DIVISION II - SITE WORK

SECTION 02010 - SOILS INVESTIGATION

The recommendations of The Report of Geotechnical Investigation for the City of Stanton, KY, for the Stanton City Hall Building by CSI dated September 29, 2014, is incorporated into the requirements of the contract documents and shall be followed in its entirety.

END OF SECTION

SECTION 02020 - TERMITE TREATMENT

Provide soil pretreatment for subterranean termites in accordance with local and Kentucky State Law.

End of Section

SECTION 02100 - EROSION CONTROL

PART 1. GENERAL

1.1 Work Included

Submit KPDES Notice of Intent (NOI) and all follow-up information. Take responsibility for locating, furnishing, installing, and maintaining temporary sediment and erosion control best management practices for earth disturbing activity areas and developing a Best Management Practices (BMP) Plan using good engineering practices as required by the Kentucky Pollutant Discharge Eliminating System (KPDES) Permit. Make and record inspections of BMPs and areas as required by the KPDES Permit. In the event of conflict between these requirements and pollution control laws, rules, or regulations of other Federal, State or Local agencies, adhere to the more restrictive laws, rules, or regulations.

1.2 Related Work

A. Section 02110 - Site Clearing
B. Section 02200 - Earth and Rock Work
C. Section 02936 - Seeding

PART 2. PRODUCTS

Not used

PART 3. EXECUTION

As the permittee, submit the KPDES Notice of Intent (NOI) form to the Division of Water. Additionally, delegate in writing to Manager, KPDES Branch, who will have signature authority for reports. Provide the Engineer a copy of the NOI and a BMP Plan to represent and warrant compliance with the Kentucky Division of Water (KDOW) KPDES Permit, related rules, and specifications prior to starting work.

Locate, furnish, install, and maintain temporary sediment and erosion control best management practices (BMP) to represent and warrant compliance with the Clean Water Act, (33 USC Section 1251 et seq.), the 404 permit, the 401 Water Quality Certification, local government agency requirements, and other related rules and permits until the project has a formal release issued.

Provide the Engineer a copy of all weekly and rainfall event inspections as they are completed. Ensure all reports are signed by the delegated authority. keep a current BMP Plan and all inspection records available for public inspection as required by the KPDES Permit.

These provisions survive the completion and/or termination of the contract. The following provisions must be followed:

1. Take full responsibility and make all corrections when a governmental agency or a local governmental authority finds a violation of the above noted requirements; that the BMPs are incomplete; that the BMP Plan is incomplete; or that the implementation of the BMP Plan is not being performed correctly or completely.

2. Make payment to the Owner for the full amount, within 10 Calendar Days of notification, when a governmental agency or a local governmental authority furnishes an assessment, damage judgment or finding, fine, penalty, or expense for a violation of the above noted requirements; the BMPs being incomplete; or the BMP Plan being incomplete or its implementation not being performed correctly or completely. The Owner may withhold the amount of money requested for the above from the next pay estimate and deliver that sum to the governmental agency or local governmental authority issuing the assessment, damage judgment or finding, fine, penalty or expense.

3. Indemnify and hold harmless the Department, and reimburse the Department for any assessments, damage judgment or finding, fine, penalty, or expense as a result of the failure of performing this portion of the Contract. The Owner may withhold the amount of any assessments, damage judgments or finding, fine, penalty or expense from the next pay estimate.

4. The Owner will find the Contract in default if a governmental agency or a local governmental authority furnishes a stop work order for any of the following: a violation of the above noted requirements, that the BMPs are incomplete, that the BMP Plan is incomplete, that the implementation of the BMP Plan is not being performed correctly or completely.

5. When the Owner or any government regulatory agency finds a violation of the above noted requirements, or that the BMPs are incomplete, or that the "BMP Plan is incomplete or that the implementation of the BMP Plan is not being performed correctly or completely, correct and mitigate the conditions within 48 hours of notification by the Owner or regulatory agency. Failure to correct non-compliant site conditions will result in the Owner applying a penalty of $500 per day until corrective actions are completed.

Upon completion of the project, provide the Engineer with a copy of the submitted KPDES Notice of Termination (NOT) form. Retain all records for 3 years or provide them to the Engineer for retention.

End of Section

SECTION 02110 - SITE CLEARING

PART 1. GENERAL

1.1 Work Included

A. Furnish all labor and equipment required and perform all clearing, grubbing and stripping of topsoil complete as shown on the Drawings and as specified herein.

B. Protect existing improvements and vegetation indicated to remain.

1.2 Related Work

A. Section 02200 - Earth and Rock Work.

PART 2. PRODUCTS

Not used.

PART 3. EXECUTION

3.1 Protection

A. Protect existing improvements, bench marks, monuments and other reference points.

B. Protect existing trees and other vegetation indicated to remain in place, against unnecessary cutting, breaking or skinning of roots, skinning of bark, piling construction materials or excavated materials within drip line, excess traffic or parking of vehicles within drip line. Provide temporary guards to protect trees and vegetation to remain.

3.2 Site Clearing

A. Remove trees, shrubs, grass and other vegetation, improvements, or obstructions, interfering with installation of new construction. All stumps, roots, and root clusters shall be grubbed out to a depth of at least two feet below subgrade elevation.

B. Strip topsoil to whatever depths encountered in a manner to prevent mixing with subsoil or other material.

3.3 Removal

A. Remove waste materials and unsuitable topsoil from to location designated by the Engineer.

End of Section

SECTION 02200 - EARTH AND ROCK WORK

PART 1. GENERAL

1.1 Work Included

A. This section includes all labor, materials, equipment, and related items to complete all earth and rock work.

B. The extent of earth and rock work is shown on drawings. The following work is included:

1. Strip top soil and vegetation from the work area.
2. Perform earthwork to achieve the required grades.
3. Establish and maintain horizontal and vertical ground control throughout the work.
4. Locate and clearly mark all utilities on or adjacent to the site.

