement and sand to match setting-bed mortar, except omit hydrated lime and use enough water to produce a pourable mixture.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine areas indicated to receive paving, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance.

1. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Remove substances from concrete substrates that could impair mortar bond, including curing and sealing compounds, form oil, and laitance.

B. Clean concrete substrates to remove dirt, dust, debris, and loose particles.

3.3 INSTALLATION, GENERAL

A. Do not use unit pavers with chips, cracks, voids, discolorations, and other defects that might be visible in finished work.

B. Mix pavers from several pallets or cubes, as they are placed, to produce uniform blend of colors and textures.

C. Cut unit pavers with motor-driven masonry saw equipment to provide clean, sharp, unchipped edges. Cut units to provide pattern indicated and to fit adjoining work neatly. Use full units without cutting where possible. Hammer cutting is not acceptable.

D. Paver and Joint Pattern: As indicated. On Drawings- See 1/A100

E. Tolerances: Do not exceed 1/32-inch unit-to-unit offset from flush (lippage) nor 1/8 inch in 10 feet from level, or indicated slope, for finished surface of paving.

F. Tolerances: Do not exceed 1/16-inch unit-to-unit offset from flush (lippage) nor 1/8 inch in 24 inches and 1/4 inch in 10 feet from level, or indicated slope, for finished surface of paving.

G. Provide steps made of pavers as indicated. Install paver steps before installing adjacent pavers.

1. Where pavers set in mortar bed are indicated for steps constructed adjacent to pavers set in aggregate setting bed, install steps and allow mortar to cure before placing aggregate setting bed and remainder of pavers. Cut off mortar bed at a steep angle so it will not interfere with aggregate setting bed.

3.4 AGGREGATE SETTING-BED APPLICATIONS

A. Place leveling course and screed to a thickness of 1 to 1-1/2 inches, taking care that moisture content remains constant and density is loose and constant until pavers are set and compacted.

B. Treat leveling course with herbicide to inhibit growth of grass and weeds.

C. Set pavers with a minimum joint width of 1/16 inch and a maximum of 1/8 inch, being careful not to disturb leveling base. If pavers have spacer bars, place pavers hand tight against spacer bars. Use string lines to keep straight lines. Fill gaps between units that exceed 3/8 inch with pieces cut to fit from full-size unit pavers.

1. When installation is performed with mechanical equipment, use only unit pavers with spacer bars on sides of each unit.

D. Vibrate pavers into leveling course with a low-amplitude plate vibrator capable of a 3500- to 5000-lbf compaction force at 80 to 90 Hz. Perform at least three passes across paving with vibrator. Vibrate under the following conditions:

1. After edge pavers are installed and there is a completed surface or before surface is exposed to rain.
2. Before ending each day's work, fully compact installed concrete pavers to within 36 inches of the laying face. Cover pavers that have not been compacted, and leveling course on which pavers have not been placed, with nonstaining plastic sheets to protect them from rain.

E. Spread dry sand and fill joints immediately after vibrating pavers into leveling course. Vibrate pavers and add sand until joints are completely filled, then remove excess sand. Leave a slight surplus of sand on the surface for joint filling.

F. Do not allow traffic on installed pavers until sand has been vibrated into joints.

G. Repeat joint-filling process 30 days later.

3.5 REPAIRING, POINTING, AND CLEANING

A. Remove and replace unit pavers that are loose, chipped, broken, stained, or otherwise damaged or that do not match adjoining units. Provide new units to match adjoining units and install in same manner as original units, with same joint treatment and with no evidence of replacement.

B. Pointing: During tooling of joints, enlarge voids or holes and completely fill with grout. Point up joints at sealant joints to provide a neat, uniform appearance, properly prepared for sealant application.

C. Cleaning: Remove excess grout from exposed paver surfaces; wash and scrub clean.

END OF SECTION

SECTION 32 92 00 - TURF AND GRASSES

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
1. Fine Grading and Preparation of Lawn Areas.
2. Top Soil and Amendments.
3. Sodding & Seeding Permanent Lawn Areas.
4. Reconditioning Lawns.
5. Fertilizer.
6. Warranty.
7. Maintenance.

