RECREATIONAL TRAILS, SIDEWALKS, AND DRIVEWAYS

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Removal of Recreational Trails, Sidewalks, and Driveways

B. Installation of Recreational Trails, Sidewalks, and Driveways

1.02 DESCRIPTION OF WORK

A. Remove existing recreational trails, sidewalks, and driveways.

B. Install recreational trail.

C. Install sidewalk.

D. Install driveway.

1.03 SUBMITTALS

Follow the General Provisions (Requirements) and Covenants, as well as the following:

A. PCC mix design.

B. HMA mix design.

C. Brick source, absorption, compressive strength; samples of brick showing texture and color.

D. Submit type and color of detectable warnings.

E. Results of required testing.

1.04 SUBSTITUTIONS

Follow the General Provisions (Requirements) and Covenants.

1.05 DELIVERY, STORAGE, AND HANDLING

Follow the General Provisions (Requirements) and Covenants, as well as the following:

A. Portland Cement Concrete: See Section 7010.

B. Hot Mix Asphalt: See Section 7020.

1.06 SCHEDULING AND CONFLICTS

Follow the General Provisions (Requirements) and Covenants.

1.07 SPECIAL REQUIREMENTS

None.

1.08 MEASUREMENT AND PAYMENT

A. Removal of Recreational Trail, Sidewalk, or Driveway:

1. **Measurement:** Measurement will be in square yards for quantity of recreational trails, sidewalks, or driveways removed.

2. **Payment:** Payment will be at the unit price per square yard for the area of recreational trail, sidewalk, or driveway removal.

3. **Includes:** Unit price includes, but is not limited to, sawing, hauling, and disposal of materials removed.

B. Removal of Curb:

1. **Measurement:** Measurement will be in linear feet for removal of curb by grinding or sawing, measured along the back of curb.

2. **Payment:** Payment will be at the unit price per linear foot for the removal of curb.

3. **Includes:** Unit price includes, but is not limited to, hauling and disposal of materials removed.

C. Recreational Trail:

1. **Measurement:** Each type and thickness of recreational trail will be measured in square yards. The area of manholes, intakes, or other fixtures in the pavement will not be deducted from the measured pavement area.

2. **Payment:** Payment will be at the unit price per square yard for each type and thickness of recreational trail.

3. **Includes:** Unit price includes, but is not limited to, subgrade preparation, jointing, sampling, smoothness testing and correction, and testing.

D. Special Subgrade Preparation for Recreational Trail:

1. **Measurement:** Measurement will be in square yards for special subgrade preparation. Measured area will include 2 feet outside of the pavement on either side of the trail.

2. **Payment:** Payment will be at the unit price for the area of special subgrade preparation.

3. **Includes:** Unit price includes, but is not limited to, water required to bring subgrade moisture content to within the required limits.

E. PCC Sidewalk:

1. **Measurement:** Each thickness of PCC sidewalk will be measured in square yards. The area of manholes, intakes, or other fixtures in the pavement will not be deducted from the measured pavement area.

2. **Payment:** Payment will be at the unit price for each thickness of PCC sidewalk.

3. **Includes:** Unit price includes, but is not limited to, minor grade adjustments at driveways and other intersections, subgrade preparation, formwork, additional thickness at thickened edges, jointing, sampling, smoothness testing and correction, and testing.

1.08 MEASUREMENT AND PAYMENT (Continued)

F. Brick Sidewalk:

1. **Brick Sidewalk with Sand Base:**
   a. **Measurement:** Measurement will be in square yards for the area of brick sidewalk placed on a sand base.
   b. **Payment:** Payment will be at the unit price for the area of sidewalk.
   c. **Includes:** Unit price includes, but is not limited to, subgrade preparation, brick edge restraints, furnishing and placing compacted sand base, and sand/cement joint filler.