1.2 Related Work Specified Elsewhere

A. Section 02100 - Erosion Control
B. Section 02110 - Site Clearing
C. Section 02936 - Seeding

1.3 Excavation Classification

A. All mass, structural, and trench excavation shall be considered unclassified. No adjustments will be allowed to the contract price for rock encountered during mass or structural excavation.

1.4 Quality Assurance

A. Codes and Standards: Perform earth and rock work in compliance with applicable requirements of governing authorities having jurisdiction. Applicable references include the following:

- ASTM D422 Particle Size Analysis of Soils.
- ASTM D423 Test for Liquid Limit of Soils.
- ASTM D424 Test for Plastic Limit and Plasticity Index of Soils.
- ASTM D698 Laboratory Compaction Characteristics of Soil Using Standard Effort
- ASTM D3017 Moisture content of Soil Aggregates in Place by Nuclear Methods (Shallow Depth).

B. Testing and Inspection Service: A testing laboratory will be employed to perform soil testing and inspection services for quality control testing during earth and rock work operations. Testing laboratory employed is to observe, test and report to the Engineer that the compaction requirements specified herein have been obtained.

1.5 Submittals

A. Test Reports-Excavating: Coordinate and schedule in a timely manner the following quality related items. The following reports shall be submitted directly to the Engineer from the testing services, with copy to the Contractor:

- Test reports on borrow material.
- Field density test reports of sufficient number to verify compaction of structural fill.
- One optimum moisture-density curve for each type of soil encountered. Determine particle size, liquid limit, plastic limit, plasticity index and maximum density of each type of soil.
- Observe proof-rolling.

1.6 Job Conditions

A. Site Information. Data on indicated subsurface conditions are not intended as representations or warranties of accuracy or continuity between soil borings. It is expressly understood that the Owner will not be responsible for interpretations or conclusions drawn by the Contractor. The data is made available for the convenience of the Contractor and is not guaranteed to represent all condition that may be encountered. No claim for extra compensation, or for extension of time, will be allowed on account of subsurface conditions inconsistent with the data shown. Additional test borings and other site examination and exploratory operations may be made by Contractor at no cost to Owner. Notify Owner prior to making any subsurface exploration.

B. Groundwater. Groundwater may be encountered during the excavation. Control the ground water to a level at least three feet below the top of the subgrade.

C. Explosives. Blasting shall only be conducted by licensed blasters and shall be in accordance with state and local requirements, and after conducting a thorough pre-blast survey.

D. Protection of Persons and Property. Barricade open excavations occurring as part of this work and post with warning lights.

E. Bench Marks and Monuments. Maintain carefully all bench marks, monuments and other reference points. If disturbed or destroyed, replace as directed at no cost to the owner.

F. Notify the Engineer 48 hours prior to the beginning of any excavation work.

PART 2. PRODUCTS

2.1 Materials

A. Satisfactory soil. Satisfactory soils are materials complying with Unified Soil Classification System (USCS), ASTM D 2487-93, soil classification group SP, SM, SC, ML, MH and CL.

PART 3. EXECUTION

3.1 Excavation

A. Excavation consists of removal and disposal of material encountered when establishing required finish grade elevations. For the purpose of this contract, mass, structural and trench excavation of all materials shall be considered unclassified. Adjustments for rock or similar materials will not be considered.

B. Unauthorized excavation. Unauthorized excavation consists of removal of materials beyond indicated subgrade elevations or dimensions without specific direction of Engineer.

- Unauthorized excavation, as well as remedial work directed by Engineer, shall be at Contractor's expense.
- Backfill and compact unauthorized excavations, as specified for authorized excavations of same classification, unless otherwise directed by Engineer.

C. Additional Excavation. When excavation has reached required subgrade elevations, notify Engineer who will make an inspection of conditions.

- If unsuitable bearing materials are encountered at required subgrade elevations, carry excavations deeper and replace excavated material as directed by Engineer.
- Removal of unsuitable bearing material and its replacement as directed will be paid on basis of contract conditions relative to changes in work.

D. Stability of Excavations. Slope sides of excavations to comply with local codes and ordinances having jurisdiction. Shore and brace where sloping is not possible because of space restriction or stability of material excavated. Maintain sides and slopes of excavations in safe condition until completion of backfilling.

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

- Establish requirements for trench shoring and bracing to comply with local codes and authorities having jurisdiction.
- Maintain shoring and bracing in excavations, regardless of time period excavations will be open. Carry down shoring and bracing as excavation progresses.

F. Dewatering. Prevent surface water and subsurface or ground water from flowing into excavations and flooding project site and surrounding area.

- Do not allow water to accumulate in excavations. Remove water to prevent softening of excavation bottoms and soil changes detrimental to stability of subgrades. Provide and maintain pumps, well points, sumps, suction and discharge lines, and other dewatering system components necessary to convey water away from excavations.

- Convey water removed from excavations and rain water to collecting or run-off areas. Establish and maintain temporary drainage ditches and other diversions outside excavation limits for each structure. Do not use trench excavations as temporary drainage ditches. Site grading should be maintained during construction so that positive drainage of the site is promoted at all times.

G. Material Storage. Stockpile satisfactory excavated materials, where directed by Engineer, until required for backfill or fill. Place, grade and shape stockpiles for proper drainage.

- Locate and retain soil materials away from edge of excavations. Do not store within drip line of trees indicated to remain.
- Dispose of excess soil material and waste materials as herein specified.

