RESIDENT PROJECT REPRESENTATIVE

Engineer shall furnish a Resident Project Representative ("RPR"), assistants, and other field staff to assist Engineer in observing progress and quality of the Work of the Contractor. The RPR, assistants, and other field staff under this project shall provide full time representation unless representation to a lesser degree is approved by Agency.

Through such additional observations of Contractor's work in progress and field checks of materials and equipment by the RPR and assistants, Engineer shall endeavor to provide further protection for Owner against defects and deficiencies in the Work. However, Engineer shall not, during such visits or as a result of such observations of Contractor's work in progress, supervise, direct, or have control over the Contractor's work nor shall Engineer have authority over or responsibility for the means, methods, techniques, sequences, or procedures selected or used by Contractor, for security or safety at the Site, for safety precautions and programs incident to the Contractor's work in progress, for any failure of Contractor to comply with Laws and Regulations applicable to Contractor's performing and furnishing the Work, or responsibility for Contractor's failure to furnish and perform the Work in accordance with the Contract Documents.

The duties and responsibilities of the RPR are as follows:

General:

RPR is Engineer's agent at the Site, will act as directed by and under the supervision of Engineer, and will confer with Engineer regarding RPR's actions. RPR’s dealings in matters pertaining to the Contractor's work in progress shall in general be with Engineer and Contractor, keeping Owner advised as necessary. RPR's dealings with subcontractors shall only be through or with the full knowledge and approval of Contractor. RPR shall generally communicate with Owner with the knowledge of and under the direction of Engineer.

Schedules:

Review the progress schedule, schedule of Shop Drawing and Sample submittals, and schedule of values prepared by Contractor and consult with Engineer concerning acceptability.

Conferences and Meetings:

Attend meetings with Contractor, such as preconstruction conferences, progress meetings, job conferences and other project-related meetings, and prepare and circulate copies of minutes thereof.

Liaison:

Serve as Engineer's liaison with Contractor, working principally through Contractor's superintendent, assist in providing information regarding the intent of the Contract Documents.

Assist Engineer in serving as Owner's liaison with Contractor when Contractor's operations affect Owner's on-Site operations.

Assist in obtaining from Owner additional details or information, when required for proper execution of the Work.

Interpretation of Contract Documents:
Report to Engineer when clarifications and interpretations of the Contract Documents are needed and transmit to Contractor clarifications and interpretations as issued by Engineer.

**Shop Drawings and Samples:**

Record date of receipt of Samples and approved Shop Drawings.

Receive Samples which are furnished at the Site by Contractor, and notify Engineer of availability of Samples for examination.

Advise Engineer and Contractor of the commencement of any portion of the Work requiring a Shop Drawing or Sample submittal for which RPR believes that the submittal has not been approved by Engineer.

**Modifications:**

Consider and evaluate Contractor's suggestions for modifications in Drawings or Specifications and report such suggestions, together with RPR's recommendations, to Engineer. Transmit to Contractor in writing decisions as issued by Engineer.

**Review of Work and Rejection of Defective Work:**

Conduct on-Site observations of Contractor's work in progress to assist Engineer in determining if the Work is in general proceeding in accordance with the Contract Documents.

Report to Engineer whenever RPR believes that any part of Contractor's work in progress will not produce a completed Project that conforms generally to the Contract Documents or will impair the integrity of the design concept of the completed Project as a functioning whole as indicated in the Contract Documents, or has been damaged, or does not meet the requirements of any inspection, test or approval required to be made; and advise Engineer of that part of work in progress that RPR believes should be corrected or rejected or should be uncovered for observation, or requires special testing, inspection or approval.

**Inspections, Tests, and System Startups:**

Consult with Engineer in advance of scheduled major inspections, tests, and systems startups of important phases of the Work.

Verify that tests, equipment, and systems start-ups and operating and maintenance training are conducted in the presence of appropriate Owner's personnel, and that Contractor maintains adequate records thereof.

Observe, record, and report to Engineer appropriate details relative to the test procedures and systems start-ups.

Accompany visiting inspectors representing public or other agencies having jurisdiction over the Project, record the results of these inspections, and report to Engineer.

**Records:**

Maintain at the Site orderly files for correspondence, reports of job conferences, reproductions of original Contract Documents including all Change Orders, Field Orders, Work Change Directives, Addenda, additional Drawings issued subsequent to the execution of the Contract, Engineer's clarifications and interpretations of the Contract Documents, progress reports, Shop Drawing and Sample submittals received from and delivered to Contractor, and other Project-related documents.

Prepare a daily report or keep a diary or log book, recording Contractor's hours on the Site, weather conditions, data relative to questions of Change Orders, Field Orders, Work Change...
Directives, or changed conditions, Site visitors, daily activities, decisions, observations in general, and specific observations in more detail as in the case of observing test procedures; and send copies to Engineer.

Record names, addresses, fax numbers, e-mail addresses, web site locations, and telephone numbers of all Contractors, subcontractors, and major suppliers of materials and equipment.

Maintain records for use in preparing Project documentation.

Upon completion of the Work, furnish original set of all RPR Project documentation to Engineer.

Reports:

Furnish to Engineer periodic reports as required of progress of the Work and of Contractor's compliance with the progress schedule and schedule of Shop Drawing and Sample submittals.

Draft and recommend to Engineer proposed Change Orders, Work Change Directives, and Field Orders. Obtain backup material from Contractor.

Furnish to Engineer and Owner copies of all inspection, test, and system start-up reports.

Immediately notify Engineer of the occurrence of any Site accidents, emergencies, acts of God endangering the Work, damage to property by fire or other causes, or the discovery of any Constituent of Concern.

Payment Requests:

Review Applications for Payment with Contractor for compliance with the established procedure for their submission and forward with recommendations to Engineer, noting particularly the relationship of the payment requested to the schedule of values, Work completed, and materials and equipment delivered at the Site but not incorporated in the Work.

Certificates, Operation and Maintenance Manuals:

During the course of the Work, verify that materials and equipment certificates, operation and maintenance manuals and other data required by the Specifications to be assembled and furnished by Contractor are applicable to the items actually installed and in accordance with the Contract Documents, and have these documents delivered to Engineer for review and forwarding to Owner prior to payment for that part of the Work.

Completion:

Participate in a Substantial Completion (pre-final) inspection, and assist in the determination of Substantial Completion and the preparation of lists of items to be completed or corrected.

Observe Contractor-arranged inspections required by Laws and Regulations applicable to the Work, including but not limited to those performed by public agencies having jurisdiction over the Work.

Participate in a final inspection in the company of Engineer, Owner, and Contractor and prepare a final list of items to be completed and deficiencies to be remedied.

Observe whether all items on the final list have been completed or corrected and make recommendations to Engineer concerning acceptance and issuance of the Notice of Acceptability of the Work.
Resident Project Representative shall not:

Authorize any deviation from the Contract Documents or substitution of materials or equipment (including "or-equal" items).

Exceed limitations of Engineer's authority as set forth in the Agreement or the Contract Documents.

Undertake any of the responsibilities of Contractor, subcontractors, suppliers, or Contractor's superintendent.

Advise on, issue directions relative to, or assume control over any aspect of the means, methods, techniques, sequences or procedures of Contractor's work unless such advice or directions are specifically required by the Contract Documents.

Advise on, issue directions regarding, or assume control over safety practices, precautions, and programs in connection with the activities or operations of Owner or Contractor.

Participate in specialized field or laboratory tests or inspections conducted off-site by others except as specifically authorized by Engineer.

Accept Shop Drawing or Sample submittals from anyone other than Contractor.

Authorize Owner to occupy the Project in whole or in part.

END OF SECTION
1. All Addenda issued by the Owner/Engineer shall be made a part of this Section.

2. If Addenda are issued, all prospective bidders are hereby notified that the Addenda form a part of the Bidding and Contract documents and modifies the original bidding and contract documents issued. Acknowledge receipt of all issued addenda in the space provided in the bid proposal section of the specifications. Failure to do so may subject the bidder to disqualification.
PART ONE - GENERAL

1.01 PROJECT LOCATION

A. The project is located within the Village of Pemberville in Wood County, OH. The Project takes place in the following areas: Roadway work will take place on Hickory Street from College Avenue to the north Village corporation limit and on College Avenue from Hickory Street to Bierley Avenue. In addition, ADA curb ramp improvements will take place at the various intersections along Hickory Street, College Avenue, and Maple Street.

1.02 PROJECT DESCRIPTION

A. The Project includes all work required to complete the improvements described by the Contract Drawings, specified, or required for a complete, operating facility. The required work generally includes, but is not limited to the following brief summary of the work:

The proposed work consists of reconstructing approximately 1,670 feet of College Avenue and resurfacing approximately 1,000 feet of College Avenue from Hickory St. to Bierley Ave. and also includes the resurfacing of approximately 725 feet of Hickory Street from College Avenue to the north Village corporation limits. Work also includes removal and replacement of curb ramps along College Avenue, Hickory Street, and Maple Street. The work generally includes excavation, pavement planing, stone base, asphalt pavement, drive approaches, stone berm, sidewalk and ADA curb ramps, and related restoration items.

1.03 SPECIFICATIONS

A. The Contract Specifications are intended to supplement the Drawings and to further describe the Contractor's required work. When specifications are included on the Drawings and they conflict with the specifications in the Specification Book, the Drawing specifications shall control. All work shall be performed by the appropriate trades. Unless included under another trade's work or specifically excluded, it shall be the responsibility of the Contractor(s) to perform all incidental work, whether or not specific mention is made of each item.

B. It is advised that the Contractor(s) and their subcontractors familiarize themselves with the complete contents of the project Specifications.

1.04 DRAWING AND DOCUMENT SCHEDULE

A. See Drawings labeled "Pemberville College Avenue/Hickory Street Roadway and ADA Curb Ramp Improvements" (29 Sheets)

PART TWO - PRODUCTS

N/A

PART THREE - EXECUTION

A. It is the sole responsibility of the Contractor to complete the project in the allotted time. Unless otherwise agreed to in writing by the Engineer, construction activities shall conform to the Construction Schedule as submitted and approved. If the Contractor deviates from the approved schedule, the Contractor shall notify the Engineer in writing as to the extent of the deviation, the reason(s) for the deviation, and what actions the Contractor intends to take to assure that the project is completed before the project completion date.

B. The Contractor shall voluntarily perform all required work and meet all requirements of the Contract Documents. Failure to comply with the requirements shall not in any way shift related responsibility to the Owner, the Engineer, or other entity.

END OF SECTION
SECTION 01011
PROJECT ADMINISTRATION

PART ONE - GENERAL

1.01 GENERAL CONTENTS AND ASSIGNMENTS

A. This Section contains general required project administrative items and coordination including:

1. 1.02 Work Changes & Modification Procedures
2. 1.03 Coordination
3. 1.04 Pre-construction Meeting
4. 1.05 Progress Meetings
5. 1.06 Pre-installation Meetings
6. 1.07 Construction Cooperation
7. 1.08 Contract Closeout
8. 1.09 Emergency Maintenance Supervisors
9. 1.10 Application for Payment
10. 1.11 Measurement & Payment
11. 1.12 Project Closeout

B. The GENERAL WORK Contractor shall serve as and be the project Construction Coordinator.

1.02 WORK CHANGES & MODIFICATION PROCEDURES

A. The Engineer will advise Contractor of minor variations in the Work not involving an adjustment to Contract Price or Contract Time in accordance with Section 00700, Paragraph 9.04 by issuing supplemental instructions.

B. The Engineer may issue a Proposal Request that includes a detailed description of a desired change and the Owner's desired method of payment with appropriate supplementary or revised Drawings and specifications. Contractor shall prepare and submit a proposal to perform the desired change within ten (10) days stating the fixed price or other basis for performing the work change as requested, any time extension requirements, the last date for Owner's acceptance, plus any other pertinent information.

C. Prior to performing any related work, the Contractor may propose a change for approval by the Engineer, by submitting a Request for Change to the Engineer. The request shall describe the proposed change and its full effect on the Work and the work being performed by others. Included shall be a statement describing the reason for the change, any proposed substitutions, the fixed price or basis for determining the change in the Contract Price, and the effect on the Contract Time, if any. Only upon approval by the Engineer shall the Contractor proceed with the proposed change.

D. When work changes involve bid unit prices, the change in Contract Price shall be based on the bid unit prices and the number of measured, approved units performed by the Contractor in completing the work change. When work changes do not involve bid unit prices, the change in Contract Price shall be a negotiated fixed price or based on a negotiated basis for determining the Change in Contract Price, as requested by the Owner. If Owner and Contractor cannot agree on the change in price or time, they shall be determined in accordance with the General Conditions.

E. Change Orders, Work Change Directives, or Written Amendments will be issued in accordance with the General Conditions.

F. All claims made by the Contractor shall be made within 14 days of the performance of a claim event and shall be sufficiently supported in detail by documented costs, quantities, employee time and payment records, paid invoices, the justification for any Contract time extension, and other relevant data to allow a complete evaluation of the claim. All claim events shall be agreed to by the Engineer prior to performing the related work, otherwise the work shall be considered unauthorized.

G. The project Drawings are believed to be in general accordance with the various applicable building, plumbing, and electrical codes, however the Engineer & Owner do not guarantee that all codes are
satisfied as shown or specified. The Contractor(s) shall be responsible for meeting all code
requirements at no additional cost to the Owner.

1.03 COORDINATION

A. Coordinate scheduling, submittals, and Work of the various Sections of the Contract Specifications to
assure the efficient and orderly sequencing of all interdependent construction elements. Include
provisions for accommodating items installed later, if applicable.

B. Verify that the space, utility requirements, and characteristics of operating equipment are compatible
with the building space and building utilities. Coordinate work of various Sections having interdependent
responsibilities for installing, connecting to, and placing such equipment into operation.

C. Verify and coordinate space requirements for all items, equipment, mechanical, and electrical work that
is indicated on the Drawings, noted, or specified. If any adjustments in the layout are required,
Contractor shall immediately bring them to the attention of the Engineer for approval and/or problem
resolution. Engineer's decision shall be final and any modifications shall be at no additional cost to the
Owner. Follow routing shown for pipes, ducts, and conduit, as closely as practical; place runs parallel
with lines of building. Utilize space efficiently to maximize accessibility for other installations, for
maintenance, and for repairs.

D. Except as otherwise indicated in finished areas, conceal pipes, ducts, and wiring. Coordinate locations
of fixtures and outlets with finish elements.

E. Coordinate completion and clean up of Work in preparation for Substantial Completion.

F. When Owner obtains occupancy of premises, coordinate access to site to minimize disruption of
Owner's activities while correcting defective Work and Work not in accordance with Contract
Documents.

1.04 PRE-CONSTRUCTION MEETING

A. Engineer will schedule a Pre-construction meeting shortly after giving Notice of Award.

B. Required Attendees at Pre-construction Meeting: Owner, Engineer, Affected Utilities, and Contractor's
Construction Manager and Superintendent.

C. The Contractor is responsible for review of the standard agenda items listed below and all other
contract documents prior to this meeting.

D. Standard Pre-construction Meeting Agenda Items:

1. Execution of Owner-Contractor Agreement
2. Submission of executed bonds and insurance certificates
3. Distribution of Contract Documents & Initial Change Order
4. Submission of list of Subcontractors, list of Products, schedule of values, and progress
   schedule.
5. Designation of individuals representing the Contract parties and the Engineer
6. Procedures, processing of field decisions, submittals, substitutions, applications for
   payments, proposal requests, Change Orders, and Contract closeout procedures
7. Scheduling
8. Scheduling activities of testing laboratories and special consultants
9. Requirements and Preparation for Monthly Progress Meetings
10. Utility Relocation Coordination
11. Use of premises by Owner and Contractor
12. Owner's requirements and occupancy
13. Construction facilities and controls provided by Owner
14. Temporary utilities provided by Owner
15. Survey and layout of structures
16. Security and housekeeping procedures
17. Testing procedures
18. Procedures for maintaining record documents
19. Requirements for start-up of equipment
20. Inspection and acceptance of equipment placed into service during construction period
21. Easements

E. Engineer will record minutes and distribute copies within 5 working days after the Pre-construction Meeting to participants, with copies to Engineer, Owner, Contractor, and those affected by the discussions or decisions made.

1.05 PROGRESS MEETINGS

A. Schedule and attend progress meetings at monthly intervals maximum.

B. Engineer will arrange for progress meetings, prepare agendas with copies for participants, preside at meetings, record minutes of the meeting, and distribute the minutes to all participants within 5 working days.

C. Attendance is required for Contractor's Superintendent, major Subcontractors and suppliers, Owner, Engineer, as appropriate to agenda items.

D. The Contractor is responsible for preparing for all Agenda items prior to the meeting.

E. Standard Agenda Items:
   1. Discussion of challenges to previous meeting minutes
   2. Review of Work progress
   3. Field observations, problems, concerns, and decisions
   4. Identification of problems that may impede planned progress.
   5. Review of submittals schedule and status of submittals
   6. Review of off-site fabrication and delivery schedules
   7. Maintenance of progress schedule
   8. Corrective measures to regain projected schedules.
   9. Planned progress during succeeding work period.
   10. Coordination of projected progress
   11. Maintenance of quality and work standards
   12. Effect of proposed changes on progress schedule and coordination
   13. Review of construction photographs and as-built drawing status
   14. Other business relating to Work

F. Revisions to Minutes:
   1. Unless the distributed meeting minutes are challenged in writing prior to the next regularly scheduled progress meeting, they shall be considered complete, correctly stated, and accepted.

   2. Anyone challenging the distributed minutes shall reproduce and distribute copies of the challenge to all indicated recipients of the particular minutes.

   3. Challenges to the prior meeting minutes shall be entertained as a priority item at the next regularly scheduled meeting.

1.06 PRE-INSTALLATION MEETINGS

A. When required by specific specification Sections, Contractor shall coordinate, schedule and convene a pre-installation meeting at the work site a minimum of 10 working days prior to commencing work of the Section.

B. Required attendance shall be the Engineer, the Contractor's Superintendent, and any other parties directly affecting, or affected by, the Section work.

C. Notify Engineer 10 days in advance of meeting date.
D. Contractor shall prepare agenda and preside at meeting:
   1. Review conditions of installation, preparation and installation procedures.
   2. Review coordination with related work.

E. Engineer shall record minutes and distribute copies within 5 work days after meeting to participants.

1.07 CONSTRUCTION COOPERATION

A. All Contractors and sub-contractors shall cooperate with the Construction Coordinator in the allocation of site mobilization areas for field offices and sheds, for existing building access, traffic, and parking facilities.

B. During construction, all Contractors and sub-contractors shall coordinate their use of the site and facilities through the Construction Coordinator.

C. All Contractors shall comply with the Construction Coordinator’s procedures for intra-project communications; submittals, reports and records, schedules, coordination drawings, recommendations; and resolution of ambiguities and conflicts.

D. All Contractors shall comply with instructions of the Construction Coordinator for use of temporary utilities and construction facilities.

E. All Contractors shall coordinate field engineering and layout work with the Construction Coordinator.

1.08 CONTRACT CLOSEOUT

A. Procedures:
   1. Submit written certification that Contract Documents have been reviewed, Work has been inspected, and that Work is complete in accordance with Contract Documents and ready for Engineer’s review.
   2. Provide submittals to Engineer that are required by governing or other authorities.
   3. Submit final Application for Payment identifying total adjusted Contract Sum, previous payments, and sum remaining due.

B. Final Cleaning:
   1. Perform final cleaning prior to final project assessment.
   2. Clean interior and exterior glass, surfaces exposed to view; remove temporary labels, stains and foreign substances, polish transparent and glossy surfaces, vacuum carpeted and other soft surfaces.
   3. Clean equipment and fixtures to a sanitary condition with cleaning materials appropriate to the surface and material being cleaned.
   4. Clean or Replace filters of operating equipment.
   5. Clean debris from roofs, gutters, downspouts, and drainage systems.
   6. Clean site; sweep paved areas, rake clean landscaped surfaces.
   7. Remove waste and surplus materials, rubbish, and construction facilities from the site. Waste removal shall be handled in such a way as to comply with relevant state or local solid waste regulations.

C. Adjusting:
   1. Adjust operating Products and equipment to ensure orderly, smooth, unhindered operation.
D. Project Record Documents:

1. Throughout the progress of the Work, maintain on site one set of the following record documents and record actual revisions to the Work:
   a. Drawings.
   b. Specifications.
   c. Addenda.
   d. Change Orders and other modifications to the Contract.
   e. Reviewed Shop Drawings, Product Data, and Samples.
   f. Manufacturer's instruction for assembly, installation, and adjusting.

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

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

4. Record information concurrent with construction progress.

5. In the Specifications, legibly mark and record at each Product section a description of actual Products installed, including the following:
   a. Manufacturer's name and product model and number.
   b. Product substitutions or alternates utilized.
   c. Changes made by Addenda and modifications.

6. Record Documents and Shop Drawings: Legibly mark each item to record actual construction including:
   a. Measured depths of foundations in relation to finish first or main floor datum.
   b. Measured horizontal and vertical locations of underground utilities and appurtenances, referenced to permanent surface improvements.
   c. Measured locations of internal utilities and appurtenances concealed in construction, referenced to visible and accessible features of the Work.
   d. Field changes of dimension and detail.
   e. Details not on original Contract drawings.