2. **Brick Sidewalk with Concrete Base:**
   a. **Measurement:** Measurement will be in square yards for the area of brick sidewalk placed on a concrete base. The area of concrete base will not be measured separately.
   b. **Payment:** Payment will be at the unit price for the area of sidewalk.
   c. **Includes:** Unit price includes, but is not limited to, subgrade preparation, concrete base, HMA setting bed, neoprene asphalt adhesive for asphalt setting bed, and sand/cement joint filler.

G. Detectable Warnings:

1. **Measurement:** Measurement will be in square feet for the area of detectable warnings installed. Paved area beneath detectable warnings will be measured with sidewalk or recreational trail item.

2. **Payment:** Payment will be at the unit price for the area of detectable warnings installed.

3. **Includes:** Unit price includes, but is not limited to, steel bar supports and manufactured detectable warning panels.

H. Driveways:

1. **Paved Driveways:**
   a. **Measurement:** Each type and thickness will be measured in square yards. The area of manholes, intakes, or other fixtures in the pavement will not be deducted from the measured pavement area.
   b. **Payment:** Payment will be at the unit price for each type and thickness of driveway.
   c. **Includes:** Unit price includes, but is not limited to, excavation, subgrade preparation, jointing, sampling, and testing.

2. **Granular Surfacing for Driveways:**
   a. **Measurement:** Measurement will be in square yards or tons, as specified in the contract documents, for the quantity of granular surfacing placed.
   b. **Payment:** Payment will be at the unit price per square yard or ton, as specified.
   c. **Includes:** Unit price includes, but is not limited to, excavation and preparation of subgrade.

1.08 MEASUREMENT AND PAYMENT (Continued)

I. Recreational Trail, Sidewalk, and Driveway Assurance Testing:

1. The Contractor will not be responsible for concrete compression or HMA density testing unless otherwise specified in the contract documents.

2. If the contract documents specify that the Contractor is responsible for concrete compression and HMA density testing, performed by an independent testing laboratory hired by the Contractor, measurement and payment will be as follows:
   a. Measurement: Lump sum item; no measurement will be made.
   b. Payment: Payment will be at the contract lump sum price.

3. The Contractor will be responsible for payments associated with all retesting resulting from failure of initial tests.

PART 2 - PRODUCTS

2.01 PORTLAND CEMENT CONCRETE

A. Class B or C concrete with materials complying with Section 7010. Use coarse aggregate of Class 2 durability or better.

B. Comply with the following for PCC mixes for recreational trails, sidewalks, and driveways unless otherwise approved by the Engineer.

Table 7030.01: PCC Mixes

	Machine Finish	Hand Finish
Type of Concrete	Class B or C	Class B or C
Slump Minimum	1/2 in.	1/2 in.
Slump Maximum	2 1/2 in.	4 in.
Percent Air Content		
• Target	7%	7%
• Minimum	6%	6%
• Maximum	8 1/2%	8 1/2%

2.02 HOT MIX ASPHALT

Comply with Section 7020 for mix design.

A. Use 100,000 ESAL, 1/2 inch or 3/8 inch mix.

B. For recreational trails adjacent to pavement that also functions as the pavement shoulder, use 300,000 ESAL, 1/2 inch mix.

C. Use asphalt binder complying with Section 7020 with a performance grade of PG 58-28 or 64-22.

2.03 BRICK PAVERS

A. Clay: Use 8 inch by 4 inch by 2 1/4 inch thick clay paving bricks manufactured to comply with ASTM C 902, Class SX, Type I. Color selection and surface texture as approved by the Engineer.

B. Concrete: Supply as specified in the contract documents.

2.04 HMA SETTING BED FOR BRICK

A. Mixture: Proportion mix using 7% asphalt binder and 93% fine aggregate. Apportion each ton in the approximate ratio of 145 pounds asphalt binder to 1,855 pounds sand. Maintain mix temperature at approximately 250°F during placement.

B. Asphalt Binder: Use asphalt binder complying with Section 7020 with a performance grade of PG 58-28 or 64-22.

C. Fine Aggregate: Use clean, hard sand with durable particles free from adherent coating, lumps of clay, alkali salts, and organic matter. Use sand that is uniformly graded from coarse to fine with all passing the No. 4 sieve and meeting AASHTO T 27.

