TECHNICAL SPECIFICATION INDEX

SECTION 01 10 00 – SUMMARY

PART 1 – GENERAL

1.1 RELATED DOCUMENTS:

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

1.2 SUMMARY

A. This Section includes the following:

1. Work covered by the Contract Drawings
2. Type of Contract
3. Use of premises
4. Owner's occupancy requirements
5. Work restrictions

1.3 WORK COVERED BY CONTRACT DOCUMENTS:

A. Project Title: FY25 Parking Lot Maintenance

Project Location: Springfield Campus
Missouri State University
901 South National
Springfield, MO 65897

B. Owner: Missouri State University

Owner's Representation: Adam Shuler, AIA
Planning, Design and Construction
Missouri State University

E. Summary: Work includes preventative parking lot maintenance for various parking lots at the Springfield campus. Work includes removing and replacing sections of paving that is broken, spalling, cracked, or deteriorating as well as improvements to paving, curbs, ramps, and sidewalks to comply with ADA parking requirements. After parking lot repairs are complete each lot will be restriped, crack filled, and sealed with an asphalt emulsion.

D. Work of the Contract can be summarized by references to the Contract, General Conditions, Supplementary Conditions, Specification Sections, Drawings, addenda and modifications to the contract documents issued after the initial printing of this project manual and including but not necessarily limited to printed material referenced by any of these. It is recognized that work of the Contract is also unavoidably affected or influenced by governing regulations, natural phenomenon including weather conditions and other forces outside the contract documents.

F. Alternates: Provide a separate alternate bid items for the following:

1. All work associated with Lot 3.
2. All work associated with Lot 10A.

G. Unit Prices: Provide separate unit price bids items for the following:

1. Cost to provide additional asphalt patching per square foot.
2. Cost to provide additional concrete patching per square foot.
3. Cost to provide additional cleaning and filling of cracks per square foot.
4. Cost to provide additional sealing and striping per square foot.
5. Cost to provide additional wheel stop per each.
6. Cost to provide additional metal posts for signs per each.
7. Cost to excavate additional unsuitable material per cubic yard.
8. Cost to provide 6” base material (type 1) compacted in place per ton.
9. Cost to provide 18” base shot rock (type 3) compacted in place per ton.

1.4 USE OF PREMISES:

A. The Contractor shall limit his use of the premises to the work indicated, to allow for Owner occupancy and use by the public.

B. Confine operations at the site to the areas permitted under the Contract. Portions of the site beyond areas on which work is indicated are not to be disturbed. Conform to site rules and regulations affecting the work while engaged in project construction.

C. Other Contracts may be carried out concurrently on the campus and in the building. This contractor shall be required to cooperate fully with work scheduling of other contractors.

D. Keep existing driveways and entrances serving the premises clear and available to the Owner and his employees at all times. Do not use these areas for parking or storage of materials. No driving or parking on grass at any time will be allowed unless work is in the area.

E. Do not unreasonably encumber the site with materials or equipment. Do not block doors with equipment, etc. during the times when the building is occupied. If storage is necessary, obtain and pay for such storage off site.

F. Lock automotive type vehicles, such as passenger cars and trucks and other mechanized or motorized construction equipment, when parked and unattended with the motor running or the ignition key in place.

G. The owner shall not accept deliveries or perform off-loading of any materials for any contractor.

H. Maintain the existing buildings in a safe and weather tight condition throughout the construction period. Repair damage caused by construction operations. Take all precautions necessary to protect the buildings and occupants during the construction period.

I. Keep public areas such as hallways, stairs, and toilet rooms free from accumulation of waste material, rubbish or construction debris.

J. The contractor and his employees shall conduct themselves in a courteous manner when working around faculty, students and the general public. Possession of firearms, narcotics or other illegal materials will not be allowed on the campus ground. Profanity, derogatory comments and gestures will not be tolerated. Such actions will result in dismissal from University property.

K. The Owner shall continue to occupy and use the buildings throughout the project therefore, the contractor is responsible for leaving the area he is working in a condition acceptable to the owner's representative. The contractor shall clean all work areas daily. All areas shall

be left broom clean.

L. Smoking or open fires will not be permitted within the buildings or on the premises.

M. Parking: Construction parking will be allowed by Owner at locations to be determined. General Contractor to notify Owner the number of requested parking spaces.