H. Cold Weather Protection. Protect excavation bottoms against freezing when atmospheric temperature is less than 35 degrees F (1 degree C).

I. Proofrolling. After excavation and before any fill placement, entire subgrade shall be proof-rolled with a loaded pneumatic tired vehicle, such as a dual axle dump truck with a gross weight of 16 to 20 tons, or similar equipment. Remove any soft, organic, or highly plastic soil encountered during proof-rolling and replace it with properly compacted fill.

3.2 Compaction

A. General. Control soil compaction during construction, providing minimum percentage of density specified for each area classification.

B. Lift Thickness. Soil used for structural fill construction should be placed in layers no greater than 10 inches in loose placement for heavy equipment placement, or 5 inches for hand operated whacker or vibratory plate placement.

C. Percentage of Maximum Density Requirements. Compact soil as required by the Geotechnical Report to the required percentage of the maximum dry density.

D. Moisture Control. Maintain soil moisture to required range of optimum moisture content. Where soil must be moisture conditioned before compaction, uniformly apply water to prevent free water from appearing on surface during or subsequent to compaction operations. Remove and replace, or scarify and air dry, soil material that is too wet to permit compaction to specified density. Soil material that has been removed because it is too wet to permit compaction may be stockpiled or spread and allowed to dry. Assist drying by disking, harrowing or pulverizing until moisture content is reduced to a satisfactory value.

3.3 Backfill and Fill

A. General. Place acceptable soil material in layers to required subgrade elevations.

B. Backfill excavations as promptly as work permits, but not until acceptance of construction below finish grade and removal of trash and debris.

C. Ground Surface Preparation. Remove vegetation, debris, unsatisfactory soil materials, obstructions, and deleterious materials from ground surface prior to placement of fills. Plow, strip, or break up sloped surfaces steeper than 1 vertical to 4 horizontal so that fill material will bond with existing surface.

D. Placement and Compaction. Place backfill and fill materials in layers to provide lift thickness.

3.4 Grading

Uniformly grade areas within limits of grading under this section, including adjacent transition areas. Smooth finished surface within specified tolerances, compact with uniform levels or slopes between points where elevations are shown, or between such points and existing grades.

3.5 Field Quality Control

A. Quality Control Testing During Construction. Allow testing service to inspect and approve subgrades and fill layers before further construction work is performed. It shall be the Contractor's responsibility to notify the testing agency at least 24 hours prior to beginning any work which requires testing.

B. If in opinion of Engineer, based on testing service reports and inspection, subgrade or fills which have been placed are below specified density, provide additional compaction and testing at no additional expense to the Owner.

3.6 Maintenance

A. Protection of Graded Areas. Protect newly graded areas from traffic and erosion. Keep free of trash and debris. Repair and reestablish grades in settled, eroded and rutted areas to specified tolerances.

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

C. Settling. Where settling is measurable or observable at excavated areas during general project warranty period, add backfill material, compact, and replace surface treatment. Restore appearance, quality and condition of surface or finish to match adjacent work, and eliminate evidence of restoration to greatest extent possible.

D. Desiccation. Where desiccation cracks are observable, remove and replace soil to restore appearance, quality and condition of surface.

3.7 Disposal of Excess and Waste Materials

Stockpile excess excavated material at a location near the site designated by the Engineer.

End of Section

SECTION 02511 - HOT-MIXED ASPHALT PAVING

PART 1. GENERAL

1.1 Work Included

A. This Section includes provisions for hot-mixed asphalt paving over prepared subbase.

B. Prepared subbase is specified in Section 02200 - Earth and Rock Work.

1.2 Submittals

A. Submit certificates that each material item meets or exceeds specified requirements.

1.3 Site Conditions

A. Weather Limitations: Apply prime and tack coats when ambient temperature is above 50 degrees F (10 deg. C) and when temperature has not been below 35 degrees F (1 deg. C) for 12 hours immediately prior to application. Do not apply when base is wet or contains an excess of moisture.

B. Construct hot-mixed asphalt surface course when atmospheric temperature is above 40 degrees F (4 deg. C) and when base is dry. Base course may be placed when air temperature is above 30 degrees F (-1 deg. C) and rising.

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

1.4 Quality Assurance

A. Codes and Standards: Comply with State Department of Transportation standard specifications, latest edition, and with local governing regulations if more stringent than herein specified.

PART 2. PRODUCTS

2.1 Materials

A. General: Use locally available materials and gradations that exhibit a satisfactory record of previous installations.

B. Coarse Aggregate: Sound, angular crushed stone, crushed gravel, complying with ASTM D 692-88.

C. Fine Aggregate: Sharp-edged natural sand or sand prepared from stone complying with ASTM D 1073.

D. Asphalt Cement: ASTM D 3381 for viscosity-graded material; ASTM D 946 for penetration-graded material.

E. Prime Coat: Cut-back asphalt type, ASTM D 2027; MC-30, MC-70 or MC-250.

F. Tack Coat: Emulsified asphalt, ASTM D 977.

G. Subgrade shall be in accordance with applicable provisions of "Kentucky Standard Specifications for Road & Bridge Construction".

H. Dense Graded Aggregate Base shall be in accordance with Section 303 of "Kentucky Standard Specifications for Road and Bridge Construction."

I. Lane Marking Paint: Chlorinated rubber-alkyd type, ready-mixed, complying with AASHTO M 248, (FS TT-P-115), Type III. Color shall be White.

J. Asphalt - Aggregate Mixture: Bituminous Concrete shall be Class 1 and shall be in accordance with "Kentucky Standard Specifications for Road and Bridge Construction".