2.05 NEOPRENE MODIFIED ASPHALT ADHESIVE FOR BRICK

A. Mastic (Asphalt Adhesive):

Solids (Base):	74% to 76%
Pounds per Gallon:	8 to 8 1/2 pounds
Solvent:	Mineral spirits with a flash point above 100° F

B. Base (2% Neoprene, 10% Asbestos-free Fiber, 88% Asphalt):

Melting Point:	200° F minimum according to ASTM D 36
Penetration:	23 to 27 according to ASTM D 5
Ductility:	1250 mm minimum according to ASTM D 113 @ 25° C, and a rate of 50 mm/minute

2.06 BRICK JOINT FILLER

Dry sand-cement mixture consisting of one part masonry cement complying with ASTM C 91 and three parts sand complying with ASTM C 144 and passing the No. 16 sieve. Provide colored cement to match bricks.

2.07 DETECTABLE WARNINGS

Use manufactured detectable warning panels or brick pavers with a non-slip surface and raised truncated domes. Comply with the Americans with Disabilities Act Accessibility Guidelines (ADAAG) for contrast and dimension requirements.

2.08 GRANULAR DRIVEWAY SURFACING

Class A crushed stone or Class C gravel complying with Iowa DOT Section 2315.

PART 3 - EXECUTION

3.01 REMOVALS

A. Remove recreational trails, sidewalks, driveways, bricks, and curbs to the removal limits specified in the contract documents.

B. Saw pavement full depth in straight lines to the specified removal limits.

C. Remove to the specified removal limits without damage to adjacent property, trees, utilities, or pavement that are to remain in place.

D. Salvage and stockpile all bricks removed.

E. Grind or saw existing curbs at locations specified in the contract documents to install recreational trails, sidewalks, and driveways.

F. Dispose of rubble and debris resulting from removal operations.

3.02 SUBGRADE PREPARATION

A. Recreational Trails:

1. **Subgrade Preparation:** Comply with Iowa DOT Section 2109.

2. **Special Subgrade Preparation:**
   a. Construct subgrade to final elevation.
   b. Scarify and mix the top 6 inches of subgrade material to a width equal to that of the proposed pavement, plus 2 feet on each side.
   c. Compact loose subgrade material with Type A compaction complying with Section 2010.
   d. Proof roll compacted subgrade according to Section 2010.

B. Sidewalks and Driveways:

1. Remove all vegetation and roots from ground surface.

2. Construct grade to final subgrade elevation.
   a. Cut area: Remove all material that will be displaced by the sidewalk.
   b. Fill area: Scarify the surface to be covered with embankment to a depth of at least 6 inches and compact. Construct embankment in lifts of 6 inches or less and compact each lift. Tamp surface with a mechanical tamper until firm and unyielding.

3. Remove all soft, spongy, or yielding spots and fill the void with suitable backfill material.

3.03 ADJUSTMENT OF FIXTURES

A. Adjust fixtures to conform to the finished pavement surface. Cooperate and coordinate with the utility agency to ensure proper fixture adjustment.

B. Comply with Sections 5020, 6010, or 8020 as appropriate.

3.04 PCC RECREATIONAL TRAILS, SIDEWALKS, AND DRIVEWAYS

A. Form Setting: Comply with Section 7010 with the following additional requirements and exceptions.

1. Slip form paving equipment may be allowed in lieu of setting forms, if approved by the Engineer.

2. Wood forms are allowed.

3. Use of an automated subgrade trimmer is not required.

4. Set forms true to line and grade and hold them rigidly in place by stakes placed outside the forms and flush with or below the top edge of the forms.

B. Concrete Pavement Placement:

1. Recreational Trails: Comply with Section 7010.

2. Sidewalk:
   a. Maintain moist subgrade in front of paving operation
   b. Deposit concrete on the subgrade as required to minimize rehandling to prevent segregation.
   c. Hand spread with shovels, not rakes.
   d. Place concrete as required to slightly overfill the space between the forms.
   e. Consolidate with vibrators and smooth by use of a straightedge.
   f. Do not contaminate freshly mixed concrete with earth or other foreign materials.