1.5 OWNER'S OCCUPANCY REQUIREMENTS:

A. Full Owner Occupancy: The Owner will occupy the site and the adjacent buildings during the entire period of construction. Cooperate fully with the Owner during construction operations to minimize conflicts and to facilitate Owner usage. Perform the work so as not to interfere with existing activities in the buildings. The contractor shall coordinate all work with the owner's representative and shall provide the owner's representative an updated work schedule as the project progresses.

1.6 COORDINATION:

B. The work of this Contract includes coordination of the entire work of the project, including preparation of schedules, and control of site utilization, from beginning of construction activity through project closeout and warranty periods.

C. Remove surplus material and waste material, including trash and debris, and legally dispose of it off Owner's property.

D. Prior to the time of substantial completion inspect, test and adjust the performance of every element, system or facility of the work as necessary to ensure that the overall performance is in compliance with the Contract Documents.

PART 2 – PRODUCTS (Not Used)

PART 3 – EXECUTION (Not Used)

END OF SECTION

SECTION 033000-CAST-IN-PLACE CONCRETE FOR SITE WORK

PART 1 - GENERAL

1.1 DESCRIPTION

A. The concrete described herein shall consist of a mixture of Portland cement, fine aggregate, coarse aggregate, an air-entraining agent and water combined in the proportions specified forthe various classes of concrete used in construction work and as set forth in these specifications. Includes concrete for site work only.

1.2 SUBMITTALS

A. Submittals for Review:

1. Concrete Mix Designs: Include:
   a. Proportions of cement, fine and coarse aggregates, and water.
   b. Combined aggregate gradation.
   c. Aggregate specific gravities and gradations.
   d. Water/cement ratio, design strength, slump, and air content.
   e. Type of cement and aggregates.

1.3 QUALITY ASSURANCE

A. Concrete Mix Design: In accordance with ACI 301, Method 1 or 2.

1.4 DELIVERY, STORAGE AND HANDLING

A. Mix and deliver concrete to project ready mixed in accordance with ASTM C94.

B. Schedule delivery so that pours will not be interrupted for over 15 minutes.

C. Place concrete on site within 90 minutes after proportioning materials at batch plant.

1.5 PROJECT CONDITIONS

A. Cold Weather Placement - Protect concrete work from physical damage or reduced strength that could be caused by frost, freezing actions, or low temperatures. Comply with ACI 306R and following requirements:

1. Air temperature at or expected to fall below 40 degrees F, uniformly heat water and aggregates before mixing to obtain a concrete mixture temperature of not less than 50 degrees F and not more than 80 degrees F at point of placement.
2. Do not use frozen materials or materials containing ice or snow. Do not place concrete on frozen subgrade or on subgrade containing frozen materials.
3. Do not use calcium chloride, salt, and other materials containing antifreeze agents or chemical accelerators unless otherwise accepted in mix designs.

B. Hot Weather Placement - Place concrete in accordance with ACI 305R and following requirements:

1. Cool ingredients before mixing to maintain concrete temperature at time of placement below 90 degrees F. Use chilled mixing water or chopped ice if water equivalent of ice is calculated in total amount of mixing water.

2. If required, cover reinforcing steel with water soaked burlap so that steel temperature will not exceed ambient air temperature.
3. Fog spray forms, reinforcing steel, and subgrade just before concrete is placed.
4. Use water-reducing retarding admixture when required by high temperatures, low humidity, or other adverse placing conditions.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Cement: Cement shall be standard brand Type 1 Portland cement that shall conform to the ASTM Designation C-150, Type I or Type II.

B. Water: Water used with cement in concrete or mortar shall be clean, clear, free of sugar, and shall be free from injurious quantities of oil, acid, alkali, salt, organic matter, vegetable matter, or other deleterious substances.

C. Aggregates:
1. Fine: ASTM C33, clean, hard, durable, uncoated natural sand, free from silt, loam, and clay.
2. Coarse: ASTM C33, clean, hard, durable, uncoated crushed stone, maximum size No. 467 Table No. 2.