PART 3. EXECUTION

3.1 Systems Defined

A. Refer to the Drawings for thickness of base and surfacing.

3.2 Surface Preparation

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

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

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

D. Prime Coat: Apply at rate of 0.20 to 0.50 gallons per square yard, over compacted subgrade. Apply material to penetrate and seal, but not flood, surface. Cure and dry as long as necessary to attain penetration and evaporation of volatile.

E. Tack Coat: Apply to contact surfaces of previously constructed asphalt or Portland cement concrete and surfaces abutting or projecting into hot-mixed asphalt pavement. Distribute at rate of 0.05 to 0.15 gallons per square yard of surface.

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

3.3 Placing Mix

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

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

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

D. Joints: Make joints between old and new pavements, or between successive days' work, to ensure continuous bond between adjoining work. Construct joints to have same texture, density, and smoothness as other sections of hot-mixed asphalt course. Clean contact surfaces and apply tack coat. At joining of new paving with existing, cut out and trim existing paving to straight lines. Prime or seal existing edges prior to placement of new material so as to produce bonded, watertight joining.

3.4 Rolling

A. General: Begin rolling when mixture will bear roller weight without excessive displacement.
B. Compact mixture with hot hand tampers or vibrating plate compactors in areas inaccessible to rollers.

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

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

E. Finish Rolling: Perform finish rolling while mixture is still warm enough for removal of roller marks. Continue rolling until roller marks are eliminated and course has attained 95 percent laboratory density.

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

G. Protection: After final rolling, do not permit vehicular traffic on pavement until it has cooled and hardened.

H. Erect barricades to protect paving from traffic until mixture has cooled enough not to become marked.

3.5 Traffic and Lane Markings

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

B. Striping: Use chlorinated-rubber base traffic lane-marking paint, factory-mixed, quick-drying, and non-bleeding. Color shall be White.

C. Do not apply traffic and lane marking paint until layout and placement have been verified with Engineer.

D. Apply paint with mechanical equipment to produce uniform, straight edges. Apply at manufacturer's recommended rates to provide minimum 12 to 15 mils. dry thickness.

3.6 Field Quality Control

A. General: Test in-place hot-mixed asphalt courses for compliance with requirements for thickness and surface smoothness. Repair or remove and replace unacceptable paving as directed by Engineer.

B. Thickness: In-place compacted thickness tested in accordance with ASTM D 3549 will not be acceptable if in excess of the following variations:

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

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

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

End of Section

SECTION 02520 - PORTLAND CEMENT CONCRETE PAVING

PART 1. GENERAL

1.1 Work Included

A. This section includes furnishing labor, materials, equipment and related items required to complete all Portland cement concrete paving as shown on drawings.

1.2 Related Work

A. Section 02200 - Earth and Rock Work
B. Section 03300 - Concrete

1.3 Quality Assurance

A. Codes and Standards: Comply with local governing regulations if more stringent than herein specified.

1.4 Submittals

A. Furnish samples, manufacturer's product data, test reports and materials certifications as required in referenced sections for concrete and joint fillers and sealers.

B. The Contractor shall prepare, in a place on the site approved by the Engineer, samples of each type concrete paving specified hereunder for evaluation and approval by the Engineer. Samples shall be not less than 36" x 36" x specified thickness, and prepared in sufficient numbers as required to establish final standards of quality and finish desired. Finally approved samples, properly identified, shall remain at the site until paving work is completed, and all work shall closely match the approved samples. At completion of the work, samples shall be removed from the site and disposed of by the Contractor.

PART 2. PRODUCTS

2.1 Materials

A. Forms: Steel, wood or other suitable material of size and strength to resist movement during concrete placement and to retain horizontal and vertical alignment until removal. Use straight forms, free of distortion and defects.

1. Use flexible spring steel forms or laminated boards to form radius bends as required.

2. Coat forms with a non-staining form release agent that will not discolor or deface surface of concrete.

B. Concrete Materials: Comply with requirements of applicable Division 3 Sections for concrete materials, admixtures, bonding materials, curing materials and others as required.

C. Expansion joint material shall be 5/8" thick by the depth of the concrete section and shall be asphaltic, premolded, non-extruding type filler confirming to ASTM D1752.

D. Welded wire mesh shall be 6 x 6, W2.9 cold drawn steel wires arranged at right angles to each other and electrically welded together at all intersections and conforming to ASTM A185.

E. Steel wire used in securing reinforcement shall be cold drawn steel conforming to the requirements of ASTM A-82.

F. Joint sealer for installation at joints in concrete paving, etc., shall be a self-leveling one part urethane sealant conforming to ASTM D412-51T and ASTM D-746 and shall be "Sonolastic Paving Joint Sealant" as manufactured by Sonneborn Building Products, Inc., "Colma Joint Sealer" as manufactured by the Sika Chemical Company, or approved equal. Color shall be gray from manufacturer's standards.

G. Primers shall be as manufactured and recommended for each sealant used in the work.

H. Backer rod to be used in all joints shall be a soft, closed cell polyryhylene foam meeting requirements of AASHTO Specifications M153-54, Type I and III and shall be Ethafoam SB as manufactured by the Dow Corning Corporation, or approved equal as manufactured by the Sonneborn Building Products, Inc., Williams Products, Inc.

I. Liquid-Membrane Forming Curing Compound: Complying with ASTM C 309, Type I, Class A unless other type acceptable to Engineer. Moisture loss not more than 0.055 gr./sq. cm. when applied at 200 sq. ft./gal.

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

"Sealkure"; Toch Div. - Carboline.
"Kure-N-Seal"; Sonneborn-Contech.
"Klearseal"; Setcon Industries.

2.2 Concrete Mix Design and Testing

1. Comply with requirements of applicable Division 3 Sections for concrete mix design, sampling and testing, and quality control, and as herein specified.