7. Submit documents to Engineer with claim for final Application for Payment.

E. Spare Parts and Maintenance Materials:

1. Provide products, spare parts, maintenance and extra materials in quantities specified in individual specification sections.

2. Deliver to Project site and place in location as directed; obtain receipt prior to final payment.

1.09 EMERGENCY MAINTENANCE SUPERVISOR

A. The Contractor shall submit to the Engineer the names, addresses, and telephone numbers of two employees responsible for performing emergency maintenance and repairs when the Contractor is not working. These employees shall be designated in writing by the Contractor as his representatives and shall have full authority to act on his behalf as specified in the General Conditions. At least one of the designated employees shall be available for contacting by telephone any time an emergency arises.

1.10 APPLICATION FOR PAYMENT

A. Submit Applications on form EJCDC C-620 (Section 00682), including continuation sheets when required. Depending on the project funding agencies, other application forms may be required. Check with Engineer before making the first pay application.

B. Preparation of Applications
1. Present required information in typewritten form.

2. Execute certification by signature of authorized officer.

3. Use data from approved Schedule of Values. Provide dollar value in each column for each line item for portion of work performed [and for stored Products].

4. List each authorized Change Order as an extension on form EJCDC C-620, listing Change Order number and dollar amount as for an original item of Work.

5. Prepare Application for Final Payment as specified.

C. Submittal Procedures

1. Submit a minimum of four (4) copies of each Application for Payment and Schedule of Values

2. Submit an updated construction schedule with each Application for Payment.

3. Payment Period: Submit Application for Payment at the end of each month to the Engineer.

4. Submit with transmittal letter as specified for Submittals in Section 01300.

5. Submit two (2) waivers for partial payment.

6. Submit two (2) certified payroll reports for payroll period.

7. If requesting payment for stored materials, submit two (2) payments for stored material form.

8. Submit any other documentation as requested by the Engineer.

D. Substantiating Data

1. When Engineer requires substantiating information, submit data justifying dollar amounts in question.

2. Provide one copy of data with cover letter for each copy of submittal. Show application number and date, and line item by number and description.

1.11 MEASUREMENT & PAYMENT

A. Measurement and Payment of Lump Sum Items will be based on Contractor's substantiated estimate of the total item value completed as accepted by Engineer. Measurement and payment criteria applicable to the unit price items follows.

1. Use measurement methods delineated in the basis of payment section of the bid proposal forms.

2. Take all measurements and compute quantities. Engineer will verify measurements and quantities.

3. Provide necessary equipment, workers, and survey personnel as required.

B. The quantities indicated in the Bid Form are for bidding and contract purposes only. Quantities and measurements supplied or placed in the Work in accordance with the Drawings and Specifications and verified by the Engineer determine payment.

1. If the actual Work performed in accordance with the Drawings and Specifications requires greater or fewer quantities than those indicated, provide the required quantities at the unit price bid.
C. Quantities shall be measured using the following devices and methods.

1. Measurement Devices:
   a. Weigh Scales: Inspected, tested and certified by the applicable state Weights and Measures department within the past year and the Engineer.
   b. Platform Scales: Of sufficient size and capacity to accommodate the conveying vehicle.
   c. Metering Devices: Inspected, tested and certified by the applicable state department within the past year and the Engineer.

2. Measurement by Weight: Concrete reinforcing steel, rolled or formed steel or other metal shapes will be measured by handbook weights. Welded assemblies will be measured by handbook or scale weight.

3. Measurement by Volume: Measured by cubic dimension using mean length, width and height or thickness.

4. Measurement by Area: Measured by square dimension using mean length and width or radius.

5. Linear Measurement: Measured by linear dimension, at the item centerline or mean chord. Underground piping shall be measured by the horizontal projection of the longitudinal axis of the pipe.

6. Stipulated Sum/Price Measurement: Items measured by weight, volume, area, or linear means or combination, as appropriate, as a completed item or unit of the Work.

D. Payment Includes the Following:

1. Full compensation for all required labor, Products, tools, equipment, plant, transportation, services and incidentals; erection, application or installation of an item of the Work; overhead and profit.

2. Final payment for unit price Work will be made on the basis of the actual measurements and quantities accepted by the Engineer multiplied by the unit price for Work incorporated in or made necessary by the Work.

E. Defective Work shall be handled as follows:

1. Replace the Work, or portions of the Work, not conforming to specified requirements.

2. If, in the opinion of the Engineer and/or Owner, it is not practical to remove and replace the Work, the Engineer and/or Owner will direct one of the following remedies:
   a. The defective Work may remain, but the unit price will be adjusted to a new price at the discretion of the Engineer.
   b. The defective Work will be partially repaired to the instructions of the Engineer and/or Owner, and the unit price will be adjusted to a new price at the discretion of the Engineer.

3. When an individual specification section identifies a different method, formula, or percentage price reduction, it shall control.

4. The authority of the Engineer and/or Owner to assess defects and make appropriate payment adjustment is final.

5. Payment will not be made for:
   a. Products and work wasted or disposed of in a manner that is not acceptable.
   b. Products and work determined unacceptable.
   c. Products not completely unloaded from the transporting vehicle.
d. Products placed and work performed beyond the lines and levels of the required Work.
e. Products and work not incorporated in the Work.
f. Loading, hauling, and disposing of rejected Products.

1.12 PROJECT CLOSEOUT

A. Provide an orderly and efficient transfer of the completed Work to the Owner. Comply with requirements stated in Conditions of the Contract and in Specifications for Administrative procedures in closing out the Work.

B. Prior to requesting inspection by the Engineer, use adequate means to assure that the Work is completed in accordance with the specified requirements and is ready for the requested inspection.

C. When the Work is substantially complete, the Contractor shall submit to Engineer the following:

1. A written notice that the Work, or designated portion thereof, is substantially complete.

2. A list of items that remain to be completed or corrected.
   a. Within a reasonable time after receipt of such notice, Engineer will make an inspection to determine the status of completion.
   b. Should Engineer determine that the Work is not substantially complete:
      1. Engineer will promptly notify the Contractor in writing, giving the reasons therefore.
      2. Contractor shall remedy the deficiencies in the Work, and send another written notice of substantial completion to the Engineer.
      3. Engineer will, within a reasonable time after receipt of such notice, re-inspect the Work.
   c. When the Engineer finds that the Work is substantially complete, Engineer will:
      1. Prepare and deliver to the Owner a tentative Certificate of Substantial Completion on a form with a tentative list of items to be completed or corrected before final payment is made.
      2. After consideration of any objections made by the Owner as provided in Conditions of the Contract, and when the Engineer considers the Work substantially complete, the Engineer will execute and deliver to the Owner and the Contractor a definite Certificate of Substantial Completion with a revised tentative list of items to be completed or corrected.

D. FINAL INSPECTION

1. When the Work is complete, Contractor shall submit written certification that:
   a. The Contract Documents have been reviewed.
   b. The Work has been inspected for compliance with Contract Documents.
   c. Work has been completed in accordance with Contract Documents.
   d. The Equipment and systems have been tested in the presence of the Owner's representative and are operational.
   e. The Work is completed and ready for final inspection.

2. Within a reasonable time after receipt of such notice, the Engineer will make an inspection to verify that status of completion.
   a. Should the Engineer consider that the Work incomplete or defective:
1. The Engineer will promptly notify the Contractor in writing, listing the incomplete or defective work.

2. The Contractor shall take immediate steps to remedy the stated deficiencies, and send another written certification to Engineer that the Work is complete.

3. Within a reasonable time after receipt of such notice, the Engineer will re-inspect the Work.

3. When the Engineer finds that the Work is acceptable under the Contract Documents, the Engineer will request the Contractor to make closeout submittals.

E. REINSPECTION FEES

1. Should Engineer be required to perform re-inspections due to failure of the Work to comply with the claims of status of completion made by the Contractor:

   a. The Owner will compensate Engineer for such additional services.

   b. The Owner will deduct the amount of such compensation from the final payment due the Contractor.

F. CONTRACTOR'S CLOSEOUT SUBMITTALS TO ENGINEER

1. Closeout submittals shall include, but are not necessarily limited to:

   a. Project Record Documents

   b. Operation and maintenance data for items so listed in pertinent other Sections of these Specifications, and for other items when so directed by the Engineer.

   c. Warranties and bonds.

   d. Keys and keying schedule.

   e. Spare parts and materials

   f. Evidence of compliance with requirements of governmental agencies having jurisdiction including, but not necessarily limited to:

      1. Certificates of inspection.

      2. Certification of Occupancy.

      3. Certificates of insurance for products and completed operations.

      4. Evidence of payment of all subcontractors, material suppliers, and laborers having a just claim, and the release of all associated liens.

      5. List of subcontractors, service organizations, and principal vendors, including names, addresses, and telephone numbers where they can be reached for emergency services at all times including nights, weekends, and holidays.

G. FINAL ADJUSTMENT OF ACCOUNTS

1. Submit a final statement of accounting to Engineer.

2. The Statement shall reflect all adjustments to the Contract Sum:

   a. The original Contract Sum.

   b. Additions and deductions resulting from:
1. Previous Change Orders.

2. Allowances.

3. Unit Prices.


5. Penalties and Bonuses.

6. Deductions for liquidated damages.

7. Deductions for re-inspection payments.

8. Other adjustments.

c. Total Contract Sum, as adjusted.

d. Previous payments.

e. Sum remaining due.

3. The Engineer will prepare a final Change Order, reflecting approved adjustments to the Contract Sum that were not previously made by Change Orders.

H. FINAL APPLICATION FOR PAYMENT

1. The Contractor shall submit the final Application for Payment in accordance with procedures and requirements stated in the Conditions of the Contract.

I. INSTRUCTION

1. The Contractor shall instruct the Owner's personnel in the proper operation and maintenance of systems, equipment, and similar items which were provided as part of the Work.

PART TWO - PRODUCTS

2.01 Provide specified products as required.

PART THREE - EXECUTION

3.01 Comply with requirements

PART FOUR – SPECIFIC REQUIREMENTS

4.01 PRE-INSTALLATION MEETING

A. A Pre-installation meeting is NOT required on this project.

END OF SECTION
PART ONE - GENERAL

1.01 DESCRIPTION

A. Work included:

1. Throughout the Contract Documents, references are made to trade and association codes and standards that define qualities and types of workmanship and materials, and establish methods for testing and reporting on pertinent characteristics.

2. Where materials or workmanship are required by the Contract Documents to meet or exceed the specifically named codes or standards, it is the Contractor's responsibility to provide materials and workmanship that meet or exceed the latest edition of the specifically named code or standard.

3. It also is the Contractor's responsibility, when required by the Contract Documents or requested by the Engineer, to deliver to the Engineer all required proof that the materials and workmanship meet or exceed the edition requirements on the date that bids were received of the specifically named code or standard. Such proof shall be in the form of a certified report of tests conducted by a testing agency approved for that purpose by the Engineer.

B. Related work described elsewhere: Specifically named codes or standards occurring on the Drawings and in other Sections of the Specifications.

1.02 QUALITY ASSURANCE

A. Familiarity with pertinent codes and standards:

In procuring all items used in this Work, it is the Contractor's responsibility to verify the detailed requirements of the referenced named codes and standards and to verify that the items procured for use in this Work meet or exceed the project Specification requirements. Except when a specific publication date is specified, the publication in effect on the date of Contract Document signing shall be considered the latest edition and shall apply. Contractor shall maintain a copy of the applicable referenced codes and standards on the project site. Any conflicts between the association codes and standards, and the project Specifications, shall be brought to the attention of the Engineer for resolution. Engineer's decision shall be final.

B. Rejection of non-complying items:

The Engineer reserves the right to reject items incorporated into the Work that fail to meet the specified minimum requirements. The Engineer further reserves the right, and without prejudice to other recourse the Engineer may take, to accept non-complying items subject to an adjustment in the Contract Amount as approved by the Engineer and the Owner.

C. Applicable standards listed in these Specifications include, but are not necessarily limited to standards promulgated by the following agencies and organizations:


2. ACI - American Concrete Institute, Box 19150, Redford Station, Detroit, Michigan 48129.

3. AGMA - American Gear Manufacturers Association

4. AI - Asphalt Institute, Asphalt Institute Building, College Park, MD 20740.


6. AISI - American Iron and Steel Institute, 1000 16th Street, N.W., Washington, D.C. 20036.
7. AMCA - Air Movement and Control Association, 30 West University Drive, Arlington Heights, IL 60004.
10. ASHRAE - American Society of Heating, Refrigerating and Air Conditioning Engineers, 345 East 47th Street, New York, NY 10017
13. AWPA - American Wood-Preservers' Association, 7735 Old Georgetown Road, Bethesda, MD 20014.
14. AWS - American Welding Society, 2501 N.W. 7th Street, Miami, Florida 33125.
15. AWWA - American Water Works Association, 6666 West Quincy Avenue, Denver, Colorado 80235.
16. CLFMI - Chain Link Fence Manufacturers Institute, 1101 Connecticut Avenue, Washington, D.C. 20036.
17. CRSI - Concrete Reinforcing Steel Institute, 228 North LaSalle Street, Chicago, Illinois 60610.
18. FM - Factory Mutual System, 1151 Boston-Providence Turnpike, Norwood, MA 02062.
20. GA - Gypsum Association, 1603 Orrington Avenue, Evanston, IL 60201.
21. IEEE - Institute of Electrical and Electronic Engineers
22. ISA - Instrument Society of America
23. MDEQ – Michigan Department of Environmental Quality
25. MLSFA - Metal Lath/Steel Framing Association, 221 North LaSalle Street, Chicago, IL 60601.
26. NAAMM - National Association of Architectural Metal Manufacturers, 221 North LaSalle Street, Chicago, IL 60601.
27. NEC - National Electrical Code, 470 Atlantic Avenue, Boston, Massachusetts 02210.
29. NFPA - National Fire Protection Association, 470 Atlantic Avenue, Boston, MA 02210.
31. NTMA - National Terrazzo and Mosaic Association, 3166 Des Plaines Avenue, Des Plaines, IL 60018.
32. ODOT - Ohio Department of Transportation, 1980 W. Broad Street, Columbus, OH 43223.
33. OSHA - Occupational Safety and Health Act
34. PCA - Portland Cement Association, 5420 Old Orchard Road, Skokie, Illinois 20076.
35. PCI - Prestressed Concrete Institute, 20 North Wacker Drive, Chicago, IL 60606.
36. PENNDOT – Pennsylvania Department of Transportation, Keystone Building, 400 North Street, Harrisburg, PA 17120
38. SDI - Steel Deck Institute, Box 3812, St. Louis, MO 63122.
39. SDI - Steel Door Institute, 712 Lakewood Center North, Cleveland, OH 44107.
40. SJI - Steel Joist Institute, 1703 Parham Road, Suite 204, Richmond, VA 23229.
41. SSPC - Steel Structures Painting Council
42. TCA - Title Council of America, Inc., Box 328, Princeton, NJ 08540.
43. UL - Underwriters’ Laboratories, Inc., 333 Pfingston Road, Northbrook, IL 60062.
44. Uni-B - Uni-Bell Plastic Pipe Association, 2655 Villa Creek Drive, Suite 164, Dallas, Texas 75234.
45. WVDOT – West Virginia Department of Transportation, Contract Administration Division, West Virginia Division of Highways, 1900 Kanawha Boulevard, East, Building 5, Room 737, Charleston, WV 25305-0430

PART TWO - PRODUCTS
N/A

PART THREE - EXECUTION
N/A

END OF SECTION
PART ONE - GENERAL

1.01 SECTION 01300 INCLUDES:

A. 1.02 Related Sections
B. 1.03 Submittal Procedures (For the Record, Shop Drawings for Review & Approval, General Information, and For Operation and Maintenance Requirements)
C. 1.04 Proposed Products list
D. 1.05 Substitutions
E. 1.06 Samples
F. 1.07 Manufacturer's installation instructions
G. 1.08 Manufacturers' certificates
H. 1.09 Operation & Maintenance Manuals
I. 1.10 Construction Schedule
J. 1.11 Schedule of Values
K. 1.12 Workers' Compensation Certificates
L. 1.13 Product and Work Item Warranties and Bonds

1.02 RELATED SECTIONS

A. When specific or more comprehensive submittals are required than are described herein, they are specified in separate Sections or within other Technical Sections.

1.03 SUBMITTAL PROCEDURES

A. The Contractor shall transmit all submittals (except for laboratory testing results) to the Engineer using AIA Form G810 or approved equal. Submittals from subcontractors, suppliers, or others will not be accepted. Laboratory testing results shall be sent directly from the Laboratory to the Engineer, as specified in Section 01410 Testing Laboratory Services.

B. Sequentially number the transmittal form. Mark revised submittals with the original number plus a sequential alphabetical extension.

C. The Contractor shall stamp and clearly identify the Submittal Date, Project Title and Location; Contractor's Name and Address, Specification Section, Purpose of the Submittal (Record Purposes, Review & Approval, General Information, and Operation & Maintenance requirements); the person who performed the submittal review, and other identification that may be appropriate.

1. Submittals for Record Purposes include laboratory test results, licenses, permits, and installation and calibration certificates. Laboratory test results shall be signed by an authorized agent of the independent laboratory performing the tests and will be used for comparing to the specification requirements. The Contractor shall obtain all licenses and permits required by Local, State, and Federal laws not obtained by the Owner. Where requested, the Contractor shall submit installation and calibration certificates from manufacturers indicating the manufacturer's satisfaction with the installation, the calibration, and the operation of the manufacturer's equipment.

2. Submittals for Review & Approval include Construction Schedules, Construction Drawings, Shop Drawings, Manufacturer's literature and certifications, Supplier's literature and certifications, Design data, Samples, Schedule of values, and other related or requested data.

Shop Drawings: Submittals for Review

a. Submit scaled, accurate drawings for review. After found to be in general conformance with the Drawings and Specifications, Engineer will distribute in accordance with PART THREE - EXECUTION
b. Submit the number of opaque reproductions desired by the Contractor, plus three (3) copies, which will be retained by Engineer for distribution. If Contractor requires more than four copies for its use, Contractor shall reimburse Engineer for the time required to markup the extra copies requested.

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

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

e. All Shop Drawings submitted for review will be stamped with the review block shown below:

3. General information is typically additional information requested to meet the general needs of the project.

4. Operation & Maintenance information is required for all equipment. See OPERATION & MAINTENANCE MANUALS below.

D. Prior to making submittals to the Engineer, the Contractor shall verify important field measurements and product dimensions. Carefully review for correctness, suitability, and fit.
E. Apply Contractor's stamp and sign, thereby certifying that Contractor has carefully reviewed the material submitted, verified the products & product dimensions, checked field measurements and product dimensions, reviewed adjacent construction Work, coordinated related information, and that the product or material for which it is seeking Engineer's approval is in accordance with the requirements of Contract Documents.

F. Unless otherwise directed, the Contractor shall make its submittals in an order that expedites the Project. Deliver to Engineer - Attention [Project Contact Person (Name)] Feller, Finch & Associates, Inc. 1683 Woodlands Drive, P.O. Box 66 Maumee, Ohio 43537. Coordinate submission of related items.

G. For each submittal for review, allow 20 working days excluding delivery time to and from the Contractor. If certain submittals require expediting, the Contractor may request that the submittal be expedited. The Engineer will place the requested expedited submittal ahead of the other project submittals and make a reasonable effort to assist in completing the review as soon as possible. The Engineer, however, shall not be responsible for any delays to the un-expedited project submittals caused by his reviewing of the expedited submittals first.

H. Identify all variations from the Contract Documents. Note any product or system limitations that may be detrimental to the successful performance of the completed Work.

I. Provide space for Contractor's and Engineer's review stamps.

J. When a submittal is being resubmitted, identify all changes made since the previous submission, and identify submittal with original section number followed by an alphabetical letter extension e.g. A, B, C... to identify the re-submittal level.

K. In general, the Engineer will attempt to either Approve or Approve as Noted most submittals. The Engineer will perform one submittal review, and one re-submittal review of an item at no cost to the Contractor. The review of substitutions, items the Contractor believes to be equal to that specified, and additional re-submittals requiring the Engineer's time to review will be billed to the Owner, and the Contractor shall reimburse Owner for said Engineer's additional review costs.

L. Distribute copies of reviewed submittals as appropriate. Engineer will distribute reviewed submittals to Owner and Project Field Representative. Instruct parties to promptly report any inability to comply with provisions.

M. Maintain an accurate submittal log for the duration of the Work, including the dates mailed and received, the status of each submittal, and the resulting outcome of each submittal. Make the submittal log available to the Engineer for review upon request. Notify Engineer in writing if any of Contractor's submittals have not been responded to in a timely manner.

1.04 PROPOSED PRODUCTS LIST

A. Within 15 days from the effective date of the Owner-Contractor Contract, submit a list of all manufacturers' major equipment and products proposed for use, identifying the name of the manufacturer, trade name, and model number of each product or piece of equipment.