2.2 ACCESSORIES

A. Admixtures:
1. Water reducing or water reducing/set retarding: ASTM C494, Type A or D.
2. Air entraining: ASTM C260.

B. Expansion Joint Filler: ASTM D1752, non asphaltic type.

C. Non-Shrink Grout: Premixed, consisting of non-metallic aggregate, cement, water reducing and plasticizing agents; minimum 7,000 psi compressive strength at 28 days.

D. Bonding Agent: Two component modified epoxy resin.

E. Curing Compound: ASTM C309, [solvent] [water] based type.

F. Curing Paper: ASTM C171, waterproof paper or polyethylene film.

2.3 PROPORTION OF MATERIALS

A. Prepare design mixes, proportioned according to requirements of MoDOT Standard Specifications for Highway Construction 2004 Edition. All mixes shall achieve a 28-day compressive strength of 4000 psi.

PART 3 - EXECUTION

3.1 PREPARATION

A. Notify Architect minimum 24 hours prior to placing concrete.

B. Accurately position anchor bolts, sleeves, conduit, inserts, and accessories. Do not cut reinforcing steel to facilitate installation of inserts or accessories.

C. Remove water and debris from forms and excavations.

D. Close openings left in forms for cleaning and inspection.

E. Prepare previously placed [and existing] concrete surfaces by cleaning with steel wire brush and applying bonding agent in accordance with manufacturer's instructions.

F. Where new concrete is doweled to existing, drill holes in existing concrete, insert steel dowels, and pack holes solid with non-shrink grout.

3.2 PLACEMENT OF CONCRETE

A. Place concrete in accordance with ACI 301 and ACI 318.

B. Ensure reinforcement, inserts, and embedded parts are not disturbed during concrete placement.

C. Deposit concrete as nearly as possible in its final position to minimize handling and flowing.

D. Place concrete continuously between predetermined expansion, control, and construction joints.

E. Do not place partially hardened, contaminated, or retempered concrete.

F. Do not allow concrete to free fall over 8 feet; provide tremies, chutes, or other means of conveyance.

G. Consolidate concrete with mechanical vibrating equipment. Hand compact in corners and angles of forms.

H. Screed slabs level, to flatness tolerance of 1/4 inch in 10 feet.

3.3 PLACEMENT OF GROUT

A. Remove loose and foreign matter from concrete; lightly roughen bonding surface.

B. Just prior to grouting, thoroughly wet concrete surfaces; remove excess water.

C. Mix grout in accordance with manufacturer's instructions. Do not retemper.

D. Place grout continuously, by most practical means; avoid entrapped air. Do not vibrate grout.

3.4 PROTECTION

A. Immediately after placement, protect concrete from premature drying, excessively hot or cold temperatures, and mechanical injury.

B. Maintain concrete with minimal moisture loss at relatively constant temperature for period necessary for hydration of cement and hardening of concrete.

C. Provide artificial heat to maintain temperature of concrete above minimum specified temperature for duration of curing period.

D. Keep forms sufficiently wet to prevent cracking of concrete or loosening of form joints.

3.5 CURING

A. Cure concrete in accordance with ACI 308:
   1. Horizontal surfaces:
      a. Surfaces to receive additional toppings or setting beds: Use curing paper method.
      b. Other surfaces: Use either curing paper or curing compound method.
   2. Vertical surfaces: Use either wet curing or curing compound method.

B. Curing Compound Method:
   1. Spray compound on surfaces in two coats, applying second at right angle to first, at minimum rate recommended by manufacturer.
   2. Restrict traffic on surfaces during curing.

C. Curing Paper Method:
   1. Spread curing paper over surfaces, lapping ends and sides minimum 4 inches; maintain in place by use of weights.
   2. Remove paper after curing.

D. Wet Curing Method: Spray water over surfaces and maintain wet for 7 days.

3.6 CLEANING

A. Remove efflorescence, stains, oil, grease, and foreign materials from exposed surfaces.

3.7 FIELD QUALITY CONTROL

A. Testing and Inspection Services:
   1. Certify each delivery ticket.
   2. Record time at which concrete was discharged from truck.
   3. Monitor and record amount of water and water reducing admixture added to concrete at project site.
   4. Determine ambient temperature and temperature of concrete sample for each set of test cylinders.
   5. Test cylinders:
      a. Make test cylinders in accordance with ASTM C172; one set of 3 cylinders for each 100 cubic yards or fraction thereof placed in any one day, for each different class of concrete.
      b. Mold and cure cylinders in accordance with ASTM C31; test cylinders in accordance with ASTM C39; one at 7 days and two at 28 days.
   6. Slump tests: Make slump tests at beginning of each day's placement and for each set of test cylinders in accordance with ASTM C143.
   7. Air content: Determine total air content of air entrained concrete for each strength test in accordance with ASTM C231.

