



EXPLANATION FOR SEWER IN WESTERN STREET BETWEEN... APPROXIMATE ESTIMATE OF WORK TO BE DONE...

PLAN AND PROFILE The work herein provided for shall be done in accordance with these specifications, plans and profiles on file in the office of the City Engineer of the City of San Bernardino.

EXCAVATION The subgrade for pipe sewers shall be the exterior bottom of the pipe and the excavation shall be made a sufficient distance between the depth indicated by the grade line on the profile and shown on the grade stakes set by the City Engineer as shown on the plans, to allow for the placing of the sewer invert.

The width of the trench shall be at least twelve (12) inches more than the exterior diameter of the pipe.

The material taken from the trench shall be deposited nearby... The material taken from the trench shall be deposited nearby...

All soft and spongy material shall be removed to a depth of one (1) foot below grade and shall be replaced with clean sand or gravel which shall then be moistened and tamped until it is solid.

SEWERING

Whenever necessary to prevent caving of the banks or injury to adjacent pipes, the contractor shall, at his own expense brace and shoring the trenches sufficiently to overcome the difficulty to the satisfaction of the City Engineer.

WATER IN TRENCHES

In general all water encountered in trenches must be drained away through sub-drains or pumped or bailed out, and the trenches must be kept dry for pipe laying.

REFILLING

After a section of the pipe sewer has been laid and the mortar used in the joints has sufficiently set, earth free from stones shall be carefully placed by hand, under and around the pipe, and to the height of one foot above the top of the sewer.

Surplus material not required in refilling trenches shall be promptly removed by the contractor as the refilling progresses and disposed of by him, and in case of deficiency of material, it shall be supplied by the contractor.

All paving removed by the contractor shall be replaced at the expense of the contractor and the surface shall be left in as good a condition as it was originally.

When existing sewer, water or gas mains are encountered in the work, all necessary precautions shall be taken to prevent injury to them and in case of injury, it shall be made good by the contractor without additional compensation.

SEWER PIPES

All sewer pipe shall be of the first quality, vitrified clay sewer pipe, of the hub and spigot pattern, of standard thickness and dimensions of hubs.

The dimensions of the hubs shall be sufficient to leave an annular space for joints of at least three-eighths (3/8) inch thickness for four (4), six (6), eight (8) and ten (10) inch pipe, and one-half (1/2) inch thickness for larger diameters.

All pipes and specials shall be sound and well burned, with a clear ring, well glazed and smooth on the inside and free from blisters, lumps or flakes which are thicker than one eighth (1/8) the normal thickness of the pipe and whose largest diameters are greater than one eighth of the inner diameter of said pipe, and all pipe having broken blisters, lumps or flakes of any size shall be rejected unless the pipe can be so laid as to bring all of these defects on the top of the sewer.

Pipes having fire-cracks of any kind extending through the thickness shall be rejected. No pipe shall be used, which, designed to be straight, varies from a straight line more than one-eighth (1/8) inch per foot of length, nor shall there be any variations between any two diameters of a pipe greater than one-twenty-fourth (1/24) the normal diameter.

No pipe shall be used which has a piece broken from the spigot and deeper than one inch or longer at any point than one-fourth (1/4) the diameter of the pipe, nor which has a piece broken from the bell and if the fracture extends into the body of the pipe, or if such fracture cannot be placed at the top of the pipe. Any pipe which betrays in any manner a want of thorough vitrification, or fusion, or the use of impure or insufficient materials or methods in its manufacture shall be rejected.

PIPE LAYING

In laying the pipe each piece must be set exactly to grade by measuring from the invert to a tightly stretched cord set parallel to the grade line of the sewer, according to stakes given by the City Engineer.

In making each joint, care must be taken so as to make the inverts set exactly, giving a true, smooth flow line. The joints shall be tightly packed and sealed with a one (1) to two (2) Portland Cement and sand mortar.

MORTAR

All mortar for brick work shall be composed of one (1) part Portland Cement to three parts sand. All mortar for pipe joints shall be composed of one (1) part Portland Cement to two (2) parts sand.