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

1.05 SUBSTITUTIONS

A. Unless otherwise specified or agreed to on an individual submittal basis, substitutions will be considered only when substantiated by the Contractor's submittal of a complete request for substitution within forty-five (45) calendar days after the Contractor has received Owner's Notice to Proceed. The request for substitution shall include any proposed deduct or increase in price offered for Owner accepting the substitution.

B. The Contractor shall accompany any request for substitution with such drawings, specifications, samples, manufacturer's literature, performance data, and other information necessary to describe and completely evaluate the proposed substitution. The burden of proof shall be on the Contractor.
C. If any substitution will affect a correlated function, adjacent construction, or the work of other trades or contractors, all necessary changes and modifications to the affected work, and their related cost, shall be identified and included in the request for substitution.

D. Approval of any request for substitution shall not relieve the Contractor from the responsibility for any deficiency that may exist in the substitution or for any departures or deviations from the requirements of the Contract Documents. Except as otherwise expressly specified by the Contractor in the request for substitution and expressly approved in writing by the Engineer, the Contractor shall be deemed to warrant by the request that the proposed substitution will satisfy all standards and requirements satisfied by the originally specified products or procedure and that the approval of the request for substitution shall not be deemed to modify the Contract Documents with respect thereto.

E. Major Equipment Evaluation:

1. Any request for substitution of equipment costing in excess of $25,000 or identified elsewhere in the Drawings or Specifications as being subject to "Major Equipment Evaluation" shall identify five (5) installations similar to that proposed. The following information regarding each installation shall be provided.
   a. Name and location of facility.
   b. Brief description (size, number, performance, etc.).
   c. Names, addresses and telephone numbers of owner, operator, design engineer and general contractor responsible for equipment installation.
   d. The following dates: Order placed, delivery, start-up and full operation.

2. Provide the manufacturer's standard published Operation and Maintenance Manual. Identify any modifications to the procedures identified that are specific to the equipment to be supplied. For the specific equipment proposed, provide the frequency of scheduled maintenance procedures and the total expected time required for routine maintenance.

3. A performance evaluation will be conducted by the Engineer and will include interviews with people other than those identified by the Contractor, manufacturer, or supplier. At a minimum, the following questions will be asked:
   a. Were there any delays or problems with delivery of equipment attributable to the manufacturer?
   b. Describe any equipment breakdowns.
   c. Describe manufacturer's service responsiveness during warranty.
   d. Describe manufacturer's service responsiveness following warranty.
   e. Describe any costs (whether covered by manufacturer or not) associated with equipment failures following installation.
   f. Is operation and maintenance, as recommended by manufacturer/supplier, adequate?
   g. Describe the equipment process performance. How long to achieve satisfactory performance? How do actual and manufacturer performance compare? How long has required/satisfactory performance been continuously achieved?

1.06 SAMPLES

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

B. Submit samples of finishes from the full range of manufacturers' standard colors or in custom colors selected by Owner/Engineer, textures, and patterns for Engineer's review.
C. Include identification on each sample, with full Project information.

D. Submit the number of samples specified in individual specification Sections, one of which will be retained by Engineer.

E. Reviewed samples that may be used in the Work are indicated in individual specification sections.

1.07 MANUFACTURER INSTALLATION INSTRUCTIONS

A. Manufacturer installation instructions shall be submitted for owner information, prior to installation.

B. When appropriate, submit printed instructions for delivery, storage, assembly, installation, startup, adjusting, and finishing to Engineer.

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

1.08 MANUFACTURER CERTIFICATES

A. When appropriate or specified in individual specification sections, submit manufacturer certifications to Engineer.

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

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

1.09 OPERATION & MAINTENANCE MANUALS

A. Contractor shall compile and furnish three (3) finalized copies of the reviewed Manual covering all equipment as follows:

1. Submittals shall include but not be limited to descriptive literature, bulletins and spec sheets that describe the equipment, system, or item; the operation of the equipment, system, or item; a detailed list of equipment components and appurtenances including manufacturer & model number where appropriate; notice of any items required for operation that are not included; utility requirements; general arrangement drawings; materials of construction, assembly data, dimensional data; performance curves, certifications and guarantees; parts lists with ordering numbers and suppliers, assembly drawings, recommended spare parts to keep on site; lubrication and routine maintenance requirements; schematic wiring and piping diagrams; calibration procedures and specifications; related data on instrumentation and control equipment; drive data; operation & maintenance data; equipment supplier's name & address; and other pertinent data as is applicable.

a. When the data submitted includes more than one model or item, the Contractor shall clearly mark the items and model that is being submitted for review.

b. Manuals shall be tailored for the contract work and be prepared by the Contractor. The manuals shall have a heavy plastic or fiberboard cover and contain all data associated with the equipment or system, as installed, including a copy of the material found by the Engineer to be in general accordance with the Drawings and Specifications. Manuals shall be printed on or be folded to 8-1/2 x 11 in. size whenever practical. Drawings shall be reduced, when practical, or provided in full size and placed in an envelope or pocket bound into the manual. The Contractor shall include clearly marked divider tabs to separate specification section equipment and to improve the ease of use. Provide a detailed Table of Contents, and use a manual title label identifying the contents of the manual. Label shall include "O & M Manual for [Project Name]", the General Contractor's Name, and the Year project was placed into service. Manuals shall be submitted in completed form and be approved by the Engineer not less than 30 days prior to the date of final acceptance.

1.10 CONSTRUCTION SCHEDULE
A. Immediately after signing the Contract, each prime Contractor shall prepare a graphic construction schedule, indicating the work to be executed during each month and the rate of expected progress to secure completion on or before the project completion date.Copies of the construction schedule, upon which has been indicated the actual progress, shall be furnished to the Engineer with each requisition for payment.

B. Should the rate of progress fall materially behind the scheduled rate of progress, and unless the delay is authorized by the Engineer in writing, each offending Contractor shall furnish additional labor, work overtime, or take other necessary means required to complete the work on or before the project completion date. No additional compensation beyond the set Contract price shall be paid for action taken or overtime expense incurred in maintaining scheduled progress.

C. Each prime Contractor on the project shall give its progress schedule to the General Work Contractor for incorporation in a combined project schedule.

D. The General Work Contractor shall prepare a combined Project Progress Schedule and shall update it monthly for presentation at project progress meetings. A copy of the combined Project Progress Schedule shall be submitted with the respective periodic estimate.

E. All project schedules shall be on 11" x 17" or smaller size paper to facilitate ease of reproduction.

1.11 SCHEDULE OF VALUES

A. Provide a detailed breakdown of the agreed Contract Sum showing values allocated to each of the various parts of the Work, as specified herein and in other provisions of the Contract Documents. A Schedule of values is required to be compatible with the "continuation sheet" accompanying applications for payment.

B. Type dated schedule on 8 1/2 in. X 11 in. white paper; Contractor's standard forms and computer printouts will be considered for approval by Engineer upon Contractor's request. Identify schedule with Project title, Name & Address of Contractor, and date of submission.

C. Schedule shall list separately the installed labor and material value of the component parts of the Work in sufficient detail to serve as a basis for computing values for progress payments during construction.

1. Identify each line item with the number and title of the respective major section of the specifications.

2. Each item shall include a directly proportional amount of the Contractor's overhead and profit.

3. For items where progress payments will be requested for stored materials, breakdown the value into the cost of the materials, delivered and unloaded; and the total installed value.

4. For completed construction, subdivide as needed to identify costs for audit, inventory, insurance and replacement cost purposes.

D. When so required by the Engineer, provide copies of the subcontracts or other data acceptable to the Engineer, substantiating the sums described.

E. Use required means to assure arithmetical accuracy of the sums described.

1.12 INSURANCE CERTIFICATES

A. Submit a copy of the Contractor's current Workers' Compensation Certificate and all renewal Certificates until the date that Final payment is due. Coverage shall not lapse for any reason.

1.13 PRODUCT AND WORK ITEM WARRANTIES AND BONDS

A. Form of Submittals

1. Bind in commercial quality 8-1/2 x 11 inch three D side ring binders with durable plastic covers.
2. Cover: Identify each binder with typed or printed title WARRANTIES AND BONDS, with title of Project; name, address and telephone number of Contractor [and equipment supplier]; and name of responsible company principal.

3. Table of Contents: Neatly type Table of Contents of the binder manual, with each item identified with the number and title of the specification section in which specified, and the name of Product or work item.

4. Separate each warranty or bond with index tab sheets keyed to the Table of Contents listing. Provide full information, using separate typed sheets as necessary. List Subcontractor, supplier, and manufacturer, with name, address, and telephone number of responsible principal.

B. Preparation of Submittals

1. Obtain warranties and bonds, executed in duplicate by responsible Subcontractors, suppliers, and manufacturers, within ten days after completion of the applicable item of work. Except for items put into use with Owner's permission, leave date of beginning of time of warranty until the Date of Substantial completion is determined.

2. Verify that documents are in proper form, contain full information, and are notarized.

3. Co-execute submittals when required.

4. Retain warranties and bonds until time specified for submittal.

C. Time of Submittals

1. For equipment or component parts of equipment put into service during construction with Owner's permission, submit documents within ten days after acceptance.

2. Make other submittals within ten days after Date of Substantial Completion, prior to final Application for Payment.

3. For items of Work for which acceptance is delayed beyond Date of Substantial Completion, submit within ten days after acceptance, listing the date of acceptance as the beginning of the warranty period.

PART TWO - PRODUCTS

N/A

PART THREE - EXECUTION

3.1 DISTRIBUTION

A. Distribution of reviewed and approved submittals will be made by the Engineer in accordance with PART FOUR of the individual specifications if addressed there, otherwise distribution will be as follows:

1. Information for Record - One copy to Owner, Engineer, and Resident Project Representative.

2. Review and Approval - After finding to be in general accordance with the Drawings and Specifications, the Engineer will issue a Construction Bulletin and distribute copies to the Contractor (the number submitted for its needs); one copy each for Owner, Engineer, and Resident Project Representative.

3.2 PERFORMANCE OF WORK

A. Complete all work associated with submittals or required above.
PART FOUR - SPECIAL PROVISIONS

4.1   None

END OF SECTION
PART ONE - GENERAL

1.01 TESTING SERVICES

A. The Village of Pemberville will retain the services of a recognized, qualified, independent testing laboratory.

B. The testing laboratory shall furnish all labor, materials, and equipment necessary to perform required asphalt and concrete tests, compaction tests, sieve analyses of aggregate materials; approve material for and design asphalt and concrete plant mixes; furnish personnel to control mixing plant production; and perform other tests as specified or as directed by the Engineer.

C. The manufacturers or suppliers of equipment and materials typically perform testing of materials and equipment for compliance with national or technical society standards. Such testing along with shop and field testing of equipment are not included under this Section, but shall be performed by the Contractor or the Contractor's supplier as specified.

D. Any testing required by the Owner shall not relieve the Contractor from the responsibility of supplying certificates from manufacturers or suppliers to demonstrate compliance with the specifications.

E. The Contractor shall notify the testing laboratory as to when tests can be made.

1.02 LABORATORY TESTS

A. The laboratory shall conduct the following tests in accordance with the specifications:

1. For each type or source of Aggregate, Bedding material, and Special backfill, the laboratory shall perform an ASTM C-136 sieve and screen analysis to determine whether the material meets the Specifications noted in the individual Sections. Retests shall be performed until the Specifications are met and each time the source of material is changed. Selected on-site material used for backfill shall be tested in a similar manner to determine if it is suitable for use as a backfilling material. Selected on-site material shall be tested at the discretion of the Engineer.

2. For each type of controlled density fill, concrete, and asphalt, the laboratory shall perform the necessary mix design and approve the materials. A redesign shall be performed whenever there is a change in materials or the sources of the materials. The asphalt design shall be made in accordance with ASTM D-1559 using the Marshall Method of mix design.

3. Asphalt and Concrete tests shall be performed in accordance with Sections 03120 or 03125 Cast-In-Place Concrete and ODOT Specifications for Asphaltic Concrete.

4. For each type of backfill material, the laboratory shall determine the moisture-density curve according to ASTM D-698. Using ASTM D-2922 test methods, the laboratory shall determine the density of placed backfill. Retests shall be performed if the compaction requirements stated in the individual Sections are not met. The sand cone (ASTM D-1556) or the balloon (ASTM D-2167) tests for density and compaction may be required, at the Engineers discretion, to verify questionable results of the ASTM D-2922 tests. The laboratory shall take a compaction test at the rate specified for each item and shall perform retests as required to demonstrate that the compaction conforms to the specifications.

5. The laboratory shall perform all other tests requested in the individual Sections of the Specifications.
1.03 LABORATORY REPORTS

A. The laboratory shall review, test, and report on the required mix designs submitted by the Contractor. Approved mix designs shall include sieve analyses and suppliers' certificates for materials incorporated in the mix.

B. The Laboratory shall distribute all of their laboratory test reports to the CONTRACTOR, ENGINEER and OWNER.

C. Submittals shall be in accordance with the requirements of Section 01300.

1.04 OTHER TESTING

A. The Contractor is not restricted from conducting whatever material or field tests he desires. However, should the Contractor at any time desire the Owner to consider the results of such testing, test reports shall be certified by an independent testing laboratory acceptable to the Owner.

1.05 DISCHARGE OF LABORATORY

A. The Owner reserves the right to discharge the laboratory at any time. If the laboratory is discharged, the Contractor shall employ another laboratory suitable to the Owner.

PART TWO - PRODUCTS
N/A

PART THREE - EXECUTION

3.01 MATERIALS TESTS

A. The laboratory shall conduct tests on materials and in locations, as directed by the Owner or the Owner's Resident Project Representative.

B. All tests shall be performed in accordance with the proper test methods mentioned above and in the individual Specification Sections. Results shall be compared to the required values included in the individual Sections.

3.02 MIXING PLANT CONTROL

A. The laboratory shall provide mix designs and control mixing plant production for conformance to product specifications as directed by the owner/Engineer.

PART FOUR - SPECIAL PROVISIONS
N/A

END OF SECTION
1.01 DESCRIPTION

A. Section 01500 specifies required related work and project controls; including:

1.02 Conformity with Drawings & Specifications
1.03 Cutting & Patching Existing Structures and Buried Improvements
1.04 Maintenance of Existing Operations
1.05 Cooperation of Contractor(s)
1.06 Road Maintenance and Restoration
1.07 Temporary Parking, Access Roads, and Paving of Trenches
1.08 Maintaining Traffic & Utilities in Right-Of-Ways
1.09 Barricades, Signs, Lights, & Site Safety
1.10 Environmental Protection
1.11 Night, Sunday and Holiday Work
1.12 Specific Contractor Responsibilities
1.13 Unauthorized Work
1.14 Use of Site
1.15 Use of Explosives
1.16 Construction Photographs
1.17 Construction Audio-Color Video Recording
1.18 Quality Assurance
3.01 Maintenance and Removal
3.02 Water Control
3.03 Erosion and Sediment Control
3.04 Notification of Utility Owners
3.05 Failure to Perform Section Provisions

B. Other related Sections that may or may not be part of this project work include, Section 01410 Testing Laboratory Services, Section 01590 Field Offices, and others when included.

1.02 CONFORMITY WITH DRAWINGS & SPECIFICATIONS

A. When there are specifications on the Drawings that conflict with Sections of the Specification book, the Drawings specifications shall control. The Contractor shall meet all provisions of the Specification book Sections that are not included on the Drawings.

B. All Work shall conform to the lines, grades, cross sections, dimensions, and directions shown on the Drawings and specified unless altered by the Engineer. The Engineer shall approve in writing all alterations and deviations that are required or desired.

C. All engineering work performed in conjunction with the project shall be performed by or be under the direct supervision of a Professional Engineer registered in the State of the project. All surveying work performed in conjunction with the project shall be performed by or be under the direct supervision of a Professional Surveyor registered in the State of the project. The Professional Engineers and Surveyors working on the project shall be acceptable to the Engineer, provide evidence of current registration, and submit Insurance Certificates giving evidence that they have current Errors and Omissions insurance coverage. The Contractor's Engineers and Surveyors shall,

1. Unless performed by the Owner (See PART FOUR) verify and protect all survey control and reference points before starting field construction work. Establish permanent benchmarks along the work route that are referenced to established control points. Record benchmark location descriptions with appropriate data on the Project Record Documents. If a survey control or
reference point is disturbed, notify the Owner's Engineer prior to re-establishing. Any discrepancies shall be promptly reported to the Owner's Engineer for resolution.

2. Unless performed by the Owner (See PART FOUR), establish and periodically verify elevations, lines, grades, and levels. Locate and lay out all improvements by surveying or other appropriate instruments. Verify that all proposed improvements are constructed on Owner's property and that dimensions, locations, angles, and elevations of the constructed work are in accordance with the Drawings. On unit price items, determine and certify quantities for payment requests.

D. Contractor shall maintain a set of Contract Documents solely for use as the Project Record Documents. The Project Record Documents shall note all deviations from the original bid documents and reflect actual constructed conditions. Contractor shall have Project Record Documents available at each progress meeting to verify that deviations are being recorded as they are encountered.

1.03 CUTTING & PATCHING STRUCTURES AND BURIED IMPROVEMENTS

A. Where existing surface structures and buried improvements are shown on the Drawings, their location, depth, configuration, and dimensions are believed to be reasonably representative based on the data used in preparing the Drawings, but such representations or the absence of representations are not guaranteed. Such improvements are shown for general informational purposes and shall not be construed to represent that the improvements will be actually as shown on the Drawings.

B. Where cutting into structures or other buried improvements and patching are noted or required, examine and assess existing conditions prior to commencing the Work, including elements subject to damage or movement during cutting and patching. Beginning to cut or patch shall be Contractor's acceptance of existing conditions.

1. PREPARATION
   a. Provide all temporary supports that are needed to ensure the structural integrity of the Work. Provide devices and methods to protect all other improvements from damage.
   b. Provide protection from the elements for areas that may be exposed by uncovering work.
   c. Maintain excavations safe, and free of water.

2. CUTTING
   a. Perform excavation and backfill as required in accordance with Section 02220 and perform cutting and patching Work as noted and required.
   b. Provide openings for the penetration of pipe and for other purposes as noted or shown on the Drawings.
   c. Cut rigid materials using masonry saws, core drills, or other appropriate cutters. Pneumatic tools are not allowed without prior approval.

3. PATCHING
   a. Execute patching to complement adjacent Work.
   b. Fit products together so they properly integrate with the other Work.
   c. Perform work using methods that avoid damage to other Work, and that will provide appropriate surfaces to receive patching and finishing.
   d. Restore work with new products in accordance with requirements of Contract Documents.
   e. Work shall be air and water tight with pipes, sleeves, ducts, conduit, and other penetrations through surfaces.
   g. Finish surfaces shall match adjacent finish.
1.04 MAINTENANCE OF EXISTING OPERATIONS

A. The function of all utilities, critical existing piping systems, collection systems, treatment facilities, and pumping facilities shall be maintained throughout the construction of the Work. When construction requires interruption of any utility, critical operation, or function, the contractor(s) shall first seek written approval from the Owner through the Engineer. Unless approval is secured in writing to the contrary, the contractor(s) shall do whatever is required to maintain continuous operation of the existing systems and facility functions. This may require, but is not limited to bypass pumping, overland piping, temporary treatment units, temporary equipment, auxiliary power, and supporting appurtenances. All interruptions shall be kept to a minimum.

1.05 COOPERATION OF CONTRACTOR(S)

A. When more than one contractor is involved in the work or related work, the contractor(s) shall plan and perform their work to minimize interference with the operation of the Owner, other contractors, utilities, and public facilities on or near the Work.

B. The Owner reserves the right to perform other work by contract or otherwise, and to permit other public entities, utilities, or others to perform work on or near the Work site during the construction period. If a conflict arises that cannot be resolved by the conflicting parties, the Owner shall determine when and how the Work will proceed. Related claims of any nature from such parties will not be considered.

1.06 ROAD MAINTENANCE & RESTORATION

A. Temporary road paving shall be provided and maintained on all pavements disturbed by the Work. Where the Work site is a pumping, treatment, similar, or related facility, suitable access roads for operating personnel and deliveries shall be provided and maintained as required.

B. Permanent pavement and final restoration shall be performed as the project approaches completion but no later than the last paving season prior to the Contract completion date.

1.07 TEMPORARY PARKING, ACCESS ROADS, AND PAVING OF TRENCHES

A. The Contractor shall provide and maintain adequate temporary parking spaces at locations approved by the Engineer on or near the Work site. The parking spaces shall be used for the contractors’ personnel and their visitors. Upon completion of the Work, remove and restore the disturbed area, as required.

B. Construct temporary all-weather access roads, including bridges and culverts if necessary, to serve the construction area. Width and load bearing capacity of the roads shall be sufficient to provide low maintenance and safe unimpeded traffic flow during construction.

C. Temporary paving, consisting of a gravel base and a 2-inch asphalt wearing course, shall be applied to all trench excavations in paved areas immediately after the excavation trench has been backfilled and compacted. Temporary paving shall be installed and maintained to the level of the surrounding roadway.