1.2 SUBMITTALS

A. Submit in Accordance with Division 1 requirements.

B. Certification of Grass Seed: From seed vendor for each grass-seed or mixture stating the botanical and common name, percentage by weight of each species and variety, and percentage of purity, germination, and weed seed. Include the year of production and date of packaging. Include identification of source and name and telephone number of supplier.

C. Certification of Sod: Submit sod vendor's certified statement of sod type, including the source and contact information.

D. Landscape Contractor Qualification Data: Include list of similar projects completed by Landscape Contractor demonstrating capabilities and experience. Include project names, addresses, and year completed, and include names and addresses of owners' contact persons.

E. Pesticides and Herbicides: Include product label and manufacturer's application instructions specific to the Project.

F. Product Certificates: For each type of manufactured product provide the Manufacturer's certified analysis of standard products or analysis of other materials by a recognized laboratory made according to methods established by the Association of Official Analytical Chemists, where applicable.

G. Material Test Reports: Include a soil analysis as specified in section 1.3.B.

H. Maintenance Instructions: Type-written instructions recommending procedures to be established by Owner for maintenance of lawn areas during a calendar year. Contractor shall submit instructions to owner and Landscape Architect before the start of the required maintenance period.

I. Warranty: Submit warranty as specified herein.

1.3 QUALITY ASSURANCE

A. Landscape Contractor Qualifications: Engage an experienced Landscape Contractor who has completed lawn installation work similar in material, design and scope to that indicated for this project with a record of successful turf establishment.
   1. Professional Membership: Landscape Contractor shall be a member in good standing of either the Professional Landcare Network or the American Nursery and Landscape Association.
   2. Experience: Landscape Contractor shall have three years' experience in sod/seed installation in addition to requirements in Division 01 Section "Quality Requirements."
   3. Field Supervision: Require Landscape Contractor to maintain an experienced full-time supervisor on Project site when work is in progress.
   4. Pesticide Applicator: Shall be State licensed, for commercial application.

B. Soil Analysis: Furnish a soil analysis and written report by a qualified soil-testing laboratory stating percentages of organic matter; gradation of sand, silt, and clay content; cation exchange capacity; deleterious material; pH; and mineral and plant-nutrient content of soils.
   1. Some top soil will be available on site, however, some may need to be trucked in. Soil analysis shall be performed for both.
   2. Testing methods and written recommendations shall comply with USDA's Handbook No. 60.
   3. The soil-testing laboratory shall oversee soil sampling; with depth, location, and number of samples to be taken per instructions from Landscape Architect. A minimum of three representative samples shall be taken from varied locations for each soil to be used or amended for planting purposes.
   4. Report suitability of tested soil for plant growth.
      a. Based upon the test results, state recommendations for soil treatments and soil amendments are to be incorporated. State recommendations in weight or volume for nitrogen, phosphorus, and potash nutrients and soil amendments shall be added to produce satisfactory planting soil suitable for healthy, viable plants.
      b. Report presence of problem salts, minerals, or heavy metals, including aluminum, arsenic, barium, cadmium, chromium, cobalt, lead, lithium, and vanadium. If such problem materials are present, provide additional recommendations for corrective action.

C. Plants & Materials Quality:
   1. Packages of seed shall bear official State or Federal stamps and certificated indicating the type, quality and content of the seed packages. Deliver packages unopened. Do not open until observed by the Landscape Architect.
   2. Sod: Minimum age of 18 months, with root development that will support its own weight without tearing, when suspended vertically by holding the upper two corners.
   3. Do not make substitutions. If specified landscape material is not obtainable, submit proof of non-availability to the Landscape Architect. Please note that all plant material is available in the immediate region. Contractor shall take necessary steps to obtain material specified. A substitution will only be considered as a last resort.
   4. Analysis and Standards: Package standard products with manufacturers certified analysis. For other materials, provide analysis by recognized laboratory made in accordance with methods established by the Association of Official Agriculture Chemists, wherever applicable.

D. Pre-installation Conference: Conduct conference at Project site.

1. Pre-Installation conference shall include the Contractor, the foreman appointed to oversee the planting operations, the Landscape Architect, and other persons as deemed appropriate for the coordination and quality control of the work.
2. At the conference, review the installation procedures for lawn areas, the sequence of operations, watering and other maintenance requirements, outstanding submittals and approvals, and such other subjects necessary for the coordination of the work of this section.

