J. Concrete Cradle and Encasement:

(Refer to Drawings S-2 and S-3 in Construction Details Section of Specifications for additional information.)

1. Preparation: Prior to the formation of cradle or encasement, if any, temporary supports consisting of timber wedges and solid concrete bricks or cap blocks shall be used to support the pipe in place. Temporary supports shall have minimum dimensions and shall support the pipe at not more than two locations, one at the bottom of the barrel of the pipe adjacent to the shoulder of the socket and the other near the spigot end.
2. Placing: After jointing of the pipe has been completed, concrete shall be uniformly poured beneath and on both sides of the pipe. Placement shall be done by the use of suitable equipment. The concrete shall be wet enough during placement to permit its flow, without excessive prodding, to all required points around the pipe surface. The width of cradle shall be such as to fill completely the trench width. In case of extremely wide trenches, concrete encasement may be confined above the top of the pipe to a narrower width but in no case shall it be less than the width of trench required for the size of pipe being used. Before depositing concrete, the space within the limits of the pour shall have been cleared of all debris and water. Water shall not be allowed to rise adjacent to, or flow over, concrete deposited for less than twenty-four hours. Concrete shall be protected from the direct rays of the sun and kept moist, by a method acceptable to the Engineer, for a period of seven days or until backfilling is begun. In no case shall backfilling begin within twenty-four hours of the time of placing and the Engineer shall have strict control of the rate of backfilling.
3. Concrete: 3,000 psi per requirements of Section 03300 — Cast-in-Place Concrete.

3.3 SERVICE CONNECTIONS

(Refer to Drawings S-14, S-14, S-16, and S-17 in Construction Details Section of Specifications for additional information.)

A. Fittings, (wye branches, risers and bends) and service pipe shall be provided in strict accordance with these Specifications and any and all practices and precautions required for the sewer main are equally applicable to the service connections from the sewer to 1 foot behind the curb line, right-of-way line, or edge of paved surface, or to a location designated by the Engineer. The Contractor shall place a 2- x 2-inch wooden marker at the end of each sewer lateral. The marker shall be one piece and may not be constructed from two (2) or more smaller pieces. The marker shall extend from the lateral invert to 12 inches above grade.

B. Service connections are to be installed at a grade of 1/4-inch per foot from the main line to the termination of the lateral.

C. The Contractor shall submit to the Engineer, on a monthly basis, all as-built information which shall include: manhole run, station, length from centerline of sewer, invert elevation at the termination point of lateral and the address or proper Authority's name for whom the lateral and the address or proper Authority's name for whom the lateral is provided.

D. If rock is encountered during the installation of the lateral, the Contractor shall extend the lateral to the required distance as specified elsewhere in these Specifications, and he shall provide a minimum "rock-free" distance of 1 foot beyond the end of the lateral. No lateral shall be "butted" against rock.

E. Plugs: Close free ends of branches and service connections with a carefully fitted plug. Type of plug used and method of installation shall meet Engineer's approval. Installed plugs shall successfully pass line acceptance tests.

3.4 SPECIALS ("Y" Branches)

A. Wherever necessary, the Developer/Building shall lay "Y" branches of the same material and strength as the sewer line for the purpose of making building connections. The "Y" branch shall be supported throughout by crushed stone. The "Y" branches shall not be backfilled until location has been noted on the Contractor's as-builts to be provided for the Authority. The "Y" also shall be laid at an angle as shown on Drawing S-18 in the Construction Details Section of the Specifications.

3.5 DEEP-CUT LATERALS

A. Where required, deep-cut laterals shall be constructed and all pipe shall conform to Specifications. Core shall be taken to have all the joints perfectly made and the alignment correct. They shall be encased in concrete into the required height. The concrete shall cover the pipe for a depth of at least 5 inches in all places. Refer to Drawing S-19 in Construction Details Section of Specifications for detailed information.

3.6 PIPELINE TESTING PREPARATION

A. Backfill trenches in accordance with detail on drawings.

B. Provide pressure pipeline with concrete reaction support blocking.

C. Flush pipeline to remove debris. Collect and dispose of flushing water and debris.

D. Clean pipelines by propelling a snug fitting rubber ball through the pipeline with water from the upstream manhole to the downstream manhole. Investigate and correct any stoppage of the cleaning ball. Collect and dispose of cleaning water and debris.

E. Lamping:

1. After flushing and cleaning, lamp gravity pipeline in the presence of the Engineer.
2. Assist the Engineer in the lamping operation by shining a light at one end of each pipeline section between manholes. The Engineer will observe the light at the other end. Pipeline that has not been installed with uniform line and grade will be rejected. Remove and re-lay rejected pipeline sections. Reclean and lamp until pipeline section achieves a uniform line and grade to the satisfaction of the Engineer.

F. Plug outlets, wye branches, and laterals. Brace plugs to offset thrust.

G. All testing for pipes and manholes shall be conducted with an Authority representative on site.

3.7 TESTING GRAVITY SEWER PIPELINES

A. Low-Pressure Air Test:

1. Test each newly installed section of gravity sewer line between manholes.
2. Slowly introduce air pressure to approximately 4.0 psig.
3. Allow pressure to stabilize for at least five minutes. Adjust pressure to 3.5 psig or the increased test pressure as determined below if groundwater is present. Start the test.
4. Test:

a. Determine the test duration for a sewer section with a single pipe size from the table below:

Nominal Pipe Size	T (Time) Min/100 Ft.
4	.3
6	.7
8	1.2
10	1.5
12	1.8

b. Record the drop in pressure during the test period. If the air pressure has dropped more than 1.0 psig during the test period, the line is presumed to have failed. If the 1.0 psig air pressure drop has not occurred during the test period, the test shall be discontinued and the line will be accepted.

c. If the line fails, determine the source of the air leakage, make corrections, and retest. The Contractor has the option to test the section in incremental stages until the leaks are isolated. After the leaks are repaired, retest the entire section between manholes.