1.08 MAINTAINING TRAFFIC & UTILITIES IN RIGHT-OF-WAYS

A. Where the Work is located on or in public streets, roads, or highways, the Contractor shall perform the work to minimize danger and inconveniences to the public. Roadways and pedestrian paths, affected by the construction work, shall be maintained and kept clean and safe. This includes providing free access to hospitals, schools, and other such facilities; and providing temporary driveways, bridges, stream crossings, and walkways as necessary.

B. Emergency vehicle access shall be provided to the Work site and to adjacent property at all times. If the work requires closure to vehicle access, the Contractor shall notify and obtain the approval of the Engineer, fire, police, and emergency medical providers of such closure. Closure time shall be kept to a minimum.

C. Provide free access to all fire hydrants, water valves, gas valves, traffic control panels, and other important utility improvements located on the site and along the path of the work.

D. Maintain gutters, waterways, and sewer systems affected by the work.
1.09 BARRICADES, SIGNS, LIGHTS & SITE SAFETY

A. The Contractor shall employ flaggers and guards for the work, when and as necessary to provide site safety. The Contractor shall erect and maintain such strong and suitable barriers, signs, and warning lights as will effectively prevent accidents and injury to people and property. Adequate lighting shall be maintained whenever natural light is insufficient and between one-half (1/2) hour before sunset and one-half (1/2) hour after sunrise.

B. The Contractor shall not leave any excavation open for any significant period awaiting further work. Excavations shall be temporarily backfilled and resurfaced, if applicable, with a temporary pavement passable to traffic.

C. In addition to other safety requirements, a fence at least four (4) feet high shall surround any excavation left open at the end of the day.

D. The Contractor shall be responsible for complying with all local, State, and Federal regulations pursuant to maintaining traffic, safety notification, construction methods and obtaining all necessary construction permits. Plan approval fees have been paid by the Owner.

E. Construction safety measures shall comply with Department of Labor Occupational Safety and Health Regulations for Construction.

1.10 ENVIRONMENTAL PROTECTION

A. When the Work includes an existing sanitary sewerage collection system or a treatment facility, the General Work Contractor shall be responsible for maintaining all sanitary and process flow streams, and plant functions. Provisions shall be made for the temporary piping, pumping, storing and/or disposing of flow streams during periods when the operation of the sewers or treatment facilities are hindered or disrupted by the Work.

B. Provide on-site sanitary facilities for project workers.

C. All contractors shall perform their work in such a manner as to eliminate all unnecessary noise, dust, and odors.

D. Maintain all equipment in compliance with all standards as required by the Occupational Safety and Health Act.

E. Take whatever action is necessary and provide all labor, tools, equipment, and machinery to adequately handle all wastewater, surface, and flood flows that may be encountered during the performance of the work. At no time shall any contractor cause the discharge of untreated wastewater to the environment.

F. It shall be the responsibility of each contractor to prevent or limit unnecessary loud noise and the pollution of air and water resulting from the construction operations.

G. The Contractor shall perform work required to prevent soil from eroding or otherwise entering onto any paved areas and into natural watercourses, ditches, and public sewer systems, and to prevent dust attributable to the construction operations from entering the atmosphere.

H. Construction sequencing shall be planned to minimize the size and time of exposure of disturbed areas. Scheduling of clearing, grading and stabilization shall reflect the construction capabilities of the Contractor as well as climate factors.

I. Trenches shall be backfilled at the end of each working day. Backfilling shall be conducted in a manner appropriate to avoid accelerated erosion until temporary and/or permanent stabilization is affected.

J. Dust from unpaved streets or parking areas and dust remaining after sweeping paved streets shall be controlled with calcium chloride dust palliative or as otherwise directed by the Engineer.

K. Existing vegetation shall be protected as much as possible during construction.
L. During construction, all contractors are prohibited from unnecessarily disturbing or uprooting trees and vegetation. Special care shall be taken so as not to disturb trees and vegetation along stream banks and in the vicinity of streams; dumping soil or debris into streams or on stream banks; changing the course of streams without encroachment permits; leaving coffer dams in streams; leaving temporary stream crossings for equipment; operating equipment in streams; or discharging silt laden water into streams.

M. All stockpiled topsoil and fill materials shall be protected from erosion by the use of a filter fabric or straw bale barrier constructed around the perimeter of the stockpiled material. The stockpiled material shall not be placed within fifty feet of any stream or channel bank.

N. Stockpiling excavated material shall not be allowed on roadways or right-of-ways unless the Contractor receives written permission to do so and transmits said permission to the Owner, from the legislative agency or property owner responsible for the maintenance of the area where the material is to be stockpiled.

O. All topsoil excavated from areas where cuts and fills are to be made shall be stockpiled on a level area enclosed in an erosion barrier and stabilized for use after the final sub grade is completed.

P. All disturbed unpaved areas that are to be exposed for more than thirty days shall be provided with a seed and mulch cover. The seed shall be a blend of 40% Kentucky Bluegrass, 40% Creeping Red Fescue, and 20% Perennial Rye applied at a rate of 5 pounds per 1000 S.F. The seeding shall include a uniform application of 12-12-12 fertilizer applied at a rate of 20 pounds per 1000 square feet and covered by 1/4 inch of soil and straw mulch or approved equal applied at a rate of three tons per acre.

Q. Mulch shall be used on all areas where temporary or final stabilization cannot be performed due to unfavorable weather conditions. Mulching materials shall be straw, wood, wood cellulose fibers, or erosion control fabric in conformance with the project specifications.

R. All temporary and final plantings shall be maintained for thirty calendar days after all planting is complete and approved by the Engineer. Maintenance shall include necessary watering, weeding, cultivating, spraying and pruning to keep plant materials in a healthy growing condition, and to keep planted areas neat and attractive during the maintenance period. At the end of the maintenance period, all plant materials shall be in healthy growing condition.

S. Final stabilization of all disturbed areas shall be performed in compliance with the project Specifications.

T. Water containing suspended material from any part of the Contractor's operations shall be clarified before discharging to storm sewers, channels, or streams.

U. The Contractor shall meet all Ohio EPA requirements related to environmental protection, construct and maintain filters, sedimentation traps, or planting basins with overflows to clarify waters containing suspended materials from fill areas, excavations, deep wells, well points, and disposal sites before discharging to drains or streams.

V. The Contractor shall carry out cleanup, grading, seeding, planting and restoration of the work area as early as practical as the construction proceeds.

W. After the construction is completed, the temporary paving and seeding shall be replaced with final paving and seeding as specified.

X. If rodents are found to be present, provide appropriate rodent control.

1.11 NIGHT, SUNDAY AND HOLIDAY WORK

A. No work will be permitted at night, Sunday or on legal holidays, except in the case of emergency, without written authorization of the Engineer. Where no emergency exists, but the Contractor believes it advantageous to work at night, Sunday or legal holidays, the Contractor shall notify the Engineer at least two days in advance, requesting written permission. Any work performed during the absence of the Engineer will be done at the Contractor's risk and responsibility, and may be subject to rejection upon later inspection.

1.12 SPECIFIC CONTRACTOR RESPONSIBILITIES
A. The General Work Contractor shall provide all temporary water, heating, lighting, and power required to construct the Work that is not specifically specified to be provided by others, until such time as the Owner takes beneficial use of the work. When the Project includes a General Work contract only, the General Work Contractor shall be responsible for providing all work that might otherwise be required of Electrical, Plumbing, or other prime contractors.

1. Pay all utility charges related to providing temporary electrical power and lighting that is required to construct the Work until the Work is placed into the beneficial service of the Owner.

2. Provide fuel for building/structure temporary heating, if any.

3. Provide temporary building or structure heat, heating equipment, and security lighting to protect the work until it is complete and ready for Owner’s occupancy. Such equipment shall meet all requirements of the N.E.C., O.B.B.C. and the local codes for temporary construction services.

4. Provide Resident Engineer’s Office (if included in this project see Section 01590)

5. Project Sign (if included in this project, see Section 01580)

6. Provide adequate water for drinking and for construction needs including supply lines as necessary to such locations that will expedite construction.

7. Provide and maintain barricades, signs, signal lights, fences, guards, flaggers and all other security and safety equipment required to protect the public, the Work, and the Owner’s Work-related facilities and operations. Restrict entry to the Work site to authorized people and vehicles. Maintain a log of workers and visitors, and make it available to Engineer and Owner upon request.

8. Meet Ohio EPA requirements related to environmental protection.

9. Provide temporary paving

10. Provide temporary construction required to maintain the operation of the existing facilities or existing facility function.

11. Provide temporary plugs, blind flanges, bulkheads, piping, connections, pumping, valves, sheeting, shoring, bracing, sanitary facilities, treatment process function, and similar work or items that may be needed while constructing the Work.

12. Provide a temporary Contractor’s office located on the Work site until completion of the Contract. An authorized agent shall be present at all times while the work is in progress.

13. Provide all items necessary for administering "First Aid to the Injured" on the job site. Maintain and display an adequate plan for the immediate removal and emergency treatment of anyone injured or who becomes critically ill on the work site.

14. Arrange for the installation of temporary electrical service for construction purposes as well as make provisions to adequately protect all transformers and any associated temporary power equipment throughout the course of construction.

15. Protect the Work against weather damage and the operations of other trades. The General Contractor shall be responsible for the proper use of all temporary wiring systems until they are removed.

16. Conform all electrical, mechanical, and plumbing work for construction purposes, if any, to local, State and Federal codes.

1.13 UNAUTHORIZED WORK

A. Work performed beyond the lines shown on the Drawings, specified, or ordered; work done without required inspection; or any Extra work performed without written authorization will be considered unauthorized work and will not be paid for under the provisions of the Contract. Work so performed may be ordered removed at Contractor’s expense.
1.14 USE OF SITE

A. Owner will make a reasonable effort to accommodate the needs of the Contractor(s) for his operation so long as his operation does not materially interfere with the safety or required operation of the site facilities.

B. Where the work is to be constructed upon or within a temporary or permanent easement, the easement(s) shown on the Drawings will be secured by the Owner without cost to the Contractor. When the work is constructed in or within 10 feet of an easement, the Contractor shall adequately stake the easement limits and shall not enter upon or occupy any private property that it does not have a written agreement to do so.

C. All improvements and surfaces disturbed by the Contractor's work shall be properly maintained during construction and be returned to their original or better condition upon completion of the project.

1.15 USE OF EXPLOSIVES

A. If the Engineer authorizes the use of explosives, the storing, handling, protecting, and firing of the explosives shall be performed only by people highly experienced in such work. The Contractor agrees and warrants that when explosives are used, all State laws, local ordinances, and applicable safety requirements will be strictly met. Contractor shall be responsible for all damage resulting from the use of the explosives.

1.16 CONSTRUCTION PHOTOGRAPHS

A. Unless excluded in PART FOUR, provide photographs of the site and construction throughout the progress of the Work by an experienced photographer that is acceptable to Engineer.

B. Take and submit photographs with each application for payment and as necessary to provide a clear, chronological record of the construction performed since the last application for payment. Specifically, photographs shall document,

1. The site or route prior to any construction
2. Required clearing
3. Excavations and buried pipe installations
4. Below-ground structures
5. Equipment
6. All related or significant work
7. The site or route upon completion of construction

C. The photographs shall include all driveways, sidewalks, curbs, ditches, streets, landscaping, trees, shrubs, culverts, catch basins, retaining walls, visible utilities, and structures within the area of construction influence.

D. Take photographs of soil erosion and sedimentation controls and safety procedures utilized, plus any important conditions that may arise on a routine basis.

E. Prints requirements:

1. Full color; two prints of each photo shall be provided. Minimum size shall be 4 inch x 6 inch.
2. Identify each print on back. Identify name of Project, contract number, phase, orientation of view, and photographer's numbered identification of original.
3. Identify the date and time of print on front, lower right corner.
4. Photographs shall be inserted into clear vinyl carrier sheets (8-3/8" x 11-3/16") chronologically in numerical order and bound in "D" ring type binders. Each binder shall contain an index identifying each photograph and coordinating it with its specific location.

F. Negatives/Digital Images:

1. Deliver negatives or digital images to Engineer with project record documents. Catalog and index negatives or digital images in chronological sequence; provide typed table of contents.
G. Technique:
   1. Provide factual presentation.
   2. Provide correct exposure and focus, high resolution and sharpness, maximum depth of field, and minimum distortion.

H. Views:
   1. Provide photographs from locations as necessary to provide diversified overall views of all the performed work from positions that are to remain accessible throughout the progress of the work
   2. Consult with Engineer for instructions on specific views required.

I. Deliver prints with each Application for Payment with transmittal letter specified under Section 01300.

1.17 CONSTRUCTION AUDIO - COLOR VIDEO RECORDING

A. Unless excluded in PART FOUR, provide audio-color video digital recording of the project construction site.
   1. Provide Pre-Construction, during construction, and completion of construction videos of the construction site or route and adjacent facilities affected by the Work.

B. Quality Assurance
   1. Secure the services of someone who is skilled and experienced in construction audio-color video recordings and whose work samples are acceptable to the Engineer.
   2. Do not replace the videographer without the Engineer's written approval.

C. Submittals
   1. Comply with pertinent provisions of Section 01300.
   2. Except as otherwise directed and separately paid for, submit two copies of each audio-video recording.

D. Preliminary Video Recording Record
   1. Prior to beginning construction, the General Contractor shall video record the construction area to provide a true and accurate video record of the project site or route. The video recording shall be high resolution and recorded to provide a clear and concise video playback and for "still" frame reviews.

E. System Description
   1. Prior to the start of any construction activities, audio-video recording is required along water and sewer line routes, roadways, and at structures that will or may be affected by the work.
   2. The recording equipment must be able to produce quality color pictures for the purpose of providing permanent documentation of existing condition of construction areas.
   3. The video portion of the recording shall reproduce a bright, sharp, clear picture with accurate color, free from distortion, drop out, tearing or other forms of picture imperfection.
   4. The audio portion of the recording shall be clear, at a proper volume, and free from distortion.

F. Product Data, Samples and Certificates
   1. Submit product data on camera and type of video recording to be used, including name, make and model number.
   2. Submit sample of work on a prior project, demonstrated for Engineer, to assure quality requirements.
G. Video Recording

1. Visually investigate all areas prior to taping, making notation of features not readily visible on a video recording. This would include, but not be limited to, culverts, catch basins, manholes, and any obstruction that may be partially buried.

2. Record all measurements including size, type, and condition of features observed during inspection.

3. All recording, except during an emergency, must be performed during times of good visibility. Generally, no outside recording will be allowed during periods of visible precipitation or when ground is covered with snow, leaves or debris without written approval of Engineer.

4. Furnish all power for auxiliary lighting required to fill in shadow areas caused by trees, utility poles, road signs, and other such objects, as well as other conditions requiring artificial illumination in order to produce the proper detail and perspective on the recordings.

5. Properly identify all recordings by date, number, location and project name under direction of the Engineer.

6. Begin each recording with the current date, project name, and municipality, general location and viewing side and direction of progress.

7. Conduct all recording in the presence of the Engineer unless waived by the Engineer. The Engineer or a person approved by the Engineer will conduct the audio portion.

8. Include recording of, but not limited to, all existing driveways, sidewalks, curbs, ditches (drainage pattern is of particular concern), streets (including full width paving condition), landscaping, trees, shrubbery, culverts, catch basins, headwalls, retaining walls, fences, visible utilities, and all building exteriors located within the zone of influence of construction. Of particular interest are existing faults, fractures, defects, or other imperfections. The term street is understood to mean street, highway, avenue, boulevard, road, alley, lane, driveway, parking lot, and the like, and all adjacent areas within the possible zone of influence.

9. Houses and buildings shall be identified both visibly and audibly by house or building number, when possible, in such a manner that the progress of the recording and the proposed route of construction may be located by reference to houses and buildings.

10. Record by audio-video recording all easements for the full width of permanent and temporary easements and all other adjacent areas within the zone of influence. Easements are understood to mean all areas not in streets that require tape coverage by walking or other special conveyance as opposed to normal wheeled conveyance in street areas. Also include in this coverage, areas that are intended to be used for construction access, storage or waste areas, and other Contractor activities.

I. Delivery of Recordings

1. Deliver recordings on CDs to Engineer prior to construction work within the area of influence.

a. Recordings must be submitted prior to the Contractor's request for the Initial progress payment.

2. Supply a record of the contents with each recording on a run sheet identifying each segment in the recording by location; street or easement viewing side, traveling direction, engineering station; referenced to recording numbers. Include a report reviewing findings of visual inspection.

3. Furnish a brief report and inventory of all recordings completed, referenced by location and record number.

4. All recordings and written records must be delivered to the Engineer. This information becomes the property of the Owner.

5. The video expense shall be part of the Contractor's obligation.

J. Video Recording of Sewers (if applicable)
1. All sewers installed under this contract shall be video recorded at no additional cost to the Owner in accordance with the following:

   a. After cleaning, manhole sections shall be visually inspected by means of closed-circuit video. The inspection shall be performed one manhole section at a time with the section flow being suitably controlled as necessary.

   b. The video camera used for the inspection shall be one specifically designed and constructed for such inspections. Lighting for the camera shall be suitable to allow a clear picture of the entire periphery of the pipe. The camera shall be operative in 100% humidity conditions. The camera, video monitor, and other components of the video system shall be capable of producing picture quality to the satisfaction of the Engineer.

   c. The camera shall be moved through the line in either direction at a moderate rate, stopping when necessary to permit proper documentation of the sewer's condition. In no case shall the video camera be pulled at a speed greater than 30 feet per minute. Manual winches, power winches, video cable, and powered rewinds or other devices that do not obstruct the camera view or interfere with proper documentation of the sewer conditions shall be used to move the camera through the sewer line. If, during the inspection operation, the video camera will not pass through the entire manhole section, the Contractor shall set up his equipment so that the inspection can be performed from the opposite manhole. If again, the camera fails to pass through the entire manhole section, the inspection shall be considered complete and no additional inspection work will be required.

   d. When manually operated winches are used to pull the video camera through the line, telephones or other suitable means of communication shall be used to set up between the two manholes of the section being inspected to assure good communication between members of the crew.

   e. Measurements for locating defects and lateral connections shall be made above ground by means of a meter device. Marking on the cable, or the like, which would require interpolation for depth of manhole, will not be allowed. Accuracy of the distance meter shall be checked by use of a walking meter, roll-a-tape, or other suitable device. Accuracy shall be satisfactory to the Engineer.

2. Documentation shall be as follows:

   a. Video Inspection Logs: Printed location records shall be kept by the Contractor that clearly show the location in relation to an adjacent manhole of each infiltration point observed during inspection. In addition, other points of significance such as the locations of building sewers, unusual conditions, roots, storm sewer connections, broken pipe, presence of scale and corrosion, and other discernible features shall be recorded and a copy of such records supplied to the Owner.

   b. Photographs: Instant developing, 35 mm, or other standard-size photographs of the video picture of problems shall be taken by the Contractor upon request of the Owner's Representative, as long as such photographing does not interfere with the Contractor's operations.

   c. Video Recording: The purpose of recording shall be to supply a visual and audio record of problem areas of the lines that may be replayed.

1.18 QUALITY ASSURANCE

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

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

   2. Should manufacturers' instructions conflict with the Contract Documents, request clarification from Engineer before proceeding.

   3. Comply with specified allowances and standards as minimum quality for the Work except where more stringent codes or specified requirements indicate higher standards or more precise workmanship.

   4. Perform work with people qualified to produce quality workmanship.
5. Secure products in place with positive anchorage devices designed and sized to withstand stresses, vibration, physical distortion, or disfigurement.

B. Monitor Tolerances:

1. Monitor tolerance control of installed products to produce acceptable quality work. Do not permit tolerances to accumulate.

2. Comply with manufacturers' tolerances. Should manufacturers' tolerances conflict with Contract Documents, request clarification from Engineer before proceeding.

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

C. Manufacturers' Field Services and Reports:

1. When individual Specification Sections require, provide for material or product suppliers or manufacturers to furnish qualified personnel to observe site conditions, conditions of surfaces and installation, quality of workmanship, start-up of equipment, testing, adjusting and balancing equipment as is applicable, and to initiate instructions when necessary.

2. Submit qualifications of observer to Engineer 30 days in advance of required observations. Observer shall be subject to the approval of Engineer.

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

4. Submit a report in duplicate within 30 days of observation to Engineer for information.

D. Workers and Equipment:

1. The Contractor shall employ only competent and efficient workers for each type of work performed. Anyone employed on the Work that is deemed incompetent, disorderly, or who commits trespass upon public or private property adjacent to the work, shall be dismissed when the Engineer so orders. No one, so dismissed, shall be re-employed unless the Engineer gives express permission. The methods, equipment, and appliances used and the labor employed on the work shall produce an Owner-acceptable quality finished product and shall be sufficient to complete the Contract within the specified time limit.

2. In hiring employees to perform work under this Contract, or any subcontract hereunder, no Contractor, Subcontractor, nor any person acting on their behalf shall discriminate against anyone performing work under this Contract, because of race, sex, creed, color or national origin.

PART TWO - PRODUCTS

2.01 PRODUCTS

A. Provide specified products as required.

PART THREE - EXECUTION

3.01 MAINTENANCE AND REMOVAL

A. Maintain temporary facilities and controls as long as needed for the safe and proper completion of the Work.

B. Remove the temporary facilities and controls as rapidly as progress of the Work will safely permit, or as directed by the Engineer.