2. Test cylinder shall be made as specified in Division 3, except as a minimum 3 test cylinders shall be made for each day's pour.

3. Design mix to produce normal-weight concrete consisting of Portland cement, aggregate, water-reducing or high-range water-reducing admixture (super plasticizer), air-entraining admixture and water to produce the following properties:

Compressive Strength: 4000 psi, minimum at 28 days, unless otherwise indicated.

Slump Range: 8" for concrete containing HRWR admixture (super-plasticizer); 3" for other concrete.

Air Content: 4% to 5%.

PART 3. EXECUTION

3.1 Surface Preparation

A. Grading. Prepare subgrades to the required elevations and sections.

B. Preparation of Subgrade. Loosen exceptionally hard spots and recompact. Remove spongy and otherwise unsuitable material and replace with stable material. Fill and tamp traces of utility trenches.

C. Compaction of Subgrade. Compact the subgrade of all surface areas with appropriate compacting equipment or by other means to such degree as will insure against settlement of the superimposed work. All surfaces shall be proof-rolled with suitable equipment to verify stability of base.

D. Checking Subgrade. Maintain all subgrades in satisfactory condition, protected against traffic and properly drained until the surface improvements are placed. Immediately in advance of concreting, check subgrade levels with templates riding the forms, correct irregularities and compact thoroughly any added fill material. On areas to receive concrete pavement, place grade stakes spaced sufficiently to afford facility for checking subgrade levels. Correct irregularities prior to concreting.

E. Utility Structures. Check for correct elevation and position all manhole covers, drainage castings, valve boxes and similar items located within areas to be paved and make or have made any necessary adjustments.

3.2 Form Work

A. Formwork shall produce concrete that strictly conforms to the shapes, lines and dimensions as called for on the drawings. Procedures and control shall be in accordance with ACI 347 "Recommended Practice for Concrete Formwork" or as modified herein.

1. Formwork for concrete steps shall be to such tolerances that the finished steps shall conform with the Kentucky Building Code for Dimensional Uniformity. There shall be no variations

exceeding 3/16" in the depth of adjacent treads or the height of adjacent risers. The tolerance between the largest and smallest riser or between the largest and smallest tread shall not exceed 3/8" in any flight of stairs.

2. Formwork for walks and curbs shall meet the following tolerances:

Top of forms not more than 1/8" in 10' deviation from proposed line.

Vertical face on longitudinal axis, not more than 1/8" in 10' deviation from proposed line.

B. Forms shall be clean, smooth, sufficiently watertight to prevent leakage of mortar; securely tied together and braced to maintain shape and position while being filled, and shored to support construction loads. Form ties shall be of an approved type.

C. All removable forms shall be treated with oil on inside faces or thoroughly drenched and saturated with water on both faces before concrete is placed therein.

D. The time for removal of forms shall be subject to the approval of the Engineer. Forms shall be removed in such a manner as to insure the complete safety of the structure.

3.3 Reinforcement

A. Locate, place and support reinforcement as specified in Division 3 Sections, unless otherwise indicated.

3.4 Concrete Placement

A. General: Comply with requirements of Division 3 Sections for mixing and placing concrete and as herein specified.

B. Install No. 57 crushed stone subbase where shown on the details. Do not place concrete until subbase and forms have been checked for line and grade. Moisten subbase if required to provide a uniform dampened condition at time concrete is placed. Do not place concrete around manholes or other structures until they are at required finish elevation and alignment.

C. Place concrete using methods which prevent segregation of mix. Consolidate concrete along face of forms and adjacent to transverse joints with 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 dislocation of reinforcing, dowels, and joint devices.

1. Deposit and spread concrete in a continuous operation between transverse joints, as far as possible. If interrupted for more than 1/2 hour, place a construction joint.

2. Do not operate equipment on concrete until pavement has attained sufficient strength to carry loads without injury.

D. All exposed concrete curbs surfaces shall be rubbed to a smooth even finish with carborundum stone, removing all form marks, imperfections and any unevenness which may appear on the surfaces of the concrete. Saw cut curbs per details within 24 hours of removing forms.

1. Automatic extruding machines may be used for curb and gutter placement at Contractor's option. If machine placement is to be used, submit revised mix design and laboratory test results which meet or exceed minimums specified. Machine placement must produce curbs and gutters to required cross section, lines, grades, finish and jointing as specified for formed concrete. If results are not acceptable, remove and replace with formed concrete as specified.

3.5 Joints

A. General: Construct expansion, weakened-plane (contraction) and construction joints true-to-line with face perpendicular to surface of concrete. Construct transverse joints at right angles to the centerline, unless otherwise indicated.

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

B. Construction joints: All construction joints in 6" thick concrete pavements shall be keyed.

1. Keyed joints shall have longitudinal keyway formed at slab edge by means of bevel cut treated wood form, or by other means approved by the Engineer.

C. Contraction Joints: Contraction joints shall be tooled or sawed as noted on the Drawings, provided where shown and as detailed on the Drawings or otherwise as directed by the Engineer.

1. Tooled joints shall be made in the plastic concrete during the finishing operation by means of a sidewalk tool. Round all edges of such joints to a uniform 1/4" radius. Depth of tooled joints shall be a minimum depth of 1" or shall be one-fourth (1/4) the thickness of the slab. See Drawings for more restrictive requirements.

2. Sawed joints shall be constructed by sawing a groove in the hardened concrete with a power-driven saw to the full depth, or depths indicated. The time of sawing shall be varied depending on existing and anticipated weather conditions and shall commence as soon as the concrete has hardened sufficiently to permit cutting the concrete without chipping, spalling or tearing. Immediately after each joint is sawed, the saw cut and adjacent concrete surface shall be thoroughly flushed with water until all waste from the sawing is removed from the joint.