3. Driveways: Comply with Figures 7030.101 and 7030.102 and Section 7010. The use of a paving machine is not required.

C. Finishing:

1. Recreational Trails and Driveways:
   a. Comply with Section 7010.
   b. Provide a burlap drag or broom finish.

2. Sidewalks:
   a. Use a wood float to depress the large aggregate and create a dense surface.
   b. Allow concrete to set until all shine has disappeared from the surface.
   c. Smooth with a metal trowel until surface is free from defects and blemishes.
   d. Construct joints by sawing or by using a jointer or groover tool.
   e. Finish edges of sidewalk or driveway with an edging tool having a radius of approximately 1/2 inch. Ensure tool marks do not appear on the finished surface.
   f. Brush with a soft broom at right angles to the side forms to provide a non-skid surface.

D. Curing: When curing is specified in the contract documents, comply with Section 7010.

E. Form Removal: Comply with Section 7010.

3.04 PCC RECREATIONAL TRAILS, SIDEWALKS, AND DRIVEWAYS (Continued)

F. Jointing:

1. Construction Joints:

a. Locate construction joints to provide uniform joint spacing.

b. Place a construction joint at the close of each day's work or when depositing of concrete is stopped for 45 minutes or more.

c. Form construction joint by using a header board. Set perpendicular to the surface and at right angles to the centerline.

2. Transverse Contraction Joints:

a. Recreational Trails:

1) Space transverse joints equal to the width of the recreational trail, or as specified in the contract documents.

2) Saw contraction joints according to Section 7010.

b. Sidewalks and Driveways:

1) Space sidewalk contraction joints equal to the width of the sidewalk.

2) Space driveway contraction joints so panel length does not exceed 12 feet.

3) Form transverse contraction joints to a depth of 1 1/4 inches with a pointed trowel or jointing tool. In lieu of forming, joints may be sawed within 12 hours of placement with a 1/8 inch blade saw to a depth of 1/3 the pavement thickness. Use a straightedge if joints are sawed with a hand-held saw.

3. Longitudinal Contraction Joints:

a. Recreational Trails and Sidewalks: Saw joint to 1/8 inch wide and to a depth of 1/3 the pavement thickness.

b. Driveways:

1) Space longitudinal contraction joints so panel width does not exceed 12 feet.

2) Form longitudinal contraction joints to a depth of 1 1/4 inches with a pointed trowel or jointing tool. In lieu of forming, joints may be sawed with a 1/8 inch blade saw to a depth of 1/3 the pavement thickness. Use a straightedge if joints are sawed with a hand-held saw.

4. Isolation Joints:

a. Install isolation joints where recreational trails, sidewalks, or driveways abut roadway pavement, parking lots, buildings, and structures.

b. For a sidewalk constructed with a driveway, install an isolation joint on the property side of the sidewalk and a 'C' or 'E' joint on the street side of the sidewalk.

c. Install a 1/2 inch or 3/4 inch thick strip of preformed resilient joint material, according to Section 7010, to the full depth of concrete. Trim any isolation joint material protruding above the finished work to the level of the abutting concrete.

5. Joint Sealing: Do not seal construction or contraction joints in recreational trails, sidewalks, or driveways.

3.05 HMA RECREATIONAL TRAILS AND DRIVEWAYS

Comply with Section 7020. Use Class IC Compaction.

3.06 BRICK SIDEWALKS

A. Brick Sidewalk with a Sand Base:

1. Comply with Figure 7030.203.

3.06 BRICK SIDEWALKS (Continued)

2. Use a cross-section and patterns as specified in the contract documents or approved by the Engineer.

3. Do not use broken bricks or materials with stained faces in the paving areas.

4. Set edge restraints true to line and grade along both edges of brick sidewalk.

5. Place bricks on smooth, compacted bedding sand and tightly set in place without gaps.

6. Compact bricks using a 3 to 5 ton roller or machine with a vibratory plate weighing a minimum of 100 pounds.

7. Tightly compact joints with brick sand/cement.

B. Brick Sidewalks with a Concrete Base:

1. General:
a. Comply with Figure 7030.203.
b. Use a cross-section and patterns as specified in the contract documents or approved by the Engineer.
c. Do not use broken bricks or materials with stained faces in the paving areas.
d. Construct the concrete base to comply with PCC sidewalk construction specifications.