BRICK

The brick shall be hard, well burned, equal to a No. 2 paving brick. All soft brick will be rejected.

CEMENT

All cement used shall be Portland Cement and must conform to the following requirements and be subject to the following test, which will be open at all times to the contractor.

- (a) FINENESS. The residue on a 200 mesh sieve shall not exceed twenty-two (22) per cent by weight.

- (b) SOUNDNESS. A part of cement paste about three (3) inches in diameter and one-half (1/2) inch in thickness at the center, tapering to a thin edge, stored in moist air for twenty-four

- (c) TIME OF SETTING. The cement shall not develop initial set in less than forty-five (45) minutes when tested with a Vicat Needle, nor in less than sixty (60) minutes when tested with a Gilmore needle. Final set shall be attained within ten (10) hours.

- (d) TENSILE STRENGTH. The average tensile strength in pounds per square inch of not less than three (3) mortar briquettes, composed of one (1) part by weight of cement and three (3) parts by weight of sand, shall not be less than the following:

Table with 3 columns: Age at Test, Storage of Briquettes, Pounds per sq. In. (7 days: 1 day in moist air, 6 days in water, 200; 28 days: 1 day in moist air, 27 days in water, 300)

The average tensile strength in twenty-eight (28) days shall be greater than the average tensile strength in seven (7) days. The City Engineer shall have the authority to require any lot of cement to be held in storage until seven (7) days test can be completed where this cement is of a brand not previously tested by him or where previous samples of the same brand tested by him have fallen below the requirements herein set forth.

Cement shall be received on the job in sacks filled at the cement factory, each containing not less than ninety-four (94) pounds net weight of cement.

SAND AND GRAVEL

The sand shall be clean, sharp, clean sand, hard and durable, free from muck, clay, or organic matter. The gravel shall be hard and durable, the largest piece of which shall be, in its largest dimension not greater than two (2) inches.

CONCRETE

The concrete for the floors of manholes and risers shall be composed of one (1) part Portland Cement and two (2) parts sand and four (4) parts screened gravel.

MANHOLES

Manholes shall be constructed in accordance with, and at the locations shown on the plans. Manholes shall have a concrete foundation covering the entire area of the base, said foundation being of the dimensions shown on the detail plan. The base shall be circular in form and shall have an internal diameter of four (4) feet in the clear. This size shall be carried to a point three and one-half (3 1/2) feet below the top of the manhole, and the walls shall then be gradually drawn into a circle, six (6) inches below the top of the manhole and having a clear internal diameter of two feet. The walls shall be of brick, eight (8) inches thick and every fourth course shall be laid as headers. The brick shall be thoroughly saturated with water before laying and shall be laid with joint joints in full bed of mortar. All joints shall be left full of mortar and inside joints shall be neatly struck. The inside of the walls and the floor of the manhole shall be plastered with a one-half (1/2) inch coat of cement mortar composed of one part Portland Cement and two parts screened sand.

Manholes shall be capped with cast iron frames and covers of patterns shown on the plans and weighing not less than three hundred and fifty (350) pounds and set in concrete, as shown on the plan.

The casing shall be sound, free from cracks or flaws, and thoroughly cleaned. Ladder rungs of three-quarter (3/4) inch round iron shall be securely bedded in the sidewalls of manholes fifteen (15) inches apart vertically as indicated on the plans, and shall be painted with asphaltum paint.

CONNECTIONS

The contractor shall not allow any drains to be connected with the sewer before completion and acceptance of the same. The contractor shall remove all rubbish or surplus material occasioned by the work, from the work after its completion and before he makes application for the acceptance of the work.

The words "connecting sewers" as herein used shall mean the connecting sewers extending from the main sewer to be constructed as herein provided to the adjacent curb line as shown on the plans and shall be constructed of four inch clay pipe and shall be connected with the main sewer in the street with eight-inch x four-inch wyes.

FINISH OF SEWERS

Extra earth derived from the trenches in streets shall be carefully and neatly graded over the trenches and the streets left in a smooth and finished condition. Extra earth at manholes shall be removed from the streets by the contractor. During the refilling the sheeting shall be carefully withdrawn in such manner as to pre-