D. Construction Joints: Place construction joints at end of placements and at locations where placement operations are stopped for a period of more than 1/2 hour, except where such

placements terminate at expansion joints. Construction joints must occur only at location of proposed contraction joints as shown on the drawings.

1. Construct joints as shown or, if not shown, use standard metal keyway-section forms.

E. Expansion Joints: Provide premolded joint filler for expansion joints, manholes, structures, walks and other fixed objects, unless otherwise indicated.

1. Locate expansion joints at 40 inches on center for each pavement lane, unless otherwise indicated.

2. Extend joint fillers full-width and depth of slab and not less than 1/2" or more than 1" below finished surface where joint sealer is indicated. If no joint sealer, place top of joint filler flush with finished concrete surface.

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

4. Protect top edge of joint filler during concrete placement with a metal cap or other temporary material. Remove protection after concrete has been placed on both sides of joint.

5. Fillers and Sealants: Comply with the requirements of applicable Division 7 Sections for preparation of joints, materials, installation and performance except as noted herein.

3.6 Concrete Finishing

A. In general, tamp and screed concrete true to grade and section, bringing sufficient mortar to the surface for finishing. Paving finishes shall be as specified for respective paving types specified hereinbefore, and shall match closely the approved samples.

B. After striking-off and consolidating concrete, smooth surface by screening and floating. Use hand methods only where mechanical floating is not possible. Adjust floating to compact surface and produce uniform texture.

C. After floating, test surface for trueness with a 10' straightedge. Distribute concrete as required to remove surface irregularities and refloat repaired areas to provide a continuous smooth finish.

D. Work edges of slabs, gutters, back top edge of curb and formed joints with an edging tool and round to 1/2" radius unless otherwise indicated. Eliminate tool marks on concrete surface.

E. After completion of floating and troweling when excess moisture or surface sheen has disappeared, complete surface finish as follows:

1. Float finishes shall be made by means of a wood hand float of type approved by the Engineer, applied circularly so as to provide a uniform medium textured surface.

2. Broom finishes shall be made by means of stiffer fiber brooms of types approved by the Engineer, applied lineally with uniform pressures as necessary to produce uniformly striated surface of required coarseness.

3. Exposed aggregate finishes may be made by one of the following methods: The Contractor shall not change methods once the work is started.

(a) Sandblasted exposed aggregate finishes shall be made by means of wet sandblasting surfaces of paving to lightly erode concrete matrix to expose coarse aggregate slightly. A deep exposure of aggregate is not desired or acceptable.

(b) Washed exposed aggregate surfaces shall be an integral finish produced by exposing the aggregate in the concrete mix. Produce finish on "green" concrete as soon as practicable. Wet the concrete surface thoroughly and scrub with stiffer fiber or wire brushes, using water freely, until the top concrete mortar surface is removed and the aggregate uniformly exposed. Rinse scrubbed surface with clean water. Remove only enough concrete mortar from the surface to match the sample approved by the Engineer. When concrete has become too hard to produce the required finish with normal scrubbing procedures, use a diluted muriatic acid while scrubbing or sandblast areas of insufficient exposure to match sample. Protect adjacent surfaces and finishes from damage.

(c) The Contractor shall exercise extreme caution to ensure all exposed aggregate concrete matches the approved sample. Retarders will not be permitted since only a very light exposure shall be required.

F. Do not remove forms for 24 hours after concrete has been placed. After form removal, clean ends of joints and point-up any minor honeycombed areas. Remove and replace areas or sections with major defects as directed by the Engineer.

3.7 Curing

A. Exposed surfaces of concrete shall be cured with an approved membrane curing compound meeting ASTM C309. Curing compound shall be applied by roller for uniform coverage and not exceeding 450 square feet coverage per gallon of material, and otherwise, in strict accordance to manufacturer's instructions.

3.8 Repairs and Protections

A. Repair or replace broken or defective concrete as directed by Engineer.

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

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

1. Sweep concrete pavement and wash free of stains, discolorations, dirt and other foreign material just prior to final inspection.

End of Section

SECTION 02720 - STORM DRAINAGE SYSTEMS

PART 1. GENERAL

1.1 Work Included

A. Storm drainage pipe fittings, and accessories.

B. Storm water structures

1.2 Submittals

A. Submit product data under provisions of Section 01300.

PART 2. PRODUCTS

2.1 Reinforced Concrete Pipe

A. Reinforced concrete pipe shall meet requirements of ANSI/ASTM C76, Class I with Wall Type A; B; C; mesh reinforcement; inside nominal diameter as required; bell and spigot end joints.

B. Joint device shall meet requirements of ANSI/ASTM C443, rubber compression gasket joint.

C. Fittings shall be of the same material as pipe, molded or formed to suit pipe size and end design, in required 'T', bends, elbows, cleanouts, reducers, traps, and other configurations required.

2.2 HDPE Pipe

HDPE pipe shall meet the following requirements:

- ASTM D1248 Standard Specification for Polyethylene Plastics Molding and Extrusion Materials
- ASTM F405 Standard Specification for Corrugated Polyethylene (PE) Tubing and Fittings
- ASTM F667 Standard Specification for Large Diameter Corrugated Polyethylene Tubing and Fittings.