3.02 WATER CONTROL

A. Grade site to drain. Maintain excavations free of water. Provide, operate, and maintain pumping equipment.

B. Protect site from ponding or running water. Provide water barriers as required to protect site from soil
erosion.

3.03 EROSION AND SEDIMENT CONTROL

A. Plan and execute construction by methods to control surface drainage from cuts and fills, from borrow and waste disposal areas. Prevent erosion and sedimentation. Meet Ohio EPA erosion control and sediment requirements.

B. Minimize amount of bare soil exposed at one time.

C. Provide temporary measures such as berms, dikes, and drains, to prevent or control water flow.

D. Construct fill and waste areas by selective placement to avoid erosive surface silts or clays.

E. Periodically inspect earthwork to detect evidence of erosion and sedimentation; promptly apply corrective measures.

F. Site clearing and grubbing shall not commence until such time that the contractor is prepared to start construction. Remove only those trees, shrubs, and grasses that must be removed for construction; protect the remainder to preserve aesthetic, habitat, and erosion control values. Install sedimentation controls immediately following access and site clearing and maintain them in effective operating condition during construction until final seeding and site restoration occurs.

G. Construct diversion channels when required to collect runoff and prevent silt and other eroded materials from entering local drainage courses. Diversion channels will flow to temporary sediment basins, and are to be stabilized through seeding, riprap, or lining with plastic.

H. Silt fences shall be trenched six to twelve inches deep, the fabric laid in the trench, and the soil properly backfilled into the trench to prevent undercutting.

I. Straw bales shall be trenched a minimum of four inches deep and placed on their ends with the binding material off the ground. Drive two stakes through the bales and into the ground 1-1/2 to 2 feet deep to secure the bale. Fill the spaces between the bales with loose straw, and properly backfill the trench with soil.

J. Where a trench excavation occurs parallel to a waterway, a vegetation barrier shall be maintained between the stream and the construction area. All trench soils shall be stockpiled on the side of the trench away from the waterway, and a line of silt barriers established along the edge of construction on the contour between the trench and the waterway.

K. Any disturbed area that will not be actively under construction for a period of 30 days or more shall be stabilized immediately by seeding and mulching or by anchored straw mulch.

L. Storm sewer inlets shall be surrounded with silt barriers to prevent siltation.

M. Slopes exceeding 15 percent or that tend to be unstable shall be provided special treatment such as water diversion berms, sod, jute blankets, or excelsior blankets.

N. If work is suspended for any reason, the contractor shall maintain the soil erosion and sedimentation controls in good operating condition during the suspension of the work. When seasonal conditions permit and the suspension of work is expected to exceed 30 days, the Contractor shall seed, fertilize, and mulch all disturbed areas left exposed when the work is suspended.

3.04 NOTIFICATION OF UTILITY OWNERS

A. Not less than five (5) days in advance of commencing excavation, notify in writing all utility companies, such as gas, water, electric power, transmission, cable, and telephone, which have installations that could be disturbed by the Work; and make proper provisions for locating, removing, relocating, or otherwise protecting said installations. Make additional utility company contacts and provisions to locate and protect utility company installations, as necessary, as the Work progresses.

B. Unless shown on the Drawings or otherwise specified to be removed, protect or relocate all active utility installations or improvements encountered by the Work. Service interruptions should be avoided whenever
possible but when unavoidable, interruptions should be kept to a minimum. In such cases, promptly notify all those affected.

C. If a utility installation or improvement is damaged, promptly notify those affected, repair or replace to utility standards. Restore service as soon as possible at no additional cost to Owner.

D. If existing utilities are found to interfering with the permanent facilities being constructed under this Section, immediately notify the Engineer and secure appropriate instructions.

E. Do not proceed with the permanent relocation of utilities until written instructions are received from the Engineer.

3.05 FAILURE TO PERFORM SECTION PROVISIONS

A. If the Contractor fails to comply with the provisions of this Section, the Owner may, but is not obligated to cause the unperformed provisions to be completed and deduct the related cost of such work from any monies due the Contractor. If Owner causes unperformed work to be completed, it shall in no way release the Contractor from his liability for the safety of the public and the work.

PART FOUR - SPECIFIC REQUIREMENTS

4.01 CONSTRUCTION PHOTOGRAPHS

A. Photographs are NOT required on this Project.

4.02 CONSTRUCTION VIDEOTAPING

A. Audio-Color Video recording is required on this Project. See Section 02510

4.03 OWNER PROVIDED SERVICES

A. The project work described in 1.02 C 1. & C 2. WILL NOT be provided by the Owner. The Contractor shall provide these services and the costs shall be included in the unit price bids for the pertinent project items.

4.04 TEMPORARY OFFICE

A. A temporary Contractor's office is NOT required on this Project

END OF SECTION
PART ONE - GENERAL

1.01 DESCRIPTION

A. This Section includes, in general, excavating any material encountered, backfilling, compacting the backfill as specified, and related work. The Contractor shall grade to the elevations shown on the Drawings, as specified herein, and as needed to meet the requirements and general intent of the construction described and shown in the Contract Documents.

B. More specifically, this Section includes, but is not limited to, surface clearing, grubbing and removal of obstructions from the area to be excavated; removing any and all subsurface obstructions; providing and installing temporary sheeting (and permanent sheeting when specified or noted on the Drawings to be left in place), shoring and bracing for excavations, temporary drainage, fluming and pumping; maintaining treatment processes; maintaining traffic; maintaining flows in rivers, creeks, drains, field drainage conduits, and sewers; damming and coffer-damming; protecting areas not in the direct path of construction and not to be disturbed, removing and replacing, or relocating existing installations or improvements in the work path including field tile and drains; restoring damaged surface improvements to pre-construction conditions or better; transporting and disposing of unsuitable and surplus excavated materials; and backfilling, compacting, and grading where shown on the Drawings, specified, or ordered by the Engineer.

C. Other Related work:
   1. Documents affecting the work of this Section include, but are not limited to, General Conditions, Supplementary Conditions, and all other Sections of these Specifications and where applicable, the Ohio Department of Transportation Specifications.

1.02 QUALITY ASSURANCE

A. Use an adequate number of skilled workers who are thoroughly trained and experienced in the necessary crafts and who are completely familiar with the specified requirements and the methods needed for the proper performance of the work of this Section.

B. Use equipment adequate in size, capacity, and number to accomplish the work of this Section in a safe and timely manner.

C. Comply with the requirements of governmental agencies having jurisdiction, and with the directions of the Engineer.

1.03 PRODUCT HANDLING

A. Comply with pertinent provisions of Section 01350 Product Requirements & Handling.

1.04 LABORATORY SERVICES

A. Provide one sieve analysis per ASTM C-136 for each material source of bedding or other granular backfill material.

B. Provide a moisture density curve per ASTM D-698 for each type of granular backfill and bedding material used. Indicate the maximum dry weight and optimum moisture content.

   1. Test consolidated backfill in trenches and around structures for the compaction compliance requirements of this Section. When compaction does not meet requirements, adjust methods, perform additional compaction and take additional tests until the specified compaction is obtained.

1.05 CONSTRUCTION THROUGH HIGHWAYS

A. Owner will obtain any needed permits required for crossing highways.

B. Contractor shall properly notify appropriate road and highway officials before starting construction in a roadway or highway right-of-way.
C. Contractor shall pay all inspection fees required by the owner of the roadway or highway right-of-way.

1.06 PROTECTION

A. Contractor shall carefully dig exploratory test pits as necessary to determine the exact location of subsurface improvements that need to be protected, supported, or maintained in operation.

B. Contractor shall furnish and install all sheeting, shoring, and bracing necessary to provide safe working conditions and to protect nearby work and improvements from damage resulting from excavating.

C. Contractor shall leave in place any sheeting, shoring, or bracing specified, shown or indicated to remain in place on the Drawings.

D. Contractor may remove temporary construction sheeting and shoring when it is no longer needed to provide safe working conditions or to protect nearby work and improvements from damage.

E. Contractor shall remove and properly dispose of all water affecting the work and keep excavations dry until Contract improvements are completed.

F. Contractor shall protect with fencing, marking tape, protection devices, and other appropriate means all areas, trees, and vegetation not directly in the path of construction, or identified by the Engineer not to be disturbed.

1.07 FOUNDATION CUSHIONS

A. The Contractor shall furnish and properly place all materials at all locations where called for by the drawings. When deemed necessary by the Engineer, the Contractor shall over-excavate and install well compacted crushed limestone to obtain firm foundations for the project structures.

PART TWO - PRODUCTS

2.01 BACKFILL MATERIALS

A. Granular Pipe Bedding Material:

Unless otherwise called for on the Drawings, granular pipe bedding material shall be well-graded number 56, 67, or 68 durable crushed gravel or crushed stone, or ODOT 703.11 Type 1 (Gradation 304). Bedding material containing a greater percentage of larger sized aggregate shall be furnished if ordered by the Engineer.

B. Granular, Premium, and/or Special Backfill:

Unless otherwise called for on the Drawings, granular, premium and special backfill material shall conform to the requirements of ODOT 304 Aggregate Base or approved equal.

C. Controlled Density Fill Material:

Controlled density fill material shall be a cement base fill material that can be deposited in a fluid state. It shall be composed of Portland cement and approved filler material. The mixture shall be submitted for Engineer's approval and shall meet the following requirements:

<table>
<thead>
<tr>
<th>Component</th>
<th>Requirement</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cement</td>
<td>100 lb/cy</td>
</tr>
<tr>
<td>Fly Ash</td>
<td>250-300 lb/cy</td>
</tr>
<tr>
<td>Sand (S.S.D.)</td>
<td>2,600-2,850 lb/cy</td>
</tr>
<tr>
<td>Water</td>
<td>500-600 lb/cy</td>
</tr>
<tr>
<td>Compressive Strength (28-day)</td>
<td>Min: 100 psi</td>
</tr>
</tbody>
</table>

D. Crushed, thoroughly washed limestone and screenings for foundation cushions shall be obtained in three sizes up to two and one-half (2-1/2") inches and shall be free from all foreign material.

2.02 RESTORATION OF SURFACE IMPROVEMENTS
A. Unless otherwise shown on the Drawings or specified elsewhere to the contrary, the Contractor shall restore all surface improvements disturbed by the work of this Section to original or better conditions.

B. Material for gravel drive and gravel berm restoration or as otherwise required, shall be ODOT 411 Stabilized Crushed Aggregate.

C. Road, related, or similar restorations shall be as is appropriate for the original surface conditions and be in accordance with ODOT Item 304 Aggregate Base, Item 301 Bituminous Aggregate Base; Item 448 Intermediate Course, Type 2 Asphalt Concrete; Item 448 Asphalt Concrete Surface Course, Type 1; Item 305 Portland Cement Concrete Base, Item 452 Plain Portland Cement Concrete Pavement, Item 608 Walks, Curbs, and Steps, and Item 609 Curbing, as these Items apply. The Engineer or his Field Representative will determine what is appropriate to restore surface conditions.

2.03 TOPSOIL

A. Where shown on the Drawings, specified, or required, provide topsoil consisting of loose, friable, loamy fertile soil, containing an amount of organic matter normal to the region, capable of sustaining healthy plant life, and reasonably free from subsoil, peat, muck, roots, heavy or stiff clay, stones larger than one (1) inch in greatest dimension, noxious weeds, sticks, brush, litter, and other deleterious matter.

B. Each load of topsoil shall be subject to approval by the Engineer.

2.04 OTHER MATERIALS

A. Provide other backfill materials, not specifically described but required, for a complete and proper installation, as selected by the Contractor and approved by Engineer.

PART THREE - EXECUTION

3.01 SURFACE AND NEAR SURFACE CONDITIONS

A. Examine the areas and conditions under which the work of this Section will be performed. Correct any conditions detrimental to the timely and proper completion of the Work. Do not proceed until unsatisfactory conditions are corrected.

3.02 FINISH LINES AND ELEVATIONS

A. Grade and shape the ground surface in accordance with the finish lines and elevations shown on the Drawings, specified or required by the Engineer. Comply with other applicable provisions of the Specifications.

3.03 PROCEDURES

A. Utilities:

1. Not less than five (5) days in advance of commencing excavation, notify in writing all utility companies, such as gas, water, electric power, transmission, cable, and telephone, which have installations that could be disturbed by the Work; and make proper provisions for locating, removing, relocating, or otherwise protecting said installations. Make additional utility company contacts and provisions to locate and protect utility company installations, as necessary, as the Work progresses.

2. Unless shown on the Drawings or otherwise specified to be removed, protect or relocate all active utility installations or improvements encountered by the Work. Service interruptions should be avoided whenever possible but when unavoidable, interruptions should be kept to a minimum. In such cases, promptly notify all those affected.

3. If a utility installation or improvement is damaged, promptly notify those affected, repair or replace to utility standards. Restore service as soon as possible at no additional cost to Owner.
4. If existing utilities are found to interfere with the permanent facilities being constructed under this Section, notify the Engineer and secure appropriate instructions immediately.

5. Do not proceed with the permanent relocation of utilities until written instructions are received from the Engineer.

3.04 EXCAVATING

A. Excavate every type of material encountered within the limits of the Work to the lines, grades, and elevations shown on the Drawings and specified herein.

B. Clear the surface of obstructions prior to open cut excavations. Paved areas, sidewalks, drives, curbs, and streets shall be cut to straight lines, and the surfacing material removed and disposed of unless otherwise properly used in the Work.

C. Remove, stockpile, and replace topsoil from the area to be excavated in accordance with the applicable sections of ODOT Items 651 and 652.

D. Trench excavations for water lines and sewers shall provide ample width for workers to properly install the pipes but the width shall not exceed the maximum shown on the Drawings, specified, or recommended by the pipe manufacturer.

1. Excavate to the depth necessary for placing granular bedding material under the pipe as shown on the Drawings. If over excavation occurs, bring trench bottom and side limits to proper grade and lines with compacted granular bedding material at no additional cost to Owner.

2. The length of trench remaining open at any time shall not exceed the length needed for the immediate installation process.

3. Backfilling shall start as soon as the pipe is in an approved condition. Additional excavating shall be initiated only after earlier excavations are properly backfilled and any surface restorations needed for safety are completed.

4. Water shall not be allowed to accumulate in any trench once the pipe is placed.

5. House connections shall not be backfilled until the pipe ends are referenced and the Engineer measures the pipe lengths.

6. Where streams are crossed, making the crossing shall be in accordance with local, State, and Federal regulations; as shown on the Drawings; and as specified.

E. Dewatering Excavated Areas:

1. Remove all water that is encountered or that collects in any excavation. Discharge the water to an approved location.

2. Keep site construction area free from standing water.

3. All dewatering flows shall be settled in silt removal basins or directed through filtering devices before discharging to a stream or storm sewer. Dewatering flows shall not be discharged onto exposed soils, stream banks, or other sites where the flow causes erosion.

4. Silt from construction operations shall not be permitted to enter the storm sewer system. When construction occurs near storm sewer inlets, erosion control measures such as inlet filters or bales of straw shall be used to prevent silt from entering the storm sewers.

5. Convey water from the construction site in a closed conduit. Do not use trench excavations as temporary drainage ditches.

F. Excavations in General:

1. Excavations shall be made as necessary to complete the Contract Work
2. Use methods and equipment that do not disturb the existing soil below structures or beyond the limits shown on the Drawings or specified. Excavate by hand tools to final grade just prior to placing concrete. Trim to required lines and grades to leave a solid base to receive concrete.

3. Any excavation that is performed below the bottom or beyond the limits shown or specified (including corrective work required) shall be considered unauthorized. All unauthorized excavation, including any corrective work required by the Engineer shall be at no additional cost to Owner.

4. Unauthorized excavation shall be filled with Class B concrete to the bottom limits of structures. Where, in the opinion of the Engineer, structural integrity is not a factor, the Engineer may permit the Contractor to replace the unauthorized excavation with pipe bedding or other granular backfill material so long as it is compacted to 100% density.

5. Cut pavements and excavate to comply with cross sections, elevations, and grades.

6. Protect excavation bottoms against freezing when air temperatures are below 35 degrees F, when construction is to continue, or other conditions require.

G. Unsuitable Materials

1. Where unsuitable subgrade materials are encountered below the bottom of a structure, pipe, drive, or road, the unsuitable material shall be made suitable or removed in the presence of the Engineer and replaced with a minimum undercut of 6”. Acceptable stone materials will be Number 1 and Number 2 size aggregate and Item 304- Aggregate Base. Compaction shall be equal to or exceeding 95% of the maximum modified Proctor dry unit weight (ASTM D-1557). In subgrade areas with unsuitable materials, the cost for undercutting, removing the unsuitable materials below the subgrade, and backfilling with stone shall be paid under bid the appropriate Contingency Bid Item for this work.

2. Where unsuitable materials are encountered elsewhere within the excavation limits, make suitable or remove, dispose, and replace it with suitable material if so ordered by the Engineer. Removing and replacing unsuitable materials shall be at no additional cost to the Owner in normal excavation limits.

H. Filling and Backfilling

1. Pipe shall be installed in granular pipe bedding material as shown on the Drawings and as specified. Plastic pipe shall have a detectable marking tape and locator wire installed per the Drawing Trench Detail.

2. Where existing installations are undercut, backfill the full exposed length under the installations with granular backfill material tamped in maximum 6-inch layers to the specified density. Extend the granular bedding outward 2 feet on either side of the existing installation and then downward at its natural slope.

3. Material excavated in connection with the Work that is of a satisfactory character shall be used for backfilling and any excess shall be placed where directed by the Engineer. Otherwise, the excess material shall be removed from the site and properly disposed of. No material containing stone, rocks, or pieces of masonry larger than 12 inches in any dimension, frozen earth, debris, organic material, or marl shall be used for backfilling. No large pieces of rock or masonry shall be placed within 2 feet of any structure or pipe.

4. Carefully hand backfill around and over structures and pipe and tamp with suitable approved tools to 1 foot above the structure or pipe. The backfill material shall be select excavated material or granular backfill material where specified or required by the Engineer. The backfill material shall be placed in uniform maximum 6-inch layers and tamped to the specified density. Backfill material from a bucket shall not be allowed to fall directly on to a structure or pipe. Bucket must be lowered so the shock of falling backfill does not cause damage.

5. After the backfill has been placed and compacted around and over structures and pipe to 1 foot above, backfill by machine with select excavated material if suitable, or with granular backfill material to the specified density, if specified, shown on the Drawings, or ordered by the Engineer.

6. Where pavement, drives, curbs and gutters, or sidewalks are located over or within 5 feet of the
trench or when any railroad track is over or within 10 feet of a trench, use granular backfill material to backfill the complete trench from the bedding material to the surface. Backfill shall extend horizontally 5 feet beyond the pavement, drive, curb and gutter, or sidewalk; and 10 feet beyond any railroad track. Backfill shall be placed in maximum 6-inch layers and compacted to the specified density.

7. If approved by the Engineer, the backfill for a utility trench may be compacted with water if satisfactory drainage is provided, if the material is granular, if the air temperature is above freezing, if the gradation of the backfill material does not change, and if the results of such compaction method provides the specified density. Compaction of granular backfill in areas other than utility trenches shall not be allowed.

8. Where called for on the Drawings, specified, or ordered, provide controlled density material in lieu of the specified granular backfill or bedding material. Contractor shall take appropriate actions to protect the installed improvements against flotation.

9. Where backfill is placed under structural slabs or footings, use select backfill, unless Class B concrete or granular backfill material is called for on the Drawings, or otherwise ordered by the Engineer.

10. Where trenches are excavated through areas with lateral groundwater flow, or areas below the ground water table, construct bulkheads consisting of native clay soil or similar material at appropriate intervals.

11. Backfill all excavations as promptly as the Work permits, but in no case before the work is properly completed, inspected, tested; and where applicable, cured, located, shored, damp-proofed, waterproofed, and the debris removed in accordance with the Contract Documents.

I. Compaction

1. Under and within 5 feet of pavements, drives, sidewalks, curbs and gutters, and within 10 feet of any railroad track, obtain compaction throughout the backfill of at least 98% of maximum dry density as determined by ASTM D-698 (Standard Proctor), but in no case, less than that of the surrounding ground.

2. Subgrades under pavements with curbs shall be compacted 6-inches beyond the back of the curb and to a depth of 12 inches below the subgrade surface to a density of not less than 100% of maximum dry density per ASTM D-698. All fill below the subgrade shall be compacted to not less than 98% of maximum dry density.

3. Subgrades under pavements without curbs shall be compacted 12-inches beyond the edge of pavement and to a depth of 12 inches below the subgrade surface to a density of not less than 100% of maximum dry density per ASTM D-698. All fill below the subgrade shall be compacted to not less than 98% of maximum dry density.

4. Subgrades under and around structures where other improvements are to be constructed shall be compacted to a depth of 12 inches below the subgrade surface to a density of not less than 100% of maximum dry density per ASTM D-698.