1.4 DELIVERY, STORAGE, AND HANDLING

A. Seed and Other Packaged Materials: Deliver packaged materials in original, unopened containers showing weight, certified analysis, name and address of manufacturer, and indication of conformance with state and federal laws, as applicable.

B. Sod: Harvest, deliver, store, and handle sod according to requirements in "Specifications for Turfgrass Sod Materials" and "Specifications for Turfgrass Sod Transplanting and Installation" in TPI's "Guideline Specifications to Turfgrass Sodding." Deliver sod in time for planting within 24 hours of harvesting. Protect sod from breakage and drying.

C. Bulk Materials:
1. Do not dump or store bulk materials near structures, utilities, walkways and pavements, or on existing turf areas or plants.
2. Provide erosion-control measures to prevent erosion or displacement of bulk materials, discharge of soil-bearing water runoff, and airborne dust reaching adjacent properties, water conveyance systems, or walkways.
3. Accompany each delivery of bulk fertilizers and soil amendments with appropriate certificates.

1.5 PROJECT CONDITIONS

A. Planting Time: Proceed with, and complete sodding & seeding work as directed below.
1. Install sod/seed during normal planting season for product provided.
2. Correlate planting with specified maintenance periods to provide maintenance from date of final completion.

B. Weather Limitations: Proceed with planting only when existing and forecasted weather conditions permit planting to be performed when beneficial and optimum results may be obtained. Apply products during favorable weather conditions according to manufacturer's written instructions and warranty requirements.

C. Coordination with other Landscape Installation: Lawn grasses should be installed after other landscape materials.

1.6 WARRANTY

A. Warranty: Lawns shall be warranted for the minimum duration of one full year, to include one full growing season after seeding, and shall be alive and in satisfactory growth at the end of the warranty period. The growing season is defined as beginning May 1 and ending October 1.

B. Replacement: At the end of the warranty period, observation will be made by the Engineer upon written notice requesting such inspection, submitted by the Contractor at least 10 days before the anticipated date. If the lawns do not show a healthy, uniform stand of grass, those

areas shall be reseeded as soon as conditions permit, but during the spring or fall seeding periods.

C. The Engineer will inspect the seeded areas within the one year warranty. Seeded areas requiring replacement during the warranty period shall be warranted one additional full year from the date of reseeding.

D. Owner's Responsibility: If an area of seeding during the warranty and replacement period is found to be damaged or destroyed due to vandalism, malicious mischief, vehicle ruts and tracks, or acts of God such as flooding, storm debris, then the Owner shall have the responsibility of replacing those lawn areas without cost or responsibility to the Contractor under this Section.

1.7 MAINTENANCE SERVICE

A. Begin maintenance of lawns immediately after each area is planted and continue for the periods required to establish acceptable lawns, but no less than the warranty period

B. Maintain lawns by watering, fertilizing, weeding, mowing, trimming, and other operations such as rolling, regrading, replanting to establish a smooth, acceptable lawn, free of eroded or bare areas.

PART 2 - PRODUCTS

2.1 TOPSOIL

A. Some topsoil shall be provided on site for the landscape contractor to complete landscape work. The landscape contractor shall be responsible for obtaining additional top soil as needed.

B. Contractor shall insure that topsoil is reasonably free of subsoil, clay lumps, brush, weeds, and other litter; and free of roots, stumps, stones larger than 1/2 inches in any dimension, and other extraneous or toxic matter harmful to plant growth.

C. Contractor shall incorporate recommended amendments for plant material applications to the provided topsoil after the placement of the topsoil throughout the site. Refer paragraph 1.3.B of this Section.

D. Additional topsoil shall be incorporated with amendments per Topsoil Testing recommendations after the placement of the topsoil throughout the site. Refer paragraph 1.3.B of this Section.

2.2 TURFGRASS

A. Turfgrass Sod: Install Bluegrass sod complying with "Specifications for Turfgrass Sod Materials" in TPI's "Guideline Specifications to Turfgrass Sodding." Furnish viable sod of uniform density, color, and texture, strongly rooted, and capable of vigorous growth and development when planted.