END OF SECTION 033000

SECTION 31 11 00 - CLEARING AND GRUBBING

PART 1 - GENERAL

1.1 DESCRIPTION

A. The work shall consist of furnishing all labor, materials, equipment, and tools for necessary clearing and grubbing as well as erosion and sediment control measures for the site.

B. RELATED DOCUMENTS

Drawings and General Requirements of the contract including Special Conditions and/or Division 1 Specifications that apply to this section.

C. This Section includes the following:

1. Protecting existing trees to remain.
2. Removing existing trees and grass *as* required within designated area shown on Removals Plan.
3. Clearing and grubbing.
4. Stripping and stockpiling topsoil, if any.

1.2 DEFINITIONS - TOPSOIL

A. Topsoil shall be a well-graded soil of good uniform quality. It shall be a natural, friable soil representative of productive soils in the vicinity. Topsoil shall be free of admixture of subsoil, foreign matter, objects larger than one inch in any dimension, toxic substances, weeds and any material or substances that may be harmful to plant growth and shall have a pH value of not less than 5.0 nor more than 7.5. The Contractor shall submit an analysis of soils along with samples for approval by the Landscape Architect.

B. Material to be obtained from stockpiles if any established under this Section, subparagraph, Topsoil Stripping, shall meet the general requirements as stated above. Topsoil not meeting the pH range specified shall be amended by the addition of pH Adjusters.

C. If insufficient suitable topsoil is available on the site to meet the depth as specified herein, the Contractor shall furnish additional topsoil. At least 10 days prior to topsoil delivery, notify the Landscape Architect of the source(s) from which topsoil is to be furnished. Obtain topsoil from well drained areas. Additional topsoil shall meet the general requirements as stated above and comply with the requirements specified elsewhere in these specifications. Topsoil not meeting the pH range specified shall be amended by the addition of pH adjusters.

1.3 MATERIAL OWNERSHIP

A. Except for stripped topsoil or other materials indicated to remain Owner's property, cleared materials shall become Contractor's property to be removed from the Project site and properly disposed of.

1.4 PROJECT CONDITIONS

A. Traffic: Minimize interference with adjoining roads, streets, walks, and other adjacent occupied or used facilities during site-clearing operations.

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

B. Salvageable Improvements: Carefully remove items indicated to be salvaged and store or turn over to Owner as directed.

C. Utility Locator Service: Notify utility locator service for area where Project is located before site clearing.

D. Do not commence site clearing operations until temporary erosion and sediment control measures are in place. Comply with all requirements of the Storm Water Pollution Prevention Plan (SWPPP).

PART 2 – PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 PREPARATION

A. Protect existing site improvements to remain from damage during construction.

1. Restore damaged improvements to their original condition, as acceptable to Owner.

3.2 UTILITIES

A. Verify that utilities have been disconnected and capped before proceeding with site clearing.

B. Existing Utilities: Do not interrupt utilities serving facilities occupied by Owner or others unless permitted under the following conditions and then only after arranging to provide temporary utility services according to requirements indicated:

1. Notify Owner not less than two days in advance of proposed utility interruptions.
2. Do not proceed with utility interruptions without Owner's written permission.

3.3 CLEARING AND GRUBBING

A. Remove obstructions, trees, shrubs, grass, and other vegetation to permit installation of new construction.

B. Fill depressions caused by clearing and grubbing operations with satisfactory soil material unless further excavation or earthwork is indicated.

1. Place fill material in horizontal layers not exceeding a loose depth of 8 inches (200 mm), and compact each layer to a density equal to adjacent original ground.

3.4 TOPSOIL STRIPPING

A. Remove sod and grass before stripping topsoil.

B. Strip topsoil to whatever depths are encountered in a manner to prevent intermingling with underlying subsoil or other waste materials.