2.3 Storm Water Structures

Storm water structures shall meet the following requirements, as applicable:

- ACI 304 - Guide for Measuring, Mixing, Transporting and Placing Concrete
- ACI 318 - Building Code Requirements for Reinforced Concrete

- ASTM C478 - Specification for Precast Reinforced Concrete Manholes Sections
- ASTM 1433 - Standard Specification for Precast Reinforced Concrete Box Sections for Culverts, Storm Drains, and Sewers
- ASTM C1478 - Standard Specification for Storm Drain Resilient Connectors Between Reinforced Concrete Storm Sewer Structures, Pipes and Laterals
- ASTM C923 - Standard Specification for Resilient Connectors Between Reinforced Concrete Manhole Structures, Pipes and Laterals
- ASTM C990 - Standard Specification for Joints for Concrete Pipe, Manholes and Precast Box Sections Using Preformed Flexible Joint Sealant
- CRSI Manual of Standard Practice

PART 3. EXECUTION

3.1 Pipe Installation

A. Verify that trench cut is ready to receive work, and excavations, dimensions, and elevations are as indicated on Drawings.

B. Install pipe, fittings, and accessories in accordance with manufacturer's instructions. Seal joints watertight.

C. Lay pipe to slope gradients noted on drawings, with maximum variation from true slope of 1/8 inch in 10 feet.

3.2 Storm Water Structure Installation

A. Precast concrete products shall be installed to the lines and grades shown in the contract documents or otherwise specified.

B. Products shall be lifted by suitable lifting devices at points provided by the precast concrete producer.

C. Products shall be installed per the precast concrete producer's recommendation.

End of Section

SECTION 02800 - LAWNS

PART 1 - SCOPE

A. This Section includes all labor, materials, equipment and related items required to complete the work of lawns as shown on the Drawings and specified herein.

1. Included hereunder are the treatment of subgrades established for lawns; finish grading; soil treatment; lawn construction; protection, maintenance, guarantee and replacement of lawns; and all work related to the above as specified.

PART 2 - MATERIALS

A. Topsoil shall be material stripped and stored under work of Section 02200 and shall be used for all work under this Section. Such topsoil shall be original surface loam obtained from well drained areas from which topsoil has not been removed previously, either by erosion, clearing and removal of trees or mechanical means. It shall not contain subsoil material and shall be clean and free of clay lumps, roots, stones or similar substances more than 1" in diameter, debris, discarded fragments of building materials or weeds and weed seeds. Topsoil shall be classified as a loam, silt loam, clay loam, or a combination thereof, as determined from the Bureau of Plant Industry, Soils and Agricultural Engineering, U.S.D.A. triangular soil texture chart. It shall be rich, friable loam containing not less than five percent (5%), nor more than twenty percent (20%) by weight of organic matter as determined by loss on ignition of over dried samples. The ignition test shall be performed on samples which have been thoroughly over dried at a temperature of 221 degrees F.

1. Any stored topsoil remaining after work is in place shall be disposed of by the Contractor as directed by the Architect.

2. If the quantity of stored topsoil is inadequate, or if none has been salvaged from the site, the Contractor shall furnish at his own expense sufficient topsoil to properly install all work as specified herein and as shown on the Drawings.

B. Commercial fertilizers shall be of analysis specified, or as recommended by the Agricultural Extension Service for treatment of topsoil in the area from which removed, and shall conform to the applicable State Fertilizer laws. Fertilizer shall be uniform in composition, dry and free flowing, and shall be delivered to the site in the original, unopened containers, each bearing the manufacturer's guaranteed analysis. Any fertilizer which becomes caked or otherwise damaged making it unsuitable for use will not be accepted.

C. Lime, if recommended for soil treatment by the Agricultural Extension Service, shall be ground limestone (Dolomite) containing not less than 85% of total carbonates, and shall be ground to such a fineness that 50% will pass through a 100-mesh sieve, and 90% will pass through a 20-mesh sieve. Coarser material shall be acceptable provided that required rates of application are increased proportionally on the basis of quantities passing the 100-mesh sieve.

D. Fertilizer Tablets or Packets. Fertilizer planting tablets or packets shall contain prolonged-release nitrogen, derived from urea-formaldehyde. Tablets or packets shall be at least of a strength of 16-8-5. The amount of available nitrogen, phosphorus or potash may be increased slightly to meet the standard manufactured products available. This fertilizer shall conform to the applicable state fertilizer laws and shall be delivered to the site in the original unopened containers, each bearing the manufacturer's guaranteed analysis.

E. Herbicide shall be an approved commercial herbicide used in soil preparation, and shall be Dacthal W-75, or approved equal.

F. Water. The Contractor shall make, at his own expense, whatever arrangements may be necessary to ensure an adequate supply of water to meet the needs of this Contract. He shall also furnish the adequate irrigation of lawns as may be required to complete the work as specified.

G. Lawn Materials:

1. Grass seed, shall be mixed and guaranteed by the dealer to be as follows:

Mixture A (All except crown vetch slopes and sodded areas)

Common Name	Proportion by Weight	Percent of Purity	Percent of Germination
Fine Lawn Fescue	80%	95%	90%
Kentucky Bluegrass	20%	90%	90%

2. Sod shall be well-rooted Kentucky Bluegrass (Poa pratensis) completely free of noxious weeds. It shall be mowed to a height not to exceed 3".

PART 3 - CONSTRUCTION AND PLANTING METHODS

A. Lawns:

1. All areas within limits of grading not required to be developed otherwise shall be planted to grass. See indications on Drawings to designate areas, if any, which are to be sodded.

