

tractor shall furnish the necessary extra material to bring the fills to the proper width and grade. When the earth work is completed the cross-section of the road shall conform to the cross-sectional drawings and profile shown in Fig. 1.

15. All slopes shall be properly dressed to lines given by the engineer.

16. Finished Grade.—When grade line is approached, the final grade stakes will be set, for which sufficient notice must be given to the engineer. (In excavating cuts, it is considered advisable, when the line of the sub-grade is approached, to compact the remaining material by rolling. The depth of material left in the cut to be compressed to the finished grade by rolling will depend upon the character of the material.)

17. Drainage.—The contractor shall construct such drainage ditches as will insure perfect sub- and surface-drainage during construction and such work shall be completed to the satisfaction of the engineer, prior to the preparation of the roadbed as herein specified.

Tile drains shall be placed as shown in the drawings attached hereto. Tile to be laid in the trench at least(.....) inches wide and(.....) feet deep below the established grade of the finished pavement. Such trench shall be back filled with crushed stone or pit run gravel, with sand removed, which after light tamping shall be(.....) inches in depth.

Open ditches must be constructed along the concrete road as shown in Fig. 1, the dimensions, side slopes and grade of said ditches being as shown on the cross-section and profile.

At the time of the acceptance of the road, the ditches must be in perfect condition, with clean slopes and bottom, containing no obstructions to the flow of water.

Sub-grade.—18. Construction.—The bottom of the excavation or top of the fill, when completed, shall be known as the sub-grade, and shall be at all places true to the elevation as shown on the plans attached hereto.

The roadway shall be graded to the proper sub-grade to permit of the specified thickness of paving materials being laid to bring the finished surface of the pavement to the lines and grades as shown on the plans.

The sub-grade shall be brought to a firm, unyielding surface by rolling the entire area with a self-propelled roller weighing not less than ten (10) tons, and all portions of the surface of the sub-grade which are inaccessible to the roller shall be thoroughly tamped with a hand tamp weighing not less than fifty (50) pounds, the face of which shall not exceed 100 square inches in area. All soft, spongy or yielding spots and all vegetable or other objectionable matter shall be entirely removed and the space refilled with suitable material.

Where considered necessary or of assistance in producing a compact, solid surface, the sub-grade before being rolled shall be well sprinkled with water.

When the concrete pavement is to be constructed over an old roadbed composed of gravel or macadam, and the concrete is to be wider than the old gravel or macadam road, the latter shall be entirely loosened and the material spread for the full width of the roadbed and rolled. All interstices shall be filled with fine material, and rolled to make a dense, tight surface of the roadbed.

19. Acceptance.—No concrete shall be deposited upon the sub-grade until it is checked and accepted by the engineer.

20. Completion.—Upon the sub-grade thus formed shall be laid the concrete pavement as shown in Fig. 1.

Forms.—21. Materials.—The forms shall be free from warp, of sufficient strength to resist springing out of shape, and shall be equal in width to the thickness of the pavement at the edges. Wooden forms shall be of not less than two (2) inch stock and shall be capped with two (2) inch angle iron.

22. Setting.—The forms shall be well staked or otherwise held to the established line and grades, and the upper edges shall conform to the established grade of the road.

23. Treatment.—All mortar and dirt shall be removed from the forms that have previously been used.

Pavement Section.—24. Width, Thickness of Concrete and Crown.—The concrete pavement shall be.....feet wide,.....(.....) inches in depth at centre, and.....(.....) inches in depth at the sides. The finished surface shall conform to the arc of a circle, as shown on Fig. 1.

NOTE.—Crown shall be not more than one-one-hundredth ($1/100$) of the width. The thickness of the concrete at the edges shall not be less than six (6) inches.

Joints.—25. Width and Location.—Transverse joints shall be not less than one-quarter ($1/4$) inch nor more than three-eighths ($3/8$) inch in width and shall be placed across the pavement perpendicular to the centre line, not more than 35 feet apart. When a curb is specified or where pavement abuts a building a joint not less than one-quarter ($1/4$) inch wide shall be placed between it and the pavement. All joints shall extend through the entire thickness of the pavement and shall be perpendicular to its surface.

26. Protection of Joints.—The concrete at transverse joints shall be protected with soft steel joint protection plates which shall be rigidly anchored to the concrete. The installation of the metal protection plates shall meet with the approval of the engineer. The surface edges of the metal plates shall conform to the finished surface of the concrete, as shown in Fig. 1.

All joints over one-quarter ($1/4$) inch high or one-half ($1/2$) inch low shall be removed.

27. Joint Filler.—All joints shall be formed by inserting during construction and leaving in place the required thickness of joint filler which shall extend through the entire thickness of the pavement.

Measuring Materials and Mixing Concrete.—28. Measuring.—The method of measuring the materials for the concrete, including water, shall be one which will insure separate and uniform proportions of each of the materials at all times. A bag of Portland cement (94 lbs. net) shall be considered one (1) cubic foot.

29. Mixing.—The materials shall be mixed to the desired consistency in a batch mixer of approved type, and mixing shall continue for at least forty-five (45) seconds after all materials are in the drum. The drum shall be completely emptied before mixing successive batches. The drum of the mixer used shall revolve at a speed not less than the minimum nor more than the maximum number of revolutions shown in the following table:

Rated capacity, cu. ft. unmixed material.	Capacity, bags of cement in 1:2:3 mix.	Revolutions per minute of drum.	
		Min.	Max.
7 to 11	1	15	21
12 to 17	2	12	20
18 to 23	3	12	20
24 to 29	4	11	17
30 to 33	5	10	15