1. Remove subsoil and non-soil materials from topsoil, including trash, debris, weeds, roots, and other waste materials.

C. Stockpile topsoil materials away from edge of excavations without intermixing with subsoil. Grade and shape stockpiles to drain surface water. Cover to prevent windblown dust.
1. Limit height of topsoil stockpiles to 72 inches (1800 mm).
2. Do not stockpile topsoil within tree protection zones.
3. Stockpile surplus topsoil to allow for respreading deeper topsoil.

3.5 SITE IMPROVEMENTS

A. Remove existing above- and below-grade improvements as indicated and as necessary to facilitate new construction.

B. Remove slabs, paving, curbs, gutters, and aggregate base as indicated.
1. Unless existing full-depth joints coincide with line of demolition, neatly saw-cut length of existing pavement to remain before removing existing pavement. Saw-cut faces vertically.
2. Paint cut ends of steel reinforcement in concrete to remain to prevent corrosion.

3.6 DISPOSAL

A. Disposal: Remove surplus soil material, unsuitable topsoil, obstructions, demolished materials, and waste materials including trash and debris, and legally dispose of them off Owner's property.

END OF SECTION 311100

SECTION 32 11 01 AGGREGATE BASE COURSE FOR PAVING

PART 1 GENERAL

1.1 DESCRIPTION:

A. The work shall consist of furnishing all labor, materials, equipment, and tools necessary for placing aggregate on a prepared subgrade in conformity with the lines, grades, thicknesses, and typical cross sections as shown on the plans or as necessary to complete the project.

B. RELATED DOCUMENTS:
Drawings and General Requirements of the contract including Special Conditions and/or Division 1 Specifications that apply to this Section.

PART 2 PRODUCTS

2.1 AGGREGATE

A. Aggregate shall be mechanically crushed limestone or dolomite. It shall not contain more than 15 percent deleterious rock and shale. Sand may be added only for the purpose of reducing the plasticity index of the fraction passing the No. 40 sieve in the finished product. Any sand, silt, and clay, and any deleterious rock and shale shall be uniformly distributed throughout the mass. The aggregates shall conform to the following gradation requirements:

Passing 1 Inch sieve	100%
Passing 1/2 Inch Sieve	60-90%
Passing No. 4	40-60%
Passing No. 40	15-35%

Plasticity Index of the fraction passing the No. 40 sieve shall not exceed 6. Material shall be delivered with sufficient moisture content to provide specified densities when compacted.

PART 3 EXECUTION

3.1 PLACING: The maximum compacted thickness of any one layer shall not exceed six (6) inches. When the specified compacted depth of the base course exceeds six (6) inches, the base shall be constructed in two or more layers of approximately equal thickness. After preliminary compaction has been secured, finish compaction shall be carried to completion by means of self-propelled steel-wheeled rollers weighing not less than ten (10) tons. Shaping and compacting shall be carried on until a true, even, uniform base course of proper grade, cross section and density is obtained. Proper moisture content shall be maintained by wetting the surface or allowing it to dry as required during shaping and compacting operations. The use of excess water, resulting in run-off or in the formation of a slurry on the surface shall beavoided. The stone base shall be compacted to not less than one hundred (100%) percent of themaximum density at as determined by ASTM D698.

3.2 TOLERANCE: The compacted base shall be brought to within a tolerance of 1/2" or less below design grade. The compacted aggregate base thickness shall not be deficient in excess of 1/2 inch from the plan thickness. Thickness measurement shall be taken and determined for each 800 square yards of base surface.

END OF SECTION 32 11 01

SECTION 32 12 00 - HOT MIX ASPHALT PAVING

PART 1 - GENERAL

1.1 DESCRIPTION

A. The work shall consist of furnishing all labor, materials, equipment, and tools for plant mix bituminous base and surface pavement.

B. RELATED SECTIONS

Section 32 11 23 – Aggregate Base for Pavements.

Section 32 17 23 – Pavement Marking

1.2 SUBMITTALS

A. Product Data: For each type of product indicated. Include technical data and tested physical andperformance properties.