5. Other areas shall be compacted to at least that of the surrounding ground.

J. Compaction Tests

1. A set of initial compaction tests on the various layers of backfill shall be performed immediately after compaction begins to prove that the method being used attains the required compaction results. If the required results are not attained, make needed adjustments in the method being used and repeat the process until the specified requirements are met.

2. Once the method of compaction has been proven, Contractor shall not change the method without the approval of the Engineer.

3. Trench backfill compaction tests shall be performed to verify the specified consolidation. Unless otherwise directed, perform not less than one test per day on each layer of backfill material used. If any test fails to meet requirements, more frequent testing, as directed by the Engineer, shall be
performed.

4. At paved areas, perform at least two field density tests per day. If any test fails to meet requirements, more frequent testing, as directed by the Engineer, shall be performed.

5. On other compacted sub-grade fill layers, perform at least one field density test per day on each sub-grade fill layer. If any test fails to meet requirements, more frequent testing, as directed by the Engineer, shall be performed.

6. If any of the above testing results are below that specified, provide additional compaction and testing as necessary to attain the specified compaction.

K. Use and Disposal of Excavated Material

1. Suitable excavated materials:
   a. Transport and place in fill or embankment areas within the limits of the Work, as directed by the Engineer.

2. Unsuitable excavated materials:
   a. Excavate and bury at a distance below grade as directed by the Engineer or include in surplus material. Replace with suitable material if needed.
   b. Include the excavation of unsuitable materials, and any needed replacement materials as part of the work of this Section.

3. Surplus materials:
   a. Dispose of unsuitable excavated material and other surplus excavated material away from the site at disposal areas located and paid for by the Contractor.

L. Excavation of rock:

1. Where rock, boulders, granite, or similar materials are encountered, and where such materials cannot be removed or excavated by conventional excavation or ripping equipment, remove or excavate such material by any other means that will neither cause additional cost to the Owner nor endanger buildings or structures whether on or off the site.

2. Do not use explosives without written permission from the Engineer.

M. Borrow:

1. Obtain material required for backfill or embankments in excess of that produced within the grading limits of the Work from borrow areas selected and paid for by the Contractor and approved by the Engineer.

N. Ditches:

1. Cut accurately to the cross sections, grades, and elevations shown on the Drawings.

2. Maintain excavations free from detrimental quantities of leaves, sticks, trash, and other debris until completion of the Work.

3. Dispose excavated materials as shown on the Drawings or as directed by the Engineer. Do not deposit materials within 3 feet of any ditch.

O. Stability of excavations:

1. Slope the sides of excavations or use shoring and bracing to maintain sides and slopes in a safe condition until backfilling is completed. Contractor shall comply with all OSHA and other applicable agency safety requirements and guidelines.
P. Shoring and bracing:

1. Provide and install shoring and bracing or work boxes as needed for the safety of personnel, for the protection of the work, and for compliance with requirements of governmental agencies having jurisdiction.

2. Maintain shoring and bracing in excavations until the excavation is closed and elsewhere while needed.

Q. Protection of people and property:

1. Barricade open holes, depressions, and other hazards occurring as part of the Work, and post warning lights on property adjacent to or having public access.

2. Operate warning lights during hours from dusk to dawn each day and as conditions require.

3. Protect structures, utilities, sidewalks, pavements, and other facilities from damage caused by settlement, lateral movement, washout, or other hazards created by the operations under this Section.

4. Contractor shall be responsible for damage resulting from the construction activity.

R. Use whatever means are necessary to prevent dust, dirt, and debris from becoming a nuisance to the public, to neighbors, and to other work being performed on or near the site.

S. Maintain access to adjacent areas at all times.

T. Crushed limestone or slag and screenings shall be placed in layers not over six (6) inches in depth and thoroughly compacted into the material below. The larger size shall be placed first, and this shall be followed by the intermediate size and, lastly, by the screenings. The amount of material of each size to be placed will depend upon the nature of the ground to be compacted. The placing of this material shall be continued until the required depth is placed, and the top of the cushion shall be finished to the lines and grades given the Engineer.

3.05 MAINTENANCE

A. Protection of newly graded areas:

1. Protect newly graded areas from traffic and erosion, and keep free from trash and weeds.

2. Repair and reestablish grades in settled, eroded, and rutted areas to the specified tolerances.

B. Where completed compacted areas are disturbed by subsequent construction operations or adverse weather, scarify the surface, reshape, and compact to the required density prior to further construction.

3.06 SODDING OR SEEDING OF DISTURBED AREAS

A. All disturbed non-paved areas shall be provided with a seed and mulch cover unless noted on the Drawings to be sodded. The seed shall be ODOT 659 Grass Mix Type Class 1. The seeding shall include a uniform application of 12-12-12 fertilizer applied at a rate of 20 pounds per 1000 square feet and hydro seed the disturbed area per ODOT 659.12. Hydro seed the disturbed area with wood fiber mulch per ODOT 659.15. Include in the unit price cost of Seeding and Mulching the disturbed area, the cost to repair seeding and mulching and one application of water, if necessary.

B. Where sodding is noted on the Drawings, sod of a well-rooted Kentucky Blue Grass or Turf Fescue Grass containing not more than 30% of other grasses or clovers, and free of all noxious weeds shall be provided and installed in accordance with ODOT Specification for Item 660.

3.07 RIGHT-OF-WAY OBSTRUCTIONS AND RESTORATION

A. OBSTRUCTION OF RIGHT-OF-WAY

The Contractor shall not remove any mailboxes, paper boxes, private light posts, signs, utility markers, trees, shrubbery, fence, guardrail or other obstructions without the prior approval of the Engineer. The Contractor shall
notify all property owners and request that the property owner remove fences, shrubs, bushes, light posts, private
signs and ornamental landscaping which includes, but is not limited to railroad ties, statues, brick or stone, wash
stone, wood chips, etc. from the public right-of-way.

IF the Owner of said obstruction does not remove or relocate said obstruction within a reasonable time (10 days
maximum), the Contractor shall remove the obstruction and place it at the direction of the Engineer. If mailboxes
cannot be immediately replaced, the Contractor shall provide for temporary mail service suitable to the U.S. Postal
Service. Payment for this work shall be included in the lump sum bid for the Restoration of Right-of-Way.

B. RESTORATION OF RIGHT-OF-WAY

All existing public and quasi-public features in the existing public right-of-way that are disturbed due to construction
such as, but not limited to mailboxes, curb, guardrail, driveways, swales, sewers, ditches, catch basins, berms,
fertilizer, seeding and mulching areas, etc. shall be replaced to their original condition in accordance with current
Ohio Department of Transportation and project specifications to the satisfaction of the Owner and Engineer.

Payment for this work shall be included in the lump sum price for Restoration of Right-of-Way, unless noted as a
separate pay item. However, no payment for this item shall be made and/or final acceptance of this project until
such time as restoration of right-of-way is complete to the satisfaction of the City Engineer.

PART FOUR - SPECIAL PROVISIONS

4.01 None

END OF SECTION
PART 1 - GENERAL

A. The following specifications shall be used for the installation of a high performance small aperture subgrade geogrid beneath the aggregate base to reinforce the subbase on new roadway construction.

1.1 DEFINITIONS

A. Engineer: Overall project engineer employed or retained by the municipality.

B. Project Owner: Municipal owner of the roadway – The Village of Pemberville.

C. Contractor: Firm engaged in the construction of roadways.

1.2 SCOPE

A. This specification addresses the installation of a high performance small aperture geogrid to reinforce the subbase beneath new roadway construction. The Contractor will furnish all labor, equipment, materials, tools and appurtenances necessary or proper for the performance and completion of the contract. Inspection and payment will be by the method stipulated in the contract.

1.3 DESCRIPTION

A. The geogrid shall be composed of a single layer and integrally formed with triangular apertures and high-profile ribs exhibiting significant dimensional stability through all ribs and junctions of the geogrid structure. The geogrid shall maintain its reinforcement and aggregate confinement capabilities under repeated dynamic loads while in service. The geogrid shall also be resistant to ultraviolet degradation, damage under normal construction practices and all forms of biological and chemical degradation normally encountered in road construction. Geogrid layers shall be placed according to the drawings and specifications and manufacturer's recommendations. The geogrid should be sized appropriately to interlock with dense graded aggregate. The subgrade geogrid to be installed shall be Tensar TX8 Geogrid as manufactured by Tensar Corporation, 2500 North Winds Parkway, Suite 500, Alpharetta, GA 30009 (Phone 770-344-2090 and Website: https://www.tensarcorporation.com/) unless otherwise approved by the Engineer. The local manufacturer's representative for Tensar is Mark Miller – Office Phone: 330-335-3635.

1.4 SUBMITTAL

A. The Contractor shall submit the following prior to construction:
   1. Submit representative geogrid product sample
   2. Submit geogrid product data sheet and certification from the Manufacturer that the geogrid product supplied meets the requirements of Part 2 of this section
   3. Submit Manufacturer's installation instructions and general recommendations.

PART 2 - MATERIALS

2.1 HIGH PERFORMANCE SMALL APERTURE GEOGRID

A. The geogrid shall be integrally formed through punching and drawing of extruded sheets of polypropylene. The geogrid shall be oriented in three substantially equilateral directions so the resulting ribs have a high degree of molecular orientation which continues at least in part through the mass of the integral node.

B. The resulting geogrid structure shall have apertures that are triangular in shape, and shall have ribs with depth-to-width ratios greater than 1.0.
C. The geogrid shall have typical characteristics shown in the table below, and shall be certified in writing by the manufacturer to meet these characteristics:

<table>
<thead>
<tr>
<th>Properties</th>
<th>Longitudinal</th>
<th>Diagonal</th>
<th>Transverse</th>
<th>General</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rib Pitch (^{(1)}), mm (in)</td>
<td>33 (1.30)</td>
<td>33 (1.30)</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>Mid-rib depth (^{(1)}), mm (in)</td>
<td>-</td>
<td>1.6 (0.06)</td>
<td>1.2 (0.05)</td>
<td></td>
</tr>
<tr>
<td>Mid-rib width (^{(1)}), mm (in)</td>
<td>-</td>
<td>0.4 (0.02)</td>
<td>0.7 (0.03)</td>
<td></td>
</tr>
<tr>
<td>Rib shape</td>
<td>rectangular</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Aperture shape</td>
<td>triangular</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Radial stiffness at low strain(^{(2)}), kN/m @ 0.5% strain (lb/ft @ 0.5% strain)</td>
<td>225 (15,400)</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

1. Nominal dimensions.
2. Radial stiffness is determined from tensile stiffness measured in any in-plane axis from testing in accordance with ASTM D6637.

D. The Contractor shall submit geogrid product data sheet and certification from the Manufacturer that the geogrid product supplied meets all of the requirements of Section 2.1.C. A minimum of one material sample may be selected at random from the material delivered and tested for compliance with the requirements of Section 2.1.C. Each sample size required shall be a minimum of three (3) feet wide with a one (1) square yard minimum area.

2.2 ALTERNATE GEOGRID MATERIALS

A. Alternate geogrid materials may be considered if they meet or exceed the design criteria of the project. Such materials must be pre-approved in writing by the Engineer. For alternate geogrid materials not meeting all the requirements of Section 2.1.C, alternate material packages must be submitted meeting or exceeding the design criteria of the project to the Engineer a minimum of 14 days prior to the bid date, and must include, as a minimum, the following:

1. Performance calibration tests of alternate geogrid material based on accelerated pavement testing (APT).

   APT shall be performed at an APT facility accredited by NCHRP for geogrid testing. APT shall be conducted in accordance with NCHRP 512 and Synthesis 325 and must be evaluated with standard highway moving wheel loads. Geogrid reinforced sections must be compared to a control section. Test results of the geogrid section must demonstrate a minimum of 100,000 equivalent single axle loads at less than \( \frac{1}{2} \) of rutting and must be continued beyond the failure criterion. The rutting performance of the sections must be assessed by trenching. Pavement testing must take place over both soft (CBR <4%) and firm (CBR >5%) subgrade conditions.

2. Results from ten or more in-situ automated plate load tests conducted, in compliance with AASHTO T221-90 (2012), on geogrid stabilized aggregate base, where the results confirmed that the structural requirements of the pavement foundation were achieved for the product being recommended. At a minimum, two of the tests must show results for 10,000 cycles and demonstrate near-linear elastic behavior.

3. Independent review and verification from a third party expert of supporting research, data, design assumptions and analyses. This will include: calibration and validation research, data normalization, product performance, design methodology and design calculations, and verification of product-specific design boundary conditions.
4. An alternate design signed and sealed by a professional engineer registered to practice in the state that the project is located that incorporates the performance benefits of the submitted geogrid in full-scale accelerated pavement testing (APT), based on the site specific conditions of the project.

5. A sample of the alternate geogrid material and certified specification sheets. Recommended installation instructions and additional information as requested by the Engineer to fully evaluate the application.

6. In-air index testing of geogrid properties, or explanations of performance based on in-air index testing of geogrid properties are not sufficient to understand the complex mechanisms involved in soil/geogrid interaction and/or the performance of MSL’s. Therefore, no acceptance of alternates based on material property comparisons or explanations of performance based on in-air testing of geogrid properties will be allowed.

PART 3 – DELIVERY, STORAGE, AND HANDLING

3.1 STORAGE AND PROTECTION

A. Prevent excessive mud, wet concrete, epoxy or other deleterious materials from coming in contact with and affixing to the geogrid materials.

B. Store at temperatures above -20 degrees F (-29 degrees C).

C. Rolled materials may be laid flat or stood on end.

D. Geogrid materials should not be left directly exposed to sunlight for more than 6 months or as recommended by the manufacturer.

3.2 EXAMINATION

A. The Contractor shall check the geogrid upon delivery to verify the proper material has been received. The geogrid shall be inspected by the Contractor to be free of flaws or damage occurring during manufacturing, shipping or handling.

PART 4 – EXECUTION

4.1 PREPARATION

A. The subgrade soil shall be prepared as indicated on the construction drawings and specifications.

4.2 INSTALLATION

A. The geogrid shall be installed at the proper elevation and alignment as shown on the construction drawings.

B. The geogrid shall be installed in accordance with these plans and specifications and any installation guidelines provided by the manufacturer or as approved by the Engineer.

C. The geogrid may be temporarily secured in place with ties, staples, pins, sand bags or backfill.

D. Aggregate shall be placed and compacted in accordance with the local Department of Transportation standards. Aggregate shall be placed, spread and compacted in such a manner that minimizes the development of wrinkles in the geogrid and/or movement of the geogrid.

E. A minimum loose aggregate thickness of 6 inches is required prior to operation of tracked vehicles over the geogrid. Turning of tracked vehicles should be kept to a minimum to prevent tracks from displacing the aggregate base material and damaging the geogrid. When underlying subgrade is trafficable with minimal rutting, rubber-tired equipment may pass directly over the geogrid reinforcement at slow speeds (less than 5 mph). Sudden braking and sharp turning movements shall be avoided.

4.3 INSPECTION AND REPAIR
PART 5 – MEASUREMENT AND PAYMENT

5.1 MEASUREMENT AND PAYMENT

A. This work will be measured and paid for by the square yard, completed in place. No allowance will be made for overlap, splices or material cut off or wasted. Different manufacturer’s overlap and splicing requirements for the intended application may vary. Payment for Item Special, SUBGRADE GEOGRID, AS PER PLAN will include furnishing the material, labor, and equipment required to furnish, place and anchor the geogrid, and any hand work necessary to establish grades, make geogrid splices, and repairs to protective coatings.

**END OF SECTION**
PART ONE - GENERAL

1.01 DESCRIPTION

A. Work Included:

1. Under this Section, the Contractor shall provide all labor, tools, equipment, and materials necessary to provide video recording of the original conditions of the project area/path.

2. Construction in any area shall not begin until the area has been video recorded and the videos showing the pre-construction conditions are submitted to the Engineer.

3. Prior to video recording, all areas to be recorded shall be investigated visually and notations made of features not readily visible by recording methods. This would include, but not be limited to, culverts (size, type, and conditions) and manholes that may be partially buried. Record all measurements made during the inspection.

1.02 APPROVALS

A. All video recording shall be conducted in the presence of the Engineer unless waived by the Engineer. At the start of recording, the Contractor shall submit a sample recording for the Engineer to review. The sample video shall be approved before any other recording is performed.

1.03 EQUIPMENT

A. Audio-video recording shall be original, previously unrecorded, standard quality, DVD. When duplicate copies are required by the Owner, all copies shall be limited to direct copies of the original recording and marked as such. All recordings shall be properly identified by tape number, location, and project name in a manner acceptable to the Engineer. An index including date of recording, subjects, and locations by tape footage and inventory of all videos completed, referenced by location and tape number, shall be furnished to the Engineer upon completion of the work and delivery of the recordings. All recordings and written records shall become the property of the Owner.

B. Recordings shall be made only when sufficient lighting, natural or artificial, is available to assure the recordings are of good quality.

C. The color camera shall be of a modern design and be compatible with the video recording format. Equipment shall be good quality.

1.04 QUALIFICATIONS

A. The Contractor shall use the services of a professional videographer actively engaged in making color audio-video records for municipal utility construction projects. The Contractor must submit at least three letters of reference pertinent to the performance and satisfactory completion of color audio-video projects for various municipalities.

B. The Engineer may make such investigation as he deems necessary to determine the ability of the videographer to perform the work and the Contractor shall furnish to the Engineer such information and data for this purpose as the Engineer may request. The Engineer reserves the right to reject any videographer if the Engineer determines that the videographer is not sufficiently qualified to perform the work contemplated.

1.05 LOCATION INFORMATION

A. Audio - Each tape shall begin with the current date, project name and municipality and be followed by the general location, i.e. name of street, viewing side and direction of progress.
B. Video - The engineering stationing numbers must be continuous, be accurate, correspond to the project stationing where applicable and include the standard engineering symbols (for example, station 14 + 84). This transparent information must appear in the lower half of the viewing screen. Stationing for areas without centerline control can be provided by the Engineer.

C. Video - Below the engineering stationing, periodic transparent alpha-numeric information should appear. This information should consist of the name of the project, name of the area covered, direction of travel, viewing side, etc.

PART TWO - PRODUCTS

2.01 RECORDINGS

A. Each recording shall begin with the current date, project name, and municipality, and be followed by the general location, i.e., name of street or property owner, location of cross county line, viewing side, and direction of progress. The engineering stationing (where required) shall be noted on the audio track. Houses and buildings shall be identified audibly by and address, when available.

B. Date and Time. All video recordings shall continuously display, by electronic means, the month, day, year, and time of the recording.

PART THREE - EXECUTION

3.01 COVERAGE

A. Taped coverage shall include all surface features located within the zone of influence of construction supported by appropriate audio description. Both sides of the street or right-of-way shall be recorded in project area. Audio description shall be made simultaneously with video coverage. Such coverage shall include, but not be limited to, all existing driveways, sidewalks, curbs, ditches, roadways, landscaping, trees, culverts, headwalls, and retaining walls or buildings located within such zone of influence.

B. House and buildings shall be identified visually by house number, when visible, in such a manner that structures of the proposed system i.e., manholes on a sewer system and gateways and hydrants on a water system, can be located by reference.

C. The rate of speed in the general direction of travel of the conveyance used during taping shall not exceed 48 feet per minute. Planning rates and zoom-in, zoom-out rates shall be controlled sufficiently such that during playback will produce clarity of the object viewed.

D. All taping shall be done during times of good visibility. No taping shall be done during periods of visible precipitation or when more than 10% of the ground area is covered with snow, unless otherwise authorized by the Engineer.

E. The Engineer shall have the authority to designate what areas may be omitted or added for audio-video coverage.

PART FOUR - SPECIAL PROVISIONS

3.01 NUMBER OF RECORDS

A. The contractor shall provide three (3) copies of the video recordings in DVD format to the Engineer prior to commencement of the project.

END OF SECTION
PART ONE - GENERAL

1.01 SCOPE

A. Under this Section, the Contractor shall furnish and install hot-mix asphaltic concrete paved traffic, road and parking areas, as shown on the drawings or specified herein, or as required to complete the work.

B. This Section includes installation and compaction of the aggregate base, installation of asphaltic coatings, installation of stabilized crushed aggregate for berm areas, and other work incidental to asphaltic concrete construction.

C. Related work:

Related work includes but is not limited to the General Conditions, supplementary Conditions, General Requirements, all applicable Divisions of the Technical Specifications, including Section 02200, Excavation, Backfill, and Compaction.

1.02 REFERENCES

A. Comply with the requirements of the reference standards noted herein or on the Drawings. Where there is a conflict, the Drawings will govern. A complete listing of applicable reference standards, including full name of publishing agency and address, is contained in Section 01090.

B. Comply with the applicable referenced paragraphs of the State of Ohio Department of Transportation (ODOT) Construction and Material Specifications.

1.03 SUBMITTALS FOR ENGINEER'S APPROVAL

A. For submittal procedures refer to Section 01300.

B. Submit a written certificate of compliance that certifies all materials provided conform to the specified referenced standards or other requirements specified herein.

1.04 QUALITY ASSURANCE

A. Asphaltic concrete paving installer shall have not less than five (5) years experience on projects of similar size and scope.