B. Turfgrass Seed: Provide fresh, clean, new-crop seed complying with tolerance for purity and germination established by Official Seed Analysts of North America. Provide seed of grass species, proportions and minimum percentages of purity, germination, and maximum

percentage of weed seed as specified and shall be mixed and warranted by the dealer in accordance with the following:

1. Permanent Lawns: Use mixture of 85% Bluegrass consisting of NuGlade Bluegrass, Odyssey Bluegrass and Liberator Bluegrass and 15% perennial Ryegrass. Apply 8.0 to 8.5 pounds per 1000 square feet (spring) and 7.0 to 7.5 pounds per 1000 square feet (fall).
2. The Contractor may submit to the Engineer for approval, specifications for a substitute mixture, which will provide a good stand of grass of similar character to that specified, if in his opinion it is desirable or necessary. Nothing in this Section shall be construed as relieving this Contractor of the requirements of the Section "Maintenance."

2.3 FERTILIZERS

A. Bonemeal: Commercial raw bonemeal, finely ground and with minimum analysis of 4 percent nitrogen and 20 percent phosphoric acid.

B. Superphosphate: Soluble mixture of phosphate obtained from treated mineral phosphates with a minimum analysis of 20 percent available phosphoric acid.

C. Commercial Fertilizer: Complete fertilizer of neutral character, with some elements derived from organic sources, containing at least 4 percent phosphoric acid, at least 2 percent potassium, and percentage of nitrogen required to provide at least 1.0 lb. of actual nitrogen per 1,000 sq. ft. of lawn area. Provide nitrogen in form that will be available to the lawn during initial period of growth.

D. Apply a minimum of 600 pounds of fertilizer per acre of planted/reconditioned lawn areas.

2.4 PESTICIDES

A. General: Pesticide, registered and approved by EPA, acceptable to authorities having jurisdiction, and of type recommended by manufacturer for each specific problem for Project conditions and application. Do not use restricted pesticides unless authorized in writing by authorities having jurisdiction.

B. Pre-Emergent Herbicide (Selective and Non-Selective): Effective for controlling the germination or growth of weeds within planted areas at the soil level directly below the mulch layer.

C. Post-Emergent Herbicide (Selective and Non-Selective): Effective for controlling weed growth that has already germinated.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine areas to be planted for compliance with requirements and other conditions affecting performance.

1. Verify that no foreign or deleterious material or liquid such as paint, paint washout, concrete slurry, concrete layers or chunks, cement, plaster, oils, gasoline, diesel fuel,

paint thinner, turpentine, tar, roofing compound, or acid has been deposited in soil within a planting area.

2. Do not mix or place soils and soil amendments in frozen, wet, or muddy conditions.
3. Suspend soil spreading, grading, and tilling operations during periods of excessive soil moisture until the moisture content reaches acceptable levels to attain the required results.
4. Uniformly moisten excessively dry soil that is not workable and which is too dusty.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

C. If contamination by foreign or deleterious material or liquid is present in soil within a planting area, remove the soil and contamination as directed by Landscape Architect and replace with new planting soil.

3.2 SITE PREPARATION

A. Protect structures, utilities, sidewalks, pavements, and other facilities, trees, shrubs, and plantings from damage caused by planting operations.
   1. Protect set grade stakes until directed to remove them.

B. Install erosion-control measures to prevent erosion or displacement of soils and discharge of soil-bearing water runoff or airborne dust to adjacent properties and walkways.

3.3 SOIL PREPARATION

A. Some topsoil shall be provided on site for the landscape contractor to complete landscape work. The landscape contractor shall be responsible for obtaining additional top soil as needed.

B. Seeding/Sodding Contractor shall examine finish grade for proper elevation and notify the Engineer of any areas detrimental to successful development of a lawn. Do not proceed with Work until unsatisfactory conditions have been corrected and acceptable to Engineer and Owner.

C. Limit preparation to areas that will be planted in immediate future.

D. Spread topsoil at a depth of 2” to all designated seeded and sodded areas. Disk or till placed topsoil and subsoil to a depth of 4”. Remove stones bigger than 1 inch in any dimension and sticks, roots, rubbish, and other extraneous matter.

E. Clean mixed topsoil of roots, plants, sods, stones, clay lumps, and other extraneous materials harmful to toxic to plant growth.