1. Job-Mix Designs: For each job mix proposed for the Work.

B. Material Certificates: For each paving material, from manufacturer.

1.3 QUALITY ASSURANCE

A. Manufacturer Qualifications: A paving-mix manufacturer capable of complying with MoDOT approved asphalt mixes

B. Regulatory Requirements: Comply with materials, workmanship, and other applicable requirements for asphalt paving work.

1.4 PROJECT CONDITIONS

A. Environmental limitations: Do not apply asphalt materials if subgrade is wet or excessively damp, if rain is imminent or expected before time required for adequate cure, or if the following conditions are not met:

1. Tack Coat: Minimum surface temperature of 60 deg F.
2. Asphalt Base Course: Minimum surface temperature of 40 deg F and rising at time ofplacement.
3. Asphalt Surface Course: Minimum surface temperature of 60 deg F at time of placement.

PART 2 - PRODUCTS

2.1 JOINT SEALANT

A. Joint sealant shall meet or exceed ASTM D-3405

B. Joint Sealant shall be Owens Corning Rubber Compound Crack Sealant hot applied rubberized joint sealant or approved equal.

2.2 SEAL COAT

A. Asphalt Emulsion: Seal coat shall meet or exceed ASTM D977 and D2397. Seal coat shall be UltraSeal Systems Type 2, Micropave Supreme (with drying agent) or approved equivalent with sand, properly proportioned, mixed and spread evenly on the existing wearing course in accordance with the manufacturer's recommendations. All components of the sealcoat mixture other than the sand shall be premixed into the product by the manufacturer or distributor. The contractor will not make any additions to the product mixture after receiving it from the manufacturer or distributor.

2.3 AGGREGATES

A. Comply with MoDOT Standard Specifications, Section 1000.
   1. Course Aggregate: ASTM D692/D692M, sound; angular crushed stone, crushed gravel, or cured, crushed blast-furnace slag.
   2. Fine Aggregate: ASTM D1073, sharp-edged natural sand or sand prepared from stone, gravel, cured blast-furnace slag, or combinations thereof.
   3. Mineral Filler: ASTM D242/D242M, rock or slag dust, hydraulic cement, or other inert material.

2.4 ASPHALT MATERIALS

A. Asphalt Binder:

Tack Coat: AASHTO M140, ASTM D977

Prime Coat: MC-30

2.5 MIXES

A. Hot-Mix Asphalt: Dense, hot-laid, hot-mix asphalt plant mixes to be located per plans:

   1. Provide crushed limestone base thickness as shown on plans, meeting MoDOT Standard Specifications for Type 1 and Type 2 aggregate
   2. Provide prime coat
   3. Provide base course equal to MoDOT Standard Specification, Section 401.
   4. Provide surface Course: Asphaltic surface coat thickness as shown on plans BP-1 or BP-2 equal to MoDOT Section 401.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Proof-roll subgrade below pavements with heavy pneumatic-tired equipment to identify soft pockets and areas of excess yielding. Do not proof-roll wet or saturated subgrades.

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

3.2 PATCHING

A. Hot-Mix Asphalt Pavement: Saw cut perimeter of patch and excavate existing pavement section to sound base. Excavate rectangular patches, extending 12 inches (300 mm) into adjacent sound pavement, unless otherwise indicated. Cut excavation faces vertically. Remove excavated material. Recompact existing unbound-aggregate base course to form new subgrade.

B. Tack Coat: Apply uniformly to vertical surfaces abutting or projecting into new, hot-mix asphalt paving at a rate of 0.05 to 0.15 gal./sq. yd. (0.2 to 0.7 L/sq. m).

C. Patching: Fill excavated pavements in two lifts with hot-mix asphalt pavement. Provide a 2" thick base course and compact while still hot. Follow with a 2" thick surface course and, while still hot, compact flush with adjacent surface.

3.3 OVERLAY

A. Examine existing asphalt. Patch as needed to provide satisfactory base for overlay.

B. Overlay shall meet or exceed 2” thick all areas.

C. Feather perimeter to match existing adjacent surfaces.

3.4 SURFACE PREPARATION

A. Immediately before placing asphalt materials, remove loose and deleterious material from substrate surfaces. Ensure that prepared subgrade is properly compacted and ready to receive paving.

1. Sweep loose granular particles from surface of unbound-aggregate base course. Do not dislodge or disturb aggregate embedded in compacted surface of base course.