B. Testing Agency:

1. All sampling, testing and inspections specified herein will be performed by an independent testing agency employed in accordance with the provisions of Section 01410.

2. Notify the testing and inspection agency not less than 24 hours in advance of work requiring testing or inspection services.

1.05 JOBSITE CONDITIONS

A. Weather limitations shall meet the requirements of ODOT Item 401.06.

PART TWO - PRODUCTS

2.01 MATERIALS

A. Aggregate Base (ODOT 304)

1. Crushed stone, crushed slag, crushed gravel, or natural gravel conforming to the requirements of ODOT Item 703.17.
B. Surface And Intermediate Course Aggregate (ODOT 448)
   1. Clean, hard, durable particles of crushed stone, crushed slag, crushed gravel, or natural gravel
      conforming to the requirements of ODOT Item 703.05.

C. Mineral Filler
   1. Rock dust, slag dust, hydrated lime, hydraulic cement, or other suitable mineral material conforming
      to the requirements of ODOT Item 703.07.

D. Asphalitic Cement
   1. Conform to the requirements of ODOT Item 702.

E. Prime Coat (ODOT 408)
   1. Liquid asphalt conforming to the requirements of ODOT Item 702.

F. Tack Coat (ODOT 407)
   1. Liquid asphalt conforming to the requirements of ODOT Item 702.

2.02 MIXES

A. Plant-Mix Pavements
   1. Furnish job-mix formulas for each pavement type, conforming to the requirements of ODOT Item 441.

B. Asphalitic Concrete Surface and Intermediate Course
   1. Mix aggregates and bituminous materials in accordance with the requirements of ODOT Item 448.

PART THREE - EXECUTION

3.01 EXAMINATION

A. Verification of Conditions
   1. Examine areas and conditions under which the work of this Section will be performed. Do not
      proceed with the work until unsatisfactory conditions have been corrected. Commencement of work
      implies acceptance of all areas and conditions.

3.02 PREPARATION

A. Pavement Planing (For Areas of Resurfacing)
   1. Plane the existing asphalt using self-propelled planing equipment that has sufficient power and
      stability to consistently and efficiently meet the requirements of ODOT Item 254.05. The equipment
      shall have grinding, sawing, or milling type cutters. Ensure that the cutters are mounted rigidly to the
      carrier and are adjustable to control the depth of cut and cross-slope. Planing of the asphalt surface,
      surface tolerances, method of measurement and basis of payment will be according to ODOT Item
      254. The planing material from the planing operations shall be deposited at an approved disposal
      site.

B. General
   1. Remove loose material from compacted subgrade, base of asphalt surfaces immediately before
      applying prime coat or tack coat.

C. PAVEMENT REPAIR: This work consists of removing existing asphalt concrete, portland concrete and
aggregate base and placing new asphalt concrete pavement and aggregate base to meet the requirements of ODOT Item 253. The replacement pavement Section for the repair shall be a minimum of six (6) inches of ODOT 301 Asphalt or otherwise in accordance with the details on the Drawings. For the pavement repair section, cut the existing pavement and remove to a point 6 inches below the surface of the road after planing. The 301 Asphalt should extend into the existing stone base. The subgrade shall be compacted per Section 02200 of the specifications and according to ODOT Item 204. Payment for excavation, compaction, disposal of the spoils, aggregate base, ODOT 408 Bituminous Prime coat and asphalt concrete installation shall be included in the unit price bid for Item 253 Pavement Repair.

D. Subgrade Compaction (For Full Depth Pavement Reconstruction and Pavement Repairs)

1. In lieu of the requirements of Item 204.06, proof rolling shall be performed on areas as directed by the Engineer as described below:
   a. A tandem axle dump truck shall be used for the proof rolling by loading it in such a manner that the rear axle’s weight is in excess of 32,000 pounds. The Contractor shall furnish, upon request, a weight slip showing the weight of the rear axles.
   b. The designated areas at subgrade prior to placing the overlying pavement layer shall be compacted to 100% of standard proctor. The truck shall then be driven over the subgrade where directed by the Engineer. The equipment shall operate at a constant speed between 2-1/2 and 5 miles per hour.
   c. Where the operation of the truck shows the subgrade to be unstable or to have non-uniform stability, the Contractor shall correct the unstable area in accordance with the provisions of ODOT Item 204.04 so that the stability of the subgrade is uniform and satisfactory. The reworked area shall then be retested. If the retesting shows these areas are unstable, and in the opinion of the Construction Engineer, additional compaction will not stabilize these areas, a field CBR test shall be performed. The results of the CBR test will be compared with the design CBR value and the need for a subbase will be evaluated. The thickness and the material used for the subbase shall be approved by the Engineer prior to placement of any material.
   d. The quantity for proof rolling shall be determined as described in ODOT Item 204.08. Payment for the accepted quantities shall be included in the contract price for Item 204, Subgrade Compaction.
   e. Note that proof rolling is required in addition to normal subgrade compaction operations and subgrade compaction testing.

E. Item 253-Pavement Repair

1. See Section C.

F. Item Special – Subgrade Improvement – Undercut and Backfill with Stone

1. Where unsuitable subgrade materials are encountered below the bottom of a drive, or road, the unsuitable material shall be made suitable or removed in the presence of the Engineer and replaced with a minimum undercut of 6”. Acceptable stone materials will be Number 1 and Number 2 size aggregate and Item 304- Aggregate Base. Compaction shall be equal to or exceeding 95% of the maximum modified Proctor dry unit weight (ASTM D-1557). In subgrade areas with unsuitable materials, the cost for undercutting, removing the unsuitable materials below the subgrade, and backfilling with stone shall be paid under bid the appropriate Contingency Bid item for this work.

G. Utility Trenches

1. Do not proceed with paving installation until utility trenches and subsequently placed fill which occurs in areas to be paved have been properly installed, compacted and tested.

H. Manhole, Catch Basin and Inlet Frame Adjustments

1. Set and adjust frames for manholes, catch basins and inlets and other such units within areas to be paved to final grade as part of this work in accordance with the details on the Drawings.
3.03 PROCEDURES AND CONTROLS

A. Grade Control
   1. Establish or verify and maintain required lines and grades, including crown and cross-slope, for each course during construction operations.

B. Traffic Control
   1. Maintain vehicular and pedestrian traffic during paving operations as required for other construction activities.

C. Barriers
   1. Furnish flagmen and provide barricades, warning signs, and warning lights for movement of traffic and safety to cause least interruption of Work.

D. Equipment
   1. Placing Equipment: Self-contained, power-driven unit capable of spreading, shaping, and finishing to the degree of smoothness required. Provide hand tools, such as shovels and rakes, as required to correct any irregularities in the pavement.

   2. Rolling Equipment: Power-driven rollers weighing not less than 8 tons, equipped with adjustable scrapers and sprinkling devices to keep roller wheels clean and wet.

   3. Hand Tampers: Provide flat plate type, pneumatic hand tampers for compacting areas next to structures or other areas inaccessible to power rollers.

3.04 BASE COURSE INSTALLATION (For Full Depth Reconstruction and Repair areas)

A. Base Course
   1. Spread base course material in maximum 8" loose lifts, using a spreader that will deposit graded material without segregating the mix.

   2. Moisture condition to within 2% of optimum moisture content, and compact by power rolling to not less than 95% of maximum modified proctor dry density (ASTM D1557). Make a sufficient number of passes to thoroughly consolidate and interlock material until it shows no weaving under roller.

   3. Provide compacted depth of dimensions indicated, conforming to required elevations and uniform profiles to receive asphaltic concrete paving.

   4. Allow no traffic on completed base course, and maintain surface free of foreign materials until installation of asphaltic concrete surface course.

3.05 ASPHALT COATING INSTALLATION

A. Prime Coat (ODOT ITEM 408) (For Full Depth Reconstruction and Repair Areas)
   1. Remove loose material from compacted base course immediately before applying prime coats. Use power brooms or blowers, supplemented by hand brooms or other acceptable means.

   2. Uniformly apply prime coat to surface of compacted aggregate base course, distributing at the rate specified in the plans or as altered by the Engineer. Apply sufficient material to penetrate and seal, but not to flood surface.

   3. Allow to cure and dry as long as necessary to attain penetration and to allow volatiles to evaporate; however, in no case less than 24 hours.

B. Tack Coat (ODOT ITEM 407) (For Resurfacing and Reconstruction and Repair Areas)
1. Remove loose material from existing or intermediate asphalt concrete course immediately before applying prime coats. Use power brooms or blowers, supplemented by hand brooms or other acceptable means.

2. Uniformly apply prime coat to surface of asphalt concrete course, distributing at the rate specified in the plans or as altered by the Engineer. Apply sufficient material to seal, but not to flood surface.

3. Only apply tack coat to areas that will be covered by a pavement course during same day.

3.06 ASPHALTIC CONCRETE MIXING AND INSTALLATION (For Reconstruction, Resurfacing, and Repair Areas)

A. Mixing And Delivery (ODOT ITEM 401 AND ITEM 402):

1. Accurately weight or measure dried aggregates and weigh or meter asphaltic cement to comply with job-mix formula requirements.

2. Transport mixtures from mixing plant to Project site in trucks having tight, clean compartments. If required, coat hauling compartment surfaces with a limewater mixture to prevent asphalt concrete mixture from sticking. Elevate and drain compartment of excess solution before loading mix.

3. Provide covers for asphaltic concrete mixture when delivering to protect mixture from weather and to prevent loss of heat.

B. Installation (ODOT ITEM 401):

1. Place paving mixture only on clean, dry, subgrade surfaces. Apply hot mix wearing surface in separate binder and surface courses, each of approximately one half total thickness required, with joints staggered. Temperature at time of placement shall be approximately 235°F. While mix is still hot, compact and finish off each course with power rollers as specified below.

2. Produce dense, watertight finish surfaces, free from roller marks or other marks and irregularities, conforming to levels and profiles indicated, with smooth transitions between elevations given. Bring surfaces flush with other materials and hold to a uniform dimension below curb tops.

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

4. Spread, tamp, and finish mixture using hand tools in areas where use of machine spreading is not practical. Place mixture at rate that will ensure proper handling and compaction before mixture becomes cooler than acceptable working temperature.

5. Carefully make joints between old and new pavements, or between successive days' work, to ensure continuous bond between adjoining work. Clean contact surfaces and apply tack coat. Construct joints of same texture, density, and smoothness as other sections of asphaltic concrete course.

C. Rolling (ODOT ITEM 401)

1. General: Begin rolling when mixture will bear roller weight without excessive displacement.

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

3. 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.

4. Second Rolling: Follow breakdown rolling as soon as possible, while mixture is hot. Continue second rolling until mixture has been evenly compacted.
5. 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 95 percent laboratory density.

D. Tolerances (ODOT ITEM 401)

1. Thickness: In-place compacted thickness will not be acceptable if variations from thicknesses noted or specified exceed ± ¼”.

2. Surface Smoothness: Test finished surface of each asphalt paving course for smoothness, using a 10 foot straightedge applied parallel with and at right angles to centerline of paved area. Surfaces will not be acceptable if variations exceed ¼” in 10 feet.

E. Patching

1. Remove and replace mixtures that become mixed with foreign materials, defective areas, and existing pavements at transitions with new paving.

2. Remove deficient areas for full depth of course. Saw-cut shall be perpendicular and parallel to direction of traffic while maintaining vertical edges.

3. Apply tack coat before placing asphalt concrete mixture. Fill with fresh hot-mixed asphalt and compact by rolling to required surface density and smoothness.

3.07 Existing Driveway Pavement Replacement

A. Existing driveway pavement replacement or feathering cost shall be included in the unit price bid for the pertinent item. Existing driveways shall be replaced or feathered with the minimum pavement section shown on the Drawings. The work area shall have a minimum distance of four feet from edge of pavement.

3.08 FIELD QUALITY CONTROL (ODOT ITEM 403)

A. Sampling And Testing

1. During paving operations the testing and inspection agency will perform sampling and testing of asphalt paving mixtures if requested by the Engineer. Record locations where samples are taken to correlate with subsequent testing.

2. Test compacted mix and report bulk density in accordance with AASHTO T166 and Marshall stability and flow in accordance with ASTM D1559.

B. Test Intervals

1. Test in-place asphaltic concrete at randomly selected locations at the rate of one test for each 500 square yards per lift, but not less than one test per day, unless otherwise directed.

C. Minimum Quality Requirements

1. Minimum acceptable density of in-place course material is 95% of recorded laboratory specimen density; minimum R_t of 90 or Marshall stability of 1650.

D. Non-Complying Work

1. Repair or replace defective or non-complying work at no additional cost to the Owner.

3.09 CLEANING AND PROTECTION

A. Protection

1. Protect newly placed material from traffic by barricades or other suitable method until mixture has
cooled and attained maximum degree of hardness. After final rolling, do not permit vehicular traffic on asphalt concrete pavement until it has cooled and hardened, and in no case sooner than six (6) hours.

B. Completed Work

1. Pavement surfaces shall be clean, free of loose gravel or aggregate, sound, and unmarred at time of acceptance of the Work.

PART FOUR - SPECIAL PROVISIONS

4.01 MAINTAINING TRAFFIC

A. Maintenance of Traffic shall be in accordance with the Notes and Details on the Drawings.

END OF SECTION
PART ONE - GENERAL

1.01 SCOPE OF WORK

A. Work included

1. Provide all exterior concrete flatwork, including walks, curb ramps and curbs and gutters as shown on the Drawings or specified herein, or as required to complete the Work.

B. Related Work

1. Excavation, filling, and preparation of subgrades are specified in Section 02200.

C. Related Documents

1. Drawings, General and Supplementary Conditions, and applicable provisions of the Contract Documents that apply to this Section.

2. Additional information concerning concrete flatwork and paving may be found on the Civil Drawings. In case of conflict between the Drawings and the information specified herein, the more stringent requirements shall govern.

1.02 REFERENCES

A. Reference Standards

1. Comply with the requirements of the reference standards noted herein, except where more stringent requirements are listed herein or otherwise required by the Contract Documents.

1.03 SUBMITTALS

A. Product Data

1. Submit manufacturer’s product data for proprietary materials and items, including reinforcement and forming accessories, admixtures, joint systems, curing compounds, dry-shake finish materials, and others if requested by Engineer.

B. Concrete Mix Design

1. Provide current mix designs for each type and quality of concrete specified herein or used in the Work.

2. Prepare concrete mix designs in accordance with ACI 211.1 and 211.2, using the aggregates and Portland cement brands proposed for use in the Work. Submit proposed mix designs not less than six (6) weeks prior to first concrete placement.

3. Submit separate mix designs for each class or category of concrete, including each combination of compressive strength and type and/or quantity of mix materials including admixtures, each change in slump limits, and each change in entrained air content.

4. Do not commence any concrete work until all mix designs are approved.

1.04 QUALITY ASSURANCE

A. Regulatory Requirements

1. Comply with ODOT or Owner’s public works standards for sidewalks, curb ramps and curbs and gutters including standard dimensions, profiles, thicknesses, reinforcing, and compressive strength. In the event of conflict between the Contract Documents and the Owner’s standards, the more stringent requirements will apply.
2. Comply with applicable requirements of ADA Handbook, ANSI A117.1, and local and State codes and ordinances regarding walks, steps, ramps, and curb ramps.

B. Field-Constructed Mock-Up

1. Cast mock-ups of each type, pattern, color, and finish of paving or other concrete flatwork. Unless otherwise indicated on the Drawings, mock-ups shall be at least equal in size to one typical panel of paving and flatwork, or as required to demonstrate typical joints, surface finish, texture, color, and standard of workmanship.

2. If the Engineer determines that one or more mock-ups do not meet requirements, demolish and remove the mock-up(s) from the site and cast another until the mock-up is accepted.

3. Keep accepted mock-up undisturbed during construction as a standard for judging completed paving.

4. Undamaged mock-up(s) may be incorporated into the Work unless otherwise directed by the Engineer.

C. Quality Control

1. All quality control testing and inspections required herein will be performed by an independent testing and inspections agency employed under the provisions of this Section.

2. Cooperate with the testing and inspection agency. Give minimum 24 hours notice for work requiring testing or inspection services. Submit samples for testing in a timely manner so as not to delay work.

3. Provide adequate facilities for testing, including suitable protected storage for freshly poured concrete test cylinders.

4. Contractor shall be responsible for cost of one set of testing of the concrete on each batch. Cost to be included in the unit price per pertinent item.

D. Record of Work

1. Keep a record listing the time and date of placement of all concrete for the structure. Such record shall be kept until the completion of the project and shall be available to the Engineer for examination at any time.

E. Batch Tickets

1. Collect and retain all concrete batch tickets. Batch tickets shall contain information specified in ASTM C94, Paragraph entitled "Batch Ticket Information".

1.05 PROJECT/SITE CONDITIONS

A. Field Measurements

1. Verify dimensions and existing conditions shown on the Drawings by taking field measurements. Report discrepancies to the Engineer for clarification, and make minor adjustments in layout as required by field conditions and as approved by the Engineer, at no additional cost to the Owner.

B. Traffic Control

1. Maintain access for vehicular and pedestrian traffic Per ODOT requirements as required for construction activities.

C. Cold Weather Concreting

1. Comply with the performance requirements of ACI 306R, excluding Chapter 6 thereof and excluding the use of accelerating additives.

2. Heat formwork, reinforcing, and accessories to not less than 40° F prior to placing concrete. Temperature of concrete at time of mixing and placement shall conform to ACI 306R, Table 1.4.1, but in no instance shall be less than 50° F.
3. Provide heated enclosures during the placement and finishing of concrete work; maintain enclosures until concrete has fully cured and attained the specified compressive strength.

4. Submit proposed system of heating to the Engineer for review prior to commencing cold weather placement.

5. When the ambient air temperature is thirty-five degrees Fahrenheit or below, the temperature of the concrete immediately after placement shall be between fifty (50) degrees Fahrenheit and eighty (80) degrees Fahrenheit.

6. The subgrade or subbase on which the concrete is to be placed shall be entirely free of frost when concrete is deposited.

D. Hot Weather Concreting

1. Comply with the performance requirements of ACI 305R, except as modified herein.

2. Moisten forms and reinforcing before placing concrete; keep exposed surfaces continually moist.

3. Reduce temperature of water used in mixing concrete by chilling or adding crushed ice. Temperature of concrete at time of placement should not exceed 90°F.

4. Take precautions during concrete placement to prevent rapid drying or flash setting of concrete. Provide a continuous fog spray of water immediately after screeding, and provide sun shading and wind screens as required to protect non-formed surfaces.

5. Use of admixtures to retard concrete setting time or reduce water requirements during hot weather placement will be subject to design mix requirements and Engineer’s review.

E. Rain

1. Do not place concrete during rain unless freshly placed concrete can be adequately protected until it has sufficiently hardened so that it will not be damaged. In the event that rain begins to fall during concrete placement, take necessary measures to assure that the strength of the structure will not be impaired and that surface finishes will be protected.

1.06 SEQUENCING AND SCHEDULING

A. Conditions For Placement

1. Do not commence mixing and placement of concrete until all the following conditions have been met.

   a. Concrete mix designs have been approved by the Engineer.

   b. Formwork and reinforcing for area to be concreted have been inspected and approved by the testing and inspections agency.

PART TWO – PRODUCTS

2.01 MATERIALS

A. Form Materials

1. Plywood, metal, metal-framed plywood, or other acceptable materials to provide full-depth, continuous, straight, smooth exposes surfaces. Use flexible or curved forms for curves of 100 ft. or less radius.

B. Form Release Agent

1. Provide commercial formulation form-release agent with a maximum of 350 g/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.
C. Expansion Joint Filler And Form Material:

1. Sealed Joints: Preformed, compressible fiber or cork filler material complying with ASTM D1751 or D1752, Type II, guaranteed compatible with expansion joint sealant materials, ½" thick unless otherwise indicated. Provide high-impact polystyrene removable "void cap" to create ½" deep reveal for installation of sealant.

2. Self-Sealing Joints: Preformed, compressible asphalt fiber joint filler complying with ASTM D994, ½" thick unless otherwise indicated. Do not use asphalt fiber filler in joints to receive elastomeric joint sealants.

D. Concrete Materials

1. Portland Cement: Provide a standard brand of Portland cement complying with ASTM C150, Type (I) (II). Use one brand of cement through the work.

2. Fly Ash: Comply with ASTM C618, Type C. Use of fly ash is subject to limitations, as specified in ODOT Items 608 and 609.

3. Fine Aggregate
   a. Washed, natural sand having strong, hard, durable particles, conforming to the physical and grading requirements of ASTM C33, and containing no more than 2% by weight of deleterious matter such as clay lumps, mica, shale, or schist.

4. Coarse Aggregate
   a. Clean, hard, fine-grained, sound crushed rock or washed gravel, or a combination of both, conforming to the physical and grading requirements of ASTM C33. Limits of deleterious substances such as clay lumps, friable particles, chert, flat, elongated, or laminated pieces shall not exceed the allowable for severe weather regions, as defined in ASTM C33. Maximum size of coarse aggregate shall not exceed 1-1/2", except where smaller size is specified in mix designs for pumped concrete.