F. Mix soil amendments and fertilizers with topsoil at rates recommended from topsoil testing for seeding and sodding applications. Delay mixing of fertilizer if planting will not follow placing of topsoil mixture within a few days. Apply soil amendments on surface of spread topsoil and mix thoroughly into top 4 inches of topsoil before planting.
   1. The topsoil shall be disked repeatedly and tilled until the topsoil is thoroughly mixed.

G. Preparation of Unchanged Grades: Where lawns are to be planted in areas that have not been altered or disturbed by excavating, grading, or stripping operations, prepare soil for lawn and grass planting as follows: Till to a depth of at least 6 inches. Apply soil amendments and initial fertilizers as specified and mix thoroughly into top 4 inches of soil. Remove high areas

and fill in depressions; till soil to a homogenous mixture of fine texture, free of lumps, clods, stones, roots, and other extraneous matter.

1. Before preparing of unchanged areas, remove existing grass, vegetation, and turf. Dispose of such material outside of Owner's property; do not turn over into soil being prepared for lawns.

H. Grade lawn and grass areas to a smooth, even surface with loose, uniformly fine texture. Roll and rake, remove ridges, and fill depressions to meet finish grades. Limit fine grading to areas that can be planted within immediate future. Remove trash, debris, stones larger than 1 inch diameter, and other objects that may interfere with planting or maintenance operations.

I. Moisten prepared lawn areas before planting if soil is dry. Water thoroughly and allow surface to dry off before planting lawns. Do not create muddy soil.

J. Restore prepared areas to specified condition if eroded or otherwise disturbed after fine grading and before planting.

3.4 SODDING

A. Lay sod within 18 hours of harvesting. Do not lay sod if dormant or if ground is frozen or muddy.

B. Lay sod to form a solid mass with tightly fitted joints. Butt ends and sides of sod; do not stretch or overlap. Stagger sod strips or pads to offset joints in adjacent courses. Work from boards to avoid damage to subgrade or sod during installation. Tamp and roll lightly to ensure contact with subgrade, eliminate air pockets, and form a smooth surface. Work sifted soil or fine sand into minor cracks between pieces of sod; remove excess to avoid smothering sod and adjacent grass.

1. Lay sod across angle of slopes exceeding 1:3.
2. Anchor sod on slopes exceeding 1:6 with wood pegs or steel staples spaced as recommended by sod manufacturer but not less than 2 anchors per sod strip to prevent slippage.

C. Saturate sod with fine water spray within two hours of planting. During first week after planting, water daily or more frequently as necessary to maintain moist soil to a minimum depth of 4” below sod.

3.5 SEEDING

A. Sow seed with a seed packer machine. Do not seed when wind velocity exceeds 5 miles per hour. Distribute seed evenly over entire area by sowing equal quantity in 2 directions at right angles to each other. Seed shall be sown at rates specified.

1. Do not use wet seed or seed that is moldy or otherwise damaged in transit or storage.

B. Rake seed lightly into top 1/8 inch of soil, roll lightly, and water with fine spray.

C. Protect seeded slopes against erosion with jute mesh erosion netting or other similar coverings acceptable to Engineer.

D. Protect seeded areas against erosion by spreading specified lawn mulch after completion of seeding operations. Spread uniformly to form a continuous blanket at least 1-1/2 inches loose measurement over seeded areas. Spread by hand, blower, or other suitable equipment.

1. Anchor mulch by mechanically crimping into the soil or tackifying with a biodegradable tackifier, at the rate of 10 to 13 gallons per 1,000 sq. ft. Take precautions to prevent damage or staining of structures or other plantings adjacent to mulched areas. Immediately clean such areas where damage occurs.

E. Protect seeded areas against hot, dry weather or drying winds by applying specified mulch within 24 hours after completion of seeding operations. Presoak and scatter evenly to a depth of 1/8 inches to 3/16 inches thick and roll to a smooth surface. Do not mound.

3.6 RECONDITIONING LAWNS

A. Recondition existing lawn areas damaged by Contractor's operations including storage of materials or equipment and movement of vehicles. Also recondition lawn areas where settlement or washouts occur or where minor regrading is required.