B. Herbicide Treatment: Apply herbicide according to manufacturer's recommended rates and written application instructions. Apply to dry, prepared subgrade or surface of compacted-aggregate base before applying paving materials.

C. Tack Coat: Apply uniformly to surfaces of existing pavement at a rate of 0.05 to 0.15 gal. /sq. yd. (0.2 to 0.7 L/sq. m).

1. Allow tack coat to cure undisturbed before applying hot-mix asphalt paving.
2. Avoid smearing or staining adjoining surfaces, appurtenances, and surroundings. Remove spillages and clean affected surfaces.

3.5 HOT-MIX ASPHALT PLACING

A. Comply with MoDOT Standard Specifications, Section 401

B. Machine place hot-mix asphalt on prepared surface, spread uniformly, and strike off. Place asphalt mix by hand to areas inaccessible to equipment in a manner that prevents segregation of mix. Place each course to required grade, cross section, and thickness when compacted.

1. Spread mix at minimum temperature of 250 deg F (121 deg C).
2. When paving machines are used, regulate paver machine speed to obtain smooth, continuous surface free of pulls and tears in asphalt-paving mat.

C. Promptly correct surface irregularities in paving course behind paver. Use suitable hand tools to remove excess material forming high spots. Fill depressions with hot-mix asphalt to prevent segregation of mix; use suitable hand tools to smooth surface.

3.6 JOINTS

A. Construction joints to ensure a continuous bond between adjoining paving sections. Construct joints free of depressions, with same texture and smoothness as other sections of hot-mix asphalt course

B. Fill all cracks 1/4" or greater, not associated with alligator areas with hot applied rubberized joint sealant specified above.

C. Prior to filling, clean all cracks using routing compressed air (80 psi minimum) and hand work to remove all dirt, dust, and moisture.

D. Herbicide Treatment: Apply herbicide according to manufacturer's recommended rates and written application instructions. Apply to dry, prepared cracks before applying joint sealant specified above.

3.7 COMPACTION

A. General: Begin compaction as soon as placed hot-mix paving will bear roller weight without excessive displacement. Compact hot-mix paving with hot, hand tampers or vibratory-plate compactors in areas inaccessible to rollers.

1. Complete compaction before mix temperature cools to 185 deg F (85 deg C).

B. Breakdown Rolling: Complete breakdown or initial rolling immediately after rolling joints and outside edge. Examine surface immediately after breakdown rolling for indicated crown, grade, and smoothness. Correct lay down and rolling operations to comply with requirements.

C. Intermediate Rolling: Begin intermediate rolling immediately after breakdown rolling while hot-mix asphalt is still hot enough to achieve specified density. Continue rolling until hot-mix asphalt course has been uniformly compacted to the following density:

1. Average Density: 92 percent of reference maximum theoretical density according to ASTM D 2041, but not less than 90 percent nor greater than 96 percent.

D. Finish Rolling: Finish roll paved surfaces to remove roller marks while hot-mix asphalt is still warm.

E. Protection: After final rolling, do not permit vehicular traffic on pavement until it has cooled and hardened. Erect barricades to protect paving from traffic until mixture has cooled enough not to become marked.

3.8 INSTALLATION TOLERANCES

A. Pavement Thickness: Compact each course to produce the thickness identified within thefollowing tolerances:

1. Base Course: Plus or minus 1/2 inch.
2. Surface Course: Plus 1/4 inch, no minus.

B. Pavement Surface Smoothness: Compact each course to produce a surface smoothness within the following tolerances as determined by using a 10-foot straightedge applied transversely or longitudinally to paved areas:

1. Base Course: 1/4 inch.
2. Surface Course: 1/8 inch.
3. Crowned Surfaces: Test with crowned template centered and a right angle to crown.Maximum allowable variance from template is 1/4 inch.

3.9 SEAL COAT

A. Prior to applying seal coat, clean surfaces to be sealed using mechanical blowers and wire brooms to remove all accumulations of dust, loose aggregate, and other foreign material.