E. Water

1. Clean and potable, free from deleterious amounts of oil, acid, alkali, salt, and organic materials.

F. Admixtures

1. Unless specified herein, no admixtures may be used without specific approval of the Engineer.

2. Air Entraining Admixture shall conform to ASTM C260. Add air entraining agent when required as indicated in ACI 301, Paragraph 3.4.1 and as required herein.

3. Water Reducing Admixture shall conform to ASTM C494, Type A.

4. High Range Water Reducing Admixture (Super-plasticizer) shall conform to ASTM C494, Type F or G.

5. Non-Corrosive, Non-Chloride Accelerators shall conform to ASTM C494, Type C or E. Furnish admixture manufacturer's long term test data proving non-corrosive effect on reinforcing steel using an acceptable accelerated corrosion test method.

6. Calcium chloride or admixtures containing more than 0.50 percent chloride ions or thiocyanates are not permitted.

7. Written certification of compliance with the above requirements, including the chloride ion content of admixtures, will be required from the admixture manufacturer prior to mix design review by the Engineer.
2.02 MIXES

A. Concrete Mix Designs

1. Comply with the requirement of ODOT Item 499, Class “C”.

B. Concrete Mixing

1. Proportion and mix concrete in accordance with ACI 304 and ASTM C94. Comply with referenced standards regarding number of drum revolutions, mixing speed, agitation speed, and addition of water after initial batching. Maximum time from initial batching to placement shall not exceed 1-1/2 hours.

PART THREE - EXECUTION

3.01 EXAMINATION

A. Verification of Conditions

1. Examine areas and conditions under which the work of this Section will be performed. Do not proceed with the work until unsatisfactory conditions have been corrected. Commencement of work implies acceptance of all areas and conditions.

3.02 PREPARATION

A. Sod Removal, Topsoil, and Seeding

1. Prior to placing any concrete or fill, all sod, roots, grass, brush or vegetation within the work limits shall be removed. The cost for the removal of sod, roots, etc. shall be included in the lump sum price bid for the restoration of right-of-way.

B. Sidewalk Removal and Replacement

1. The extent of removal of existing sidewalk, curb ramps, driveway aprons, curbs and gutters or pavement shall be determined by the Engineer. In all removals, the edge shall be cut carefully on a neat line by use of a power saw to full depth. The cost for said saw cutting, removal of existing concrete, stone, asphalt or other type of pavement shall be included in the lump sum price bid for the restoration of right-of-way.

2. Any slabs of sidewalk, curb and gutter or driveway not originally designated for removal that are damaged in the process of removing adjacent slabs shall be removed and replaced at the Contractor’s expense.

3. No patching of slabs will be allowed. The limits of removal will be determined by the Engineer and may include removal of the entire slab. All slabs smaller than two feet (2’) in length shall be removed and replaced.

4. If it is determined by the Engineer that a street has been damaged by heavy equipment used in conjunction with work in this contract, the Contractor shall be required to replace the damaged pavement at his expense.

5. The pavement damaged or removed during construction shall be replaced at the Contractor’s expense, in conformance with the current edition of the Ohio Department of Transportation’s Construction and Material Specifications, County, and the Owner’s current specifications. If any of the asphalt is damaged or removed, the asphalt shall be removed at the direction of the Engineer and replaced to its existing cross-section or never less than 1 1/2” – 448 Asphalt Concrete Surface Course, 2 1/2” – 448 Asphalt Concrete Intermediate Course and 10” – 304 Aggregate Base. The cost for replacing the asphalt pavement shall be included in the lump sum price bid for the restoration of right-of-way.

6. The curb and gutter damaged or removed during construction shall be replaced at the Contractor’s expense in conformance with the current edition of the Ohio Department of Transportation Construction and Materials Specifications, County, and Owner’s Current Specifications. If any of the curb and gutter is damaged or removed at the direction of the Engineer, it shall be replaced to its
existing cross-section. The cost for replacing the curb and gutter shall be included in the price bid for the Curb Ramp.

7. At locations where any reconstructed sidewalks, curb ramps, adjoin street or alley pavement, all gutter joints shall be sealed with asphalt cement (ODOT Item 705.04) following completion of work with a reasonable amount of time. In no case should this time exceed the completion time of the contract. The costs for this work shall be included in the lump sum price bid for the restoration of right-of-way item.

C. Subgrade Preparation

1. Unstable subgrade material shall be removed to the depth specified by the Engineer. All resulting depressions shall be filled with granular material. For adjustments in elevation, any portion of the subgrade that is excavated below the bottom of the sidewalk, curb ramp or driveway shall also be filled with granular material.

2. No additional compensation over and above the unit price bid for the appropriate sidewalk or curb ramp item shall be granted for excavation or embankment necessary for the aforementioned conditions.

3. All granular material shall meet the requirements of ODOT item 304. The granular material shall be placed and compacted in layers not to exceed four inches (4") in compacted thickness. Each layer shall be rolled with a five (5) ton roller or compacted by means of mechanical tampers in accordance with ODOT item 203.13. Moisture condition and compact re-worked subgrade to density required in Section 02200.

4. Tree roots exposed by excavation shall be removed to a minimum depth required below the bottom of the new sidewalk to allow for proper sidewalk grade. The cost for root removal shall be included in the unit price bid for the appropriate sidewalk item. However, the severing to tree roots greater than 2" in diameter is prohibited. At some locations it may be necessary to ramp the sidewalk or curb ramp over the existing roots. Cost for this work, along with any additional embankment required shall be included in the lump sum price bid for the restoration of right-of-way item.

D. Utility Trenches

1. Do not proceed with concrete flatwork and paving installation until all utility trenches within or crossing areas to be paved, and any subsequent filling in the areas, have been properly compacted and tested.

E. Preparation For Concrete Placement

1. 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.

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

3. 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.

4. Remove loose material from compacted subgrade surface immediately before placing concrete.

F. Weather Conditions

1. Keep informed of forecast weather conditions for anticipated time of concrete placement. Do not schedule or commence concrete placement when inclement weather is likely to occur.

3.03 INSTALLATION

A. Edge Forms and Screed Construction

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

3. Check completed formwork and screeds for grade and alignment to following tolerances:
   a. Top of Forms: Not more than 1/8" in 10 ft.
   b. Vertical Face on Longitudinal Axis: Not more than 3/8" in 10 ft.

4. Forms for concrete sidewalks, curb ramps and curbs and gutters shall be lumber not less than one and one-half inches (1 1/2") thick or steel of equal rigidity. Flexible strips may be used on curves. The forms shall be securely held to line and grade and shall at no time deviate more than 1/4 inch from an accurate template then feet (10") in length. Forms shall be cleaned and oiled after each use. The depth of the forms shall be equal to the specified slab thickness. Forms shall be removed after the concrete has initially set but in no case shall they be removed later than three (3) days after the concrete is placed. All honeycomb must be corrected immediately following removal of forms.

B. Joints

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

2. 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:
   a. Toolied Joints: Form contraction joints in fresh concrete by grooving and finishing each edge of joint with a radiused jointed tool.
   b. Sawed Joints: Form contraction joints with power saws equipped with shatterproof abrasive or diamond-rimmed blades. Cut 1/8" wide joints into hardened concrete when cutting action will not tear, abrade, or otherwise damage surface and before development of random contraction cracks.
   c. Inserts: Form contraction joints by inserting premolded plastic, hardboard, or fiberboard strips into fresh concrete until top surface of strip is flush with paving surface. Radius each joint edge with a jointer tool. Carefully remove strips or caps of two-piece assemblies after concrete has hardened. Clean groove of loose debris.

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

4. Expansion Joints
   a. Form expansion joints using preformed joint filler strips abutting concrete curbs, catch basins, manholes, inlets, structures, walks, other fixed objects, and where indicated.
b. Locate expansion joints as specified below unless otherwise indicated on the Drawings.

c. Extend joint fillers full width and depth of joint, not less than ½" or more than 2" below finished surface where joint sealant is indicated. Place top of joint filler flush with finished concrete surface when no joint sealant is required.

d. Furnish joint fillers in one-piece lengths for full width being placed wherever possible. Where more than one length is required, face or clip joint filler sections together.

e. Protect top edge of joint filler during concrete placement with a metal, plastic, or other temporary preformed cap or 'void strip’. Remove protective cap after concrete has been placed on both sides of joint.

f. Elastomeric joint sealants are specified in ODOT Item 705.11.

5. Isolation Joints

a. Isolation joints shall extend the full depth of the slab, and shall be made with pre-molded joint filler. They shall be used along the edges of the sidewalk across driveways, along curbs, along buildings, and wherever else the sidewalk passes by a rigid surface or structure. Isolation joints shall be used for construction joints wherever work is stopped and restarted, or where new sidewalks abut existing sidewalks. Transverse joints shall be used for expansion joints at twenty (20) foot intervals, unless otherwise directed.

3.04 CONCRETE PLACEMENT:

A. General

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

2. 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.

3. When concrete placing is interrupted for more than ½ hour, place a construction joint.

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

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

6. 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.

7. Screed paved surfaces with a straightedge and strike off. Use bull floats or derbies 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.

8. Concrete shall be leveled to provide a cross-slope as shown on the sidewalk detail.

9. Bonding New concrete to Old:

a. Before concrete is deposited upon or against concrete that has taken its initial set or has hardened, thoroughly clean surface of existing concrete to remove all laitance and loose material.

b. Remove encrustations from formwork and reinforcing, and clean formwork with high-pressure water spray.

c. Moisten bonding surface of existing concrete just prior to depositing new concrete, and remove all standing water.
d. Chemical bonding agents are not permitted without the prior written approval of the Engineer.

B. Walks and Curb Ramps

1. Minimum 4" thick (minimum 6" thick at areas subject to vehicular traffic), with expansion joints at intervals of approximately 20 ft. and tooled contraction joints at intervals equal to width of walks and curb ramps or maximum 5 ft. o.c. Tool edges to rounded profile and finish as noted herein or shown on the Drawings. Pitch walks ¼" per ft. for drainage towards the street on curb streets and on non-curb streets, the sidewalk shall slope ¼" per ft. away from the street. Prior to placing any concrete, the Contractor shall contact the Engineer to have the area inspected and approved for grades.

C. Requirements for Thickness of Sidewalk

1. Concrete sidewalks shall be at least four inches (4") thick. Driveway or alley sidewalks which are directly adjacent to driveways or alleys shall be at least six inches (6") thick. Curb ramp thickness shall be per the Ohio Department of Transportation Standard Detail BP - 7.1.

2. Cores to determine the thickness of sidewalks and curb ramps constructed under this contract may be taken at random locations as determined by the Engineer at no cost to the Contractor.

3. In the event that a sidewalk or curb ramp constructed under this contract is found to be of insufficient thickness, the Contractor shall be compensated at an adjusted unit price as indicated below:

<table>
<thead>
<tr>
<th>AMOUNT OF DEFICIENCY IN SLAB THICKNESS, d</th>
<th>PERCENTAGE OF UNIT PRICE BID FOR COMPENSATION</th>
</tr>
</thead>
<tbody>
<tr>
<td>d&lt; 1/8&quot; (0.125 inches)</td>
<td>100% (Actual Thickness)</td>
</tr>
<tr>
<td>1/8&quot; &lt; d ≤ 3/8&quot; (0.375 inches)</td>
<td>(Specified Thickness)</td>
</tr>
<tr>
<td>3/8&quot; &lt; d</td>
<td>0%</td>
</tr>
</tbody>
</table>

The above adjustments shall be applied to the entire square footage of slabs of equal specified thickness constructed continguously between expansion joints (generally spaced at 20 foot intervals).

4. In the event that slab thickness deficiencies are found, the Contractor may, at his own expense, have additional cores taken in any location or number, by persons acceptable to the Engineer, to limit the price adjustments as indicated above.

5. When the deficiency in thickness is more than three-eights (3/8) of an inch (0.375 inches), and the Contractor takes additional cores, the square footage for which no compensation will be granted shall be determined by the length of slab from the deficient core taken by the Owner to the first core taken by the Contractor which is not more than three-eights (3/8) of an inch (0.375 inches) deficient in thickness.

6. When the deficiency in thickness is more than one-eighth (1/8) of an inch (0.125 inches), and not more than three-eights (3/8) of an inch (0.375 inches), and the Contractor takes additional cores, the "Actual Thickness" to be used in the equation indicated above for determining the price adjustment shall be the average of the thicknesses of the cores taken by the Owner and those taken by the Contractor.

D. Concrete Strength Requirements

1. Test cylinders may be taken, at random, to determine whether specified concrete design strengths are being met. In the event that the 28-day concrete strength is found to be insufficient, the Contractor shall be compensated at an adjusted unit price, to be determined by the percentage of specified strength reached, e.g., specified strength 4000 psi; cylinder test reveals 3000 psi strength; adjusted unit price shall be 75% of the bid price. The adjusted bid price shall be applied to the load of concrete, or to an amount determined by the Engineer.
3.05 FINISHING

A. Finishes

1. Unless otherwise indicated or noted on the Drawings, provide the following finishes on concrete flatwork and paving.

   a. Walks and Curb Ramps: Medium broom, non-slip finish, with uniform striations perpendicular to long dimension of walk or ramp. After floating and edging, the concrete shall be brushed with an approved fiber hair brush in a transverse direction, except at driveways and alley crossings where it shall be brushed longitudinally.

   b. Edging: Edging shall be required along all isolation joints, contraction joints, and along forms. Edging shall be ¾" radius.

3.06 CURING AND PROTECTION:

A. Curing

1. Exposed Surfaces: Immediately after finishing slabs or other non-formed concrete surfaces, apply one of the following curing materials or methods to prevent premature drying.

   a. Sprinkle or spray horizontal surfaces with fine mist of clean water and immediately cover with polyethylene or other approved impervious sheeting to prevent evaporation. Leave coverings in place a minimum of seven (7) days.

   b. Applying a liquid membrane-forming chemical curing compound guaranteed compatible with succeeding finishes.

2. Formed Surfaces

   a. Where forms are exposed to sun or wind, minimize moisture loss by keeping forms continuously wet until they can be safely removed. If forms are removed prior to seven days after placement of concrete, continue curing by application of liquid membrane-forming curing compound.

B. Protection

1. Provide barricades or other suitable barriers to prevent pedestrian or vehicular traffic until concrete has sufficiently hardened.

2. Remove and replace flatwork and other concrete work defaced by vandals, at no additional cost to the Owner.

3. Completed concrete sidewalks and curb ramps shall not be open to pedestrian traffic until at least 24 hours have elapsed from the time the concrete work is finished. Driveway, alley sidewalks and curb ramps shall be protected from heavy loads until at least seven (7) days have elapsed.

   When, due to the lack of proper barricades, pedestrian or bicycle traffic damages the completed sidewalks and curb ramps before the concrete has sufficiently hardened, the Contractor shall be held responsible for correcting said damage in a manner acceptable to the Engineer. If corrections are not made before the concrete has initially set, the damaged areas shall be removed and replaced at the direction of the Engineer.

3.07 Composite Paver Tiles (Detectable Warning)

A. Truncated domes shall consist of cast-in-place composite paver tiles as manufacture by ADA Solutions, Inc., Armor – Tile, or approved equal, with brick red color and installed by pressing tiles into place in the freshly poured concrete.

3.08 Item Special – Concrete Grinding or Saw Cutting (NOT APPLICABLE)

3.09 Ramp Landings (NOT APPLICABLE)

3.10 Manhole/Catch Basin/Pull Box Adjusted and/or Reconstructed To Grade
A. All structure included in this item shall be constructed in accordance with the methods outlined in the Owner's and ODOT's current construction standards. When it is necessary for the structure to be raised or lowered to conform to the final grade of the sidewalk surface, the frame casting shall be set in a mortar bed to the proper elevation, and expansion joint material shall be placed around it. A concrete collar is not required for adjustments made in the sidewalk. All repair work shall include plastering the inside and outside walls with a minimum 3/4" thickness of plaster, within limits of work.

B. Extreme care shall be exercised to prevent earth or debris from entering into the pipe or structure. All such earth or debris resulting from construction operations shall be removed from the pipe, manhole and/or catch basin and/or pullbox before final acceptance by the Owner.

C. The Contractor shall determine the number of structures to be adjusted for this project. No structures are shown on the drawing.

D. When a catch basin and/or manhole and/or pullbox is adjusted to grade, the work shall include the replacement, repair and/or remortaring of up to twelve (12) inches (as measured from the bottom surface of the casting of existing brick or block) as determined by the Engineer. It shall be the responsibility of the Contractor to visit the site to determine the amount of structures to be adjusted or reconstructed to grade.

E. Cost of all work including the removal, adjusting, cleaning and resetting of existing castings shall be included in the price for the restoration of right-of-way item.

3.11 Miscellaneous

A. Limits of all removals and replacements shall be only as directed by the Engineer.

B. Any saw cutting of existing sidewalk and curb ramp required to facilitate placement of proposed pedestrian sidewalk shall be included in the lump sum price bid for the restoration of right-of-way item.

C. Where it is necessary to remove or construct a particular contract proposal item (e.g. sidewalk) and excavation and/or embankment are needed for regarding purposes, the cost of any equipment, materials or labor required to complete said grading work shall be included in the lump sum price bid for the restoration of right-of-way item. Specifically, excavation will be required where new walk or curbs are to be constructed in areas that currently do not have said items. All grading shall be performed under the direction of the Engineer.

D. The Contractor shall be responsible for determining the need of and obtaining any and all temporary easements and/or private property owner permissions along the project route, and outside of public right-of-ways, that are needed to complete the project in an acceptable and proper fashion. The Contractor shall be directly liable to the respective property owner affected by his workmanship to satisfy said property owner of any claims regarding damage by the Contractor to the subject private property. The Owner shall not be responsible for the Contractor's workmanship on private property.

E. Price bid for the pertinent items shall include all work and materials not included in the quantities necessary to complete the project in a workmanship manner including, but not limited to, backfill material, pavement replacement, traffic control, cleanup, etc.

F. Work included in the substantial completion date consists of sidewalks, grading and cleanup completed to the satisfaction of the Owner.

G. Work included in the final completion date consists of seeding and mulching and punch list items completed to the satisfaction of the Owner.

3.12 SITE CLEANUP

A. Cleaning The Site

1. The Contractor shall, no later than two (2) days following removal of sidewalk remove all surplus material, dirt and rubbish from the site.
2. The Contractor shall complete all restoration including regarding, topsoil and seeding no later than ten (10) days after the concrete is placed.

3. Upon completion of work, the Contractor shall remove all tools, equipment and any other belongs, leaving the entire site free of debris, clean and in good condition.

4. No additional compensation will be granted to the Contractor for performance of the work described in this section, but the cost thereof will be included in the lump sum price bid for the restoration of right-of-way item. The Contractor will not be compensated for work done at any location at which the provisions of this section have not been met to the satisfaction of the Engineer.

B. Backfilling

1. Following removal of the forms and correction of all honeycomb, the edges of the sidewalk shall be coated with curing material at the approved application rate. When the curing materials has completely dried, earth fill shall be deposited against the edge of the sidewalk.

C. Ground Restoration

1. Following completion of back filling and grading operations at a particular location, the disturbed ground shall be covered with a minimum of two inches (2") of topsoil that conforms to ODOT Item 653.02 followed by Seeding and Mulching. All work associated with furnishing and placing topsoil shall conform to ODOT Item 653.

2. Seeding and Mulching, and Commercial Fertilizer ODOT Item 659: This item shall consist of hydro-seeding the disturbed areas. The Contractor shall use a hydro seed mixture with a wood fiber mulch such as Conved 2000, or approved equal. The Contractor shall not be permitted to use hay or straw in any form as mulch. Fertilizer can be applied in granular form prior to hydroid-seed or may be mixed with the hydro-seed mixture.

3. Wherever seeding and mulching is applied on this project, it shall be as described above. The work described above shall be included in the cost for Restoration of Right-of-way.

4. The Contractor shall be responsible for watering the seeding and mulching area if arid conditions last more than one week. The Contractor shall be responsible for watering the seeding and mulching areas until the Owner releases the Contractor from maintenance of the seeding and mulching areas.

5. The cost for the placement of topsoil in the disturbed area and watering shall be included in the lump sum price bid for the restoration of right-of-way item.

D. Surplus Excavation & Debris

1. Prior to commencing work, the Contractor shall provide a map or detailed description of all proposed haul routes and dump sites which will be utilized throughout the duration of this contract. The proposed routes and dump sites will require the review and approval of the Owner.

2. The following construction items shall be completed within the time limits specified. At the discretion of the Engineer, liquidated damages for delay as indicated in the contract documents will be levied for work not completed in the time stipulated. This sum is agreed on as proper measures of liquidated damages that the Owner will sustain per diem by failure of Contractor to complete the work in the time stipulated and this sum is not to be construed in any sense as a penalty.

   a. No later than two (2) days following removal of sidewalk, the Contractor shall remove all surplus material, dirt, and rubbish from the site.

   b. Concrete shall be placed within 48 hours of removal of the existing walk.

   c. In no case shall forms be removed later than three (3) days after concrete is placed.

   d. All restoration, including regarding, topsoil, and seeding shall be completed no later than ten (10) days after concrete is placed.

END OF SECTION