B. Provide fertilizer, seed or sod, and soil amendments as specified for new lawns to provide satisfactorily reconditioned lawn. Provide new planting soil to fill low spots and meet new finish grades.

C. Cultivate bare and compacted areas thoroughly to provide a good, deep planting bed.

D. Remove diseased or unsatisfactory lawn areas; do not bury into soil. Remove topsoil containing foreign materials resulting from Contractor's operations including oil drippings, stone, gravel, and other construction materials; replace with new topsoil.

E. Where substantial lawn remains (but is thin), mow, rake, aerate if compacted, fill low spots, remove humps, cultivate soil, fertilize, and seed. Remove weeds before seeding. If weeds are extensive, apply selective chemical weed killers. Apply a seedbed mulch, if required, to maintain moist condition.

F. Water newly planted areas and keep moist until new grass is established.

3.7 SATISFACTORY TURF

A. Turf installations shall meet the following criteria as determined by Landscape Architect:
1. Satisfactory Turf: At end of maintenance period, a healthy, well-rooted, even-colored, viable turf has been established, free of weeds, open joints, bare areas, and surface irregularities.

B. Use specified materials to reestablish turf that does not comply with requirements and continue maintenance until turf is satisfactory.

3.8 MAINTENANCE OF LAWN GRASS

A. Begin maintenance of lawns immediately after each area is planted and continue for the periods required to establish acceptable lawns, but no less than the following:
1. At least 60 days, after date of substantial completion.
    a. If planted in fall and not given full 60 days of maintenance, or if not considered acceptable at that time, continue maintenance during following spring until acceptable lawn is established.

B. Maintain lawns by watering, fertilizing, weeding, mowing, trimming, and other operations such as rolling, regrading, replanting to establish a smooth, acceptable lawn, free of eroded or bare areas.

C. Watering: The Contractor shall be responsible for the coordination of the installation of lawns and on-site water availability. Water, if irrigation system is not complete at the time of planting, shall be furnished by the Contractor. All hoses and equipment required for watering shall be furnished by the Contractor as needed.

D. Seed: During the first two weeks after seed is placed, water daily. Thereafter, keep seeded area moist until grass seed has completely germinated and started to grow.

E. Lay out temporary lawn-watering system and arrange watering schedule to prevent puddling, water erosion, and displacement of seed or mulch (if any). Lay out temporary watering system to avoid necessity of walking over muddy or newly seeded areas.

F. Mow lawns as soon as there is enough top growth to cut with mower set at specified height for principal species planted. Repeat mowing to maintain specified height. Remove no more than 40 percent of grass leaf growth in initial or subsequent mowings. Do not delay mowing until grass blades bend over and become matted. Do not mow when grass is wet. Time initial and subsequent mowings to maintain following grass height:
   1. Mow grass from 1-1/2 inches to 2-1/2 inches high. Do not mow to less than 1-1/2 inches.

3.9 PESTICIDE APPLICATION

A. Apply pesticides and other chemical products and biological control agents in accordance with requirements of authorities having jurisdiction and manufacturer's written recommendations. Coordinate applications with Owner's operations and others in proximity to the Work. Notify Owner before each application is performed.

B. Post-Emergent Herbicides (Selective and Non-Selective): Apply only as necessary to treat already-germinated weeds and in accordance with manufacturer's written recommendations.

3.10 ACCEPTANCE

A. When work is substantially completed, including maintenance, Engineer will, upon request, make an inspection to determine acceptability.
   1. Lawn work may be inspected for acceptance in parts agreeable to Engineer, provided work offered for inspection is complete, including maintenance.

B. Replant rejected work and continue specified maintenance until reinspected by Engineer and found to be acceptable.

C. Lawns will be acceptable provided requirements, including maintenance, have been met and healthy, uniform close stand of specified grass is established free of weeds, bare spots, and surface irregularities.

3.11 CLEANUP AND PROTECTION

A. Promptly remove soil and debris created by turf work from paved areas. Clean wheels of vehicles before leaving site to avoid tracking soil onto roads, walks, or other paved areas.

B. Erect temporary fencing or barricades and warning signs to protect newly planted areas from traffic. Maintain fencing and barricades throughout initial maintenance period and remove after plantings are established.

C. Remove nondegradable erosion-control measures after grass establishment period.

END OF SECTION