OKLAHOMA DEPARTMENT OF TRANSPORTATION
SPECIAL PROVISIONS
FOR
ROLLER COMPACTED CONCRETE PAVEMENT

These Special Provisions revise, amend, and where in conflict, supersede applicable sections of the 1999 Standard Specifications for Highway Construction, English and Metric, as applicable. Units of measurement are provided in the subsections in both English and Metric equivalents. The units applicable for this project will be those specified in the project plans.

(add the following:)

SECTION 440
ROLLER COMPACTED CONCRETE PAVEMENT

440.01. DESCRIPTION.

This work consists of placing roller compacted concrete pavement (RCCP) for temporary crossovers and detours to the thickness as shown on the plans.

440.02. MATERIALS.

All materials shall meet the requirements specified in the Subsections of Section 700-Materials:

Portland Cement Concrete	701
Fly Ash	702

The following special requirements shall be met:

The use of Type III and Type IIIA cement will not be permitted.

Water Cement ratio in the RCCP shall be 0.30 to 0.40. The slump for this water cement ratio should be less than one inch (25mm). No free water should appear in the RCCP mix; the mix should appear dry. The proper paste will be approximately achieved when a handful of the mix can be squeezed to form a ball with no free moisture. Using the weight in pounds of each material, calculate the water-cement ratio(W/C) by the following equation:

W/C=Water/(Cement+Fly Ash+Blast Furnace Slag+Silica Fume)

Minimum cement content shall be 564 lb/cy (335 kg/cm). Air content shall be 5 + 1.5 percent. The air entrainment may be omitted if approved by the Engineer. The minimum 28 day compressive strength shall be 3000 psi (20 mPa). Compressive strength is based on the average of three test cylinders. One set of three cylinders shall be required for each 1000 cubic yards (765 cubic meters) of RCCP.

The freeze/thaw requirement (AASHTO T161) of the coarse aggregate shall be waived. The gradation of the combined aggregate in the RCCP shall be well graded within the limits of

the following table:

SIEVE SIZE	PERCENT PASSING
1 inch (25 mm)	100
No. 4 (4.75mm)	30-70
No. 16 (1.18mm)	10-50
No. 40 (425µmm)	5-25
No. 200 (75µmm)	2-12

Material passing the No. 200 screen shall be non-plastic.

440.03 EQUIPMENT.

The equipment shall be subject to approval of the Engineer and shall comply with the following:

(a) **Mixing plant.** The mixing plant shall be no more than 30 minutes haul time from the placing site. The mixing plant will be a twin shaft, continuous flow pugmill mixer or a central concrete batch plant equipped with synchronized metering devices and feeders to maintain the correct proportions of aggregate, cementitious materials, and water (as described in subsection 414.03.(a)(1) of the 1999 Specifications Book). The mixing plant must be capable of producing a uniform mixture. The mixing plant shall have a minimum output capacity of 220 tons (200 metric tons) per hour.

(b) **Discharge Hopper.** The pugmill shall be equipped with a discharge hopper having a capacity of at least 1.1 ton (1 metric ton). The discharge hopper shall be equipped with dump gates to ensure rapid and complete discharge without segregation.

(c) **Controls.** Cementitious material feed unit, aggregate bins, and water control units shall be in accordance with Section 414.

(d) **Paver.** The RCC mix will be placed by mechanical grade-controlled self-powered pavers capable of spreading the RCCP mix within specified tolerances, true to line, grade, and crown indicated.

(e) **Compaction rollers.** The RCCP mix will be compacted with self-propelled smooth steel drum rollers with a mass of 10 tons (9 metric ton) to 20 tons (18 metric tons) capable of vibratory primary compaction and static finish rolling.

(f) **Other compaction equipment.** Light walk-behind, or similar sized vibratory rollers and mechanical tampers shall be furnished for use in compaction areas inaccessible to the large rollers.

(g) **Haul trucks.** Haul trucks shall be in accordance with Section 414.

440.04. CONSTRUCTION METHODS.

(a) **Placement.** Place the RCCP to the thickness, grades and lines as indicated in the plans or as directed by the engineer. No layer shall be in excess of 8 inches(200mm) or less than 4 inches(100mm).

(b) **RCCP levels.** Do not allow the level of RCCP mix in the paver hopper to approach empty between loads, and maintain the RCCP mix above the auger shaft during paving.

(c) **RCCP placement restrictions.** Cold weather placement, temperature limitations and protection of the pavement shall be in accordance with Section 414.

(d) **Placement procedures.** Place the RCCP mix with the paver to a sufficient depth that will produce the specified thickness when compacted and conform to the required cross-section and grade. Operate the paver in a manner that will prevent segregation and produce a smooth continuous surface without tearing, pulling or shoving. Limit the length of RCCP spread to that which can be compacted and finished within the appropriate time limit under the prevailing air temperature, wind and other climatic conditions.

(e) **Adjacent lanes.** Place adjacent lanes in not less than 45 minutes unless a cold joint is provided. The time limit may be increased or decreased, depending on ambient conditions of temperature and humidity as approved by the engineer.

(f) **Hand placement.** Place RCCP by hand involving very small, odd-shaped areas where use of machine placement is impractical. Placement shall be in a manner to prevent segregation. Spread the mixture uniformly with shovels in a loose layer of thickness that, when compacted, will conform to density, grade, thickness, and surface texture requirements.

(g) **Rolling.** Compact with a self-propelled vibratory steel wheel rollers. Rolling shall begin within 10 minutes of spreading and except for fresh joints shall be completed within 45 minutes of start of mixing. Increase or decrease the time, depending on the ambient conditions of temperature and humidity, as approved by the Engineer. Rolling shall be completed consistent with a rolling pattern established with a nuclear density gage for maximum density. During vibratory compaction, do not let the roller start or stop in vibratory mode. Stagger the stopping point of successive rolling passes to avoid forming a depression on the surface.

(h) **Curing.** Cure the RCCP by keeping the surface continuously moist by spray truck or by use of a sprinkler system for a minimum of seven days or until the RCCP reaches 3000 psi (20mPa) whichever comes first or in accordance with Section 414.

(i) **Finish.** Finish the surface texture with a burlap drag or astroturf.

(j) **Thickness.** Ensure that the compacted thickness complies with the design thickness of the pavement. The Contractor may be required to core the RCCP, at his expense, to verify the thickness of the pavement at the rate of one core per 500 square yards (418 square meters). All core holes shall be patched by the Contractor at his expense with a material approved by

the Engineer. The average thickness of all cores shall be equal to or greater than plan depth with no individual core thickness deficient by more than one inch (25mm). If the average thickness is less than the design thickness, deductions in the RCCP pay item for deficient cores shall the volume placed less the theoretical volume applied at the bid price unit. If one or more cores are deficient by more than one inch (25mm), the deduction will be tripled.

(k) Tolerances. Surface tolerances shall be in accordance with Section 401 for PC Concrete Pavement.

440.05. METHOD OF MEASUREMENT.

Roller Compacted Concrete Pavement shall be measured in square yards (square meters) as indicated on the plans of completed pavement for the specified thickness.

440.06. BASIS OF PAYMENT.

Accepted quantities, measured as provided above, will be paid for at the contract unit price for:

ROLLER COMPACTED CONCRETE
PAVEMENT.....SQUARE YARD (SQUARE METER)

which shall be full compensation for furnishing all materials, equipment, labor and incidentals necessary for proportioning, mixing, delivery and placement of the concrete.