2. Preparation of Subgrade. All areas to be planted in lawn, except as specified below, shall be sub-soiled. The term "Subsoiling" as used herein means the mechanical cleavage of the subsoil without major displacement or inversion of the existing soil horizon. It is the purpose of this operation to rupture the subsoil, creating cracks and fissures to a depth of 2', except where rock or other equally resistant material is encountered. Only equipment adequate and suitable for the purpose shall be used. The work shall be done under optimum soil conditions so as to insure maximum possible

results. All subgrades for lawns and planting areas shall be subsoiled when finished subgrade is achieved by cutting, or when less than 12" of fill is required. Subsoiling shall be accomplished on 2' centers, parallel to contours before spreading of topsoil. Subsoiling will not be required on slopes greater than three to one. After the subsoiling operation is complete, all stones over 2" in size, sticks and rubbish shall be removed, and the surface graded and lightly compacted so that it will be parallel to the proposed finished grade. No heavy objects, except lawn rollers, shall be moved over lawn areas after the subgrade soil has been prepared unless the subgrade soil is again graded and loosened as specified above before top soil is spread.

3. Finished Grading - Lawn Areas. After the subgrade soil has been prepared, topsoil shall be spread evenly thereon and lightly compacted. No topsoil shall be spread in a frozen or muddy condition.

   a. Areas to be sodded shall be brought to within the thickness of the sod of the finished grade.

   b. Allowance for settlement shall be made.

   c. Areas where the topsoil has not been removed shall be scarified, smoothed and sticks, stones, and rubbish shall be removed.

4. Soil improvements shall be made if and as recommended by the Agricultural Extension Service prior to planting of lawns.

   a. Ground limestone, if required, shall be applied at the recommended rates per acre, and shall be thoroughly mixed into the topsoil and as far ahead of seeding as will not interfere with other grading operations.

   b. Fertilizer, if required, shall be of analysis and rates per 1,000 sq. feet of lawn areas as recommended in the topsoil analysis, and shall be mixed lightly in the top few inches of topsoil. Fertilizer may be mixed with and as distributed with grass seed.

5. Planting of lawns:

   a. Sowing of Seed. Immediately before any seed is to be sown, the ground shall be scarified as necessary and shall be raked until the surface is smooth, friable and of uniformly fine texture. Lawn areas shall be seeded evenly with a mechanical spreader at rates specified hereinbelow, lightly raked, rolled with a 200 pound roller and watered with a fine spray. The method of seeding may be varied at the discretion of the Contractor, on his own responsibility to establish a smooth, uniform turf composed of the grasses specified. The sowing of seed shall be done only within the season extending from March 1st to May 15th, and from September 1st to October 15th, unless other seasons may be approved by the Architect.

      1. Mixture A - 6 lbs. per 1,000 sq. ft.
      2. Mixture B - 2 lbs. per 1,000 sq. ft.

b. Laying of Sod. Before any sod is laid, all soft spots and inequalities in grade shall be corrected. Fertilizer spread shall be raked in. Sod shall be laid so that no voids occur, tamped or rolled and then thoroughly watered. The completed sodded surface shall be true to finished grade, even and firm at all points. The season for laying sod shall conform to that of sowing seed.

c. Sod on slopes 2 to 1 or steeper shall be held in place by wooden pins about 1" square and about 6" long driven through the sod into the soil until they are flush with the top of the sod, or by other approved methods for holding the sod in place. Stakes shall be spaced along the centerline of a strip of sod at intervals of approximately 3'.

d. Mulching. All seeded areas having a slope of 3 to 1 or greater shall be mulched with straw, using clean, fresh straw, free from seeds and chaff, applied at the rate of 100 lbs. per 1,000 sq. feet of area to be mulched.

e. Clean-Up. Any soil, manure peat or similar material which has been brought onto paved areas within or outside the site by hauling operations or otherwise shall be removed promptly, keeping these areas clean at all times. Upon completion of the planting, all excess soil, stones and debris which has not previously been cleaned up shall be removed from the site or disposed of as directed by the Architect. All lawns and planting areas shall be prepared for final inspection.

f. Other Work. The Contractor shall be responsible for the repair of any damage caused by his activities or those of his subcontractors within or outside of the site such as the storage of topsoil or other materials, operations of equipment or other usages. Such repair operations shall include any regrading, sodding or other work necessary to restore damaged work or areas to an acceptable condition.

PART 4 - MAINTENANCE

A. Maintenance shall begin immediately following the last operation of installation for each portion of lawn and shall continue in accordance with the following requirements:

1. Lawns shall be protected and maintained by watering, regular mowings and replanting as may be necessary to produce a uniform stand of grass. Maintenance shall continue until a dense, uniform turf is established composed of the grasses specified and until acceptance, and shall include repair of damage caused by erosion. For the purpose of establishing an acceptable standard, scattered bare spots, none of which is larger than one square foot will be allowed up to a maximum of 3% of any lawn area.

2. New planting shall be protected and maintained until the end of the lawn maintenance period, or if installed after the lawn maintenance period, until installation of planting is complete and the planting is formally accepted. Maintenance shall include watering, weeding, cultivating, mulching, tightening and repairing of guys, removal of dead material, resetting the plants to proper grades or upright position and restoration of the planting saucer and other necessary operations.

PART 5 - INSPECTION FOR ACCEPTANCE

A. Inspection of the work of this Section to determine completion of the work will be made by the Architect at the conclusion of the maintenance period, upon written notice requesting such inspection submitted by the Contractor at least 10 days prior to the anticipated date. The condition of lawns will be noted and determination made by the Architect whether maintenance shall continue in any part.

B. Acceptance. After inspection, the Contractor will be notified in writing by the Architect of acceptance of all work of this Section or if there are any deficiencies of the requirements for completion of the work. Lawn maintenance or other work remaining to be done shall be subject to reinspection before acceptance.

C. Acceptance in Part. The work of this Section will be accepted in part by the Owner upon written application by the Contractor, provided the work offered for acceptance comprises all of the work of this Section entirely completed, including lawn maintenance located within a continuous area which is a substantial portion definitely separated from the remainder of the site by roads, walks, fences and other structural barriers, or readily defined topographical features.

End of Section