1. Burn and scrape all areas of excessive oil buildup.
2. Remove all debris and dirt from the job site.

B. Apply primer to all areas to be sealed prior to applying seal coat to promote adhesion of sealer.

C. Asphalt Emulsion: First coat shall be applied by brush or squeegee over all pavement areas. Subsequent coat(s) may be machine applied. Apply three (3) coats of seal coat at all entries and turning areas (end of aisles). Allow seal coat to dry thoroughly before applying next coat. Apply seal coat in strict accordance with the manufacturer's written instructions.

D. No lumping, balling, or unmixed aggregate shall be permitted. Any oversized aggregate or foreign materials shall be screened from the aggregate prior to delivery to the mixing machine. No segregation of the emulsion and sand aggregate will be permitted. No streaks, such as caused by oversized aggregate, shall be left in the finished pavement. Any damage to uncured sealcoat will be repaired at the contractor’s expense.

3.10 WHEEL STOPS

A. Any existing wheel stops that must be removed and reinstalled shall be securely reattached into pavement with not less than two galvanized steel dowels embedded at one-quarter to one-third points. Securely install dowels into pavement and bond to wheel stop. Recess head of dowel beneath top of wheel stop. Notify MSU Project Manager if any wheel stops need to be replaced.

3.11 FIELD QUALITY CONTROL

A. Testing Agency: If necessary to ensure compliance with the specifications, the Owner may engage a qualified independent testing and inspecting agency to perform field tests and inspections and to prepare test reports. If test reports or measurements indicate that the work does not comply with specified requirements, the cost of testing and inspecting will be deducted from the Contract Amount.

B. If necessary, additional testing and inspecting, at Contractor's expense, will be performed to determine compliance of replaced or additional work with specified requirements.

C. Replace and compact hot-mix asphalt where core tests were taken.

D. Remove and replace or install additional hot-mix asphalt where test results or measurements indicate that it does not comply with specified requirements.

3.12 DISPOSAL

A. Except for material indicated to be recycled, remove excavated materials from Project site and legally dispose of them in an EPA-approved landfill.

END OF SECTION 32 12 00

SECTION 32 17 00 - PAVEMENT MARKINGS

PART 1 - GENERAL

1.1 DESCRIPTION

A. The work shall consist of pavement markings including parking space designations, directional arrows, painted handicapped symbols and access aisles at designated spaces.

B. Drawings and General Requirements of the Contract including Special Conditions and/or Division 1 Specifications that apply to this section.

1.2 QUALITY ASSURANCE

A. Job Conditions: Do not apply marking paint when weather is foggy or rainy, or ambient or pavement temperatures are below 40 degrees F., nor when such conditions are anticipated during 8 hours after application.

1.3 SUBMITTALS

A. Submit manufacturer's product data and installation instructions.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Traffic Marking Paint:

1. Type: Latex, waterborne emulsion, lead and chromate free, ready mixed, exceeding Federal Specification FS TT-P-1952D. Pavement marking paint shall be Sherwin Williams Acrylic Waterborne Traffic Marking Paint #TM226 or approved equal.

2. Colors:
   a. White: Parking stall stripping, directional emblems, restricted parking zone striping.
   b. Blue: ADA designated parking.

2.2 APPLICATION EQUIPMENT

A. Pressurized, self-contained paint machine capable of applying a straight line from 2 to 6 inch wide, with consistent coverage.

PART 3 - EXECUTION

3.1 INSPECTION AND PREPARATION

A. Locate markings as indicated on Drawings. Provide qualified technician to supervise equipment and application of markings. Lay out markings using guide lines, templates and forms.

B. Thoroughly clean pavement surfaces free of dirt, sand, gravel, oil and other foreign materials.

C. Allow paving to cure before painting as required by manufacturer of traffic paint.

3.2 APPLICATION

A. Apply pavement-marking paint over existing striping, arrows, symbols, and lettering unless noted otherwise. Do not apply pavement-marking paint until layout, colors, and placement have been verified with Owner.

B. Do not apply pavement-marking paint until seal coat has dried thoroughly to prevent seal coat bleeding through marking paint.

C. Apply paint with mechanical equipment to produce pavement markings of dimensions indicated with uniform, straight edges. Apply a minimum of 2 coats of pavement-marking paint at manufacturer's recommended rates to provide a minimum wet film thickness of 15 mils (0.4 mm) per coat.

D. Restrict traffic on pavement until stripping if fully cured.

END OF SECTION 321700