2. HMA Setting Bed:
a. Place 3/4 inch depth control bars on the base to serve as guides for the striking board. Shim depth control bars as necessary to adjust bedding thickness and to ensure the top surface of pavers will be at the required finished grade.
b. Place HMA bedding material between the parallel depth control bars. Pull striking board over bars several times. After each pass, spread fresh bedding material over low or porous spots to produce a smooth and even setting bed. After placing and smoothing each section, advance depth control bars to next section. After removal of depth control bars and shims, carefully fill any depressions that remain.
c. While still hot, roll the HMA bedding with a power roller to a nominal depth of 3/4 inch.
d. Ensure the joints in the concrete base do not project through the HMA setting bed.
e. Apply neoprene modified asphalt adhesive over the top surface of the cooled asphalt setting bed with notched trowel with serration not exceeding 1/16 inch. Allow adhesive to dry to the touch before placing pavers.

3. Brick Pavers:
a. Place the pavers by hand in straight courses with hand tight joints and uniform top surface.
b. Sweep dry joint filler into joints until the joints are completely filled.
c. Fog surface lightly with water to cure cement.
d. Clean any cement stains from brick surface. Remove stains from other concrete surfaces.

4. Protection: Protect newly laid pavers at all times using panels of plywood. Panels can be advanced as work progresses; however, keep the plywood protection in areas that will be subjected to movement of materials, workers, and equipment. Take precautions in order to avoid depressions and protect paver alignment until cured and ready for pedestrian or vehicle traffic.

3.07 DETECTABLE WARNING INSTALLATION

A. Manufactured Panels:

1. Comply with Figure 7030.204.

2. Install according to manufacturer's recommendations.

3. Set panels in fresh concrete.

B. Brick Pavers:

1. Comply with Figure 7030.203.

2. Install according to Section 7030, 3.06.

3.08 TOLERANCES

A. Check finished surface with a 10 foot straightedge placed parallel to the centerline.

B. Ensure the cross-section and profile of the pavement is constructed to within a tolerance of 1/4 inch in 10 feet (0.2%) of the design grades. This does not allow maximum slopes to be exceeded.

C. Mark areas showing bumps of more than 1/4 inch in 10 feet and grind down with an approved grinding tool to an elevation where the area will not show deviations in excess of 1/8 inch.

3.09 GRANULAR DRIVEWAY SURFACING

Comply with Iowa DOT Section 2315.

3.10 CLEANING RECREATIONAL TRAILS, SIDEWALKS, AND DRIVEWAYS

A. Remove all litter and construction materials or tools immediately after the end of the curing period.

B. Remove excess dirt from the site.

C. Broom clean completed recreational trails, sidewalks, and driveways.

3.11 TESTING

A. General: When testing is specified in the contract documents as the Contractor's responsibility, provide testing using the services of an independent testing laboratory approved by the Engineer.

B. Concrete Compression Tests: When the concrete volume placed on a single day exceeds 20 cubic yards, comply with the following test requirements:

1. Prepare at least two test cylinders per day.

2. If the concrete volume placed on a single day exceeds 200 cubic yards, prepare two test cylinders for each 200 cubic yards placed.

3. Provide 7 and 28 calendar day tests according to ASTM C 39.

3.11 TESTING (Continued)

C. HMA Density and Thickness Tests: When the area of HMA placed on a single day exceeds 100 square yards, comply with the following test requirement:

1. Prepare at least two cores per day.

2. If the area of HMA placed on a single day exceeds 2,000 square yards, prepare two cores for each 2,000 square yards placed.

END OF SECTION