XII. SANITARY SEWER

The City's sewer collection system generally flows by gravity to the Main Sewer Pump Station located on McCarthy Blvd. in the northwestern part of the City. The Pines Neighborhood drains to Venus Pump Station, a small lift station, in the southwestern part of the City.

All design submittals shall show all sewer lines necessary for the development, including planned City Master Sewer Plan Lines.[a] Submittals shall show sizes, sewer pipes, appurtenances, manholes, laterals and all sewer profiles (slopes, invert elevations and proposed surface elevations) and shall show cleanouts and sewer backflow devices.

A. Design Criteria

1. Material

a. *Polyvinyl Chloride (PVC) Pipe.* PVC pipe and fittings shall conform to ASTM D3034 (SDR 35) for pipe diameters four inches (4") through fifteen inches (15") and ASTM F679 for pipe diameters from eighteen inches (18") through twenty-four inches (24"), as amended to date. PVC pipe shall only be allowed for residential sewage flows.

1. *Joints:* Joints shall be bell gasket joints. Gaskets shall conform to ASTM F477. Joints shall conform to ASTM D3212.

2. *Fittings:* Fittings shall be from the same manufacturer as the pipe.

3. *Caps:* Caps shall be furnished with branch pipes that are to be left unconnected. Caps shall consist of the same materials as the pipe. Caps of the type recommended by the pipe's manufacturer shall be used.

b. *Reinforced Concrete Pipe (RCP).* RCP shall be Class III and conform to ASTM C76 for sewer pipe and lined with PVC T-lock sheets applied at the top 300 degrees of the pipe. Portland Cement used in the manufacturing of RCP shall conform to the specifications for Type V Portland Cement, ASTM C150 as amended to date, unless otherwise specified in the special provisions or shown on the plans.

[a] **City of Milpitas Sewer Master Plan Update, RMC Inc., December 2009.**

1. *Joints:* Joints shall be neoprene compound rubber gasket joints. Gaskets shall conform to AWWA C302 Paragraphs 3.3 and 3.4.

2. *Fittings:* Fittings shall be from the same manufacturer as the pipe.

3. *Caps:* Caps shall be furnished with branch pipes that are to be left unconnected. Caps shall consist of the same materials as the pipe. Caps of the type recommended by the pipe's manufacturer shall be used.

c. *Ductile Iron Pipe (DIP).* DIP shall conform to ANSI A21.50 (AWWA C150). DIP shall only be allowed for sewer laterals, unless otherwise specified in the project design special provisions or shown on the plans.

1. *Joints:* Joints shall be rubber gasket push-on joints with the rubber gasket forming the sole element relied upon for sealing. Joints shall conform to ANSI A21.11 (AWWA C11).

2. *Fittings:* Fittings shall be from the same manufacturer as the pipe.

3. Caps: Caps shall be furnished with branch pipes that are to be left unconnected. Caps shall consist of the same materials as the pipe. Caps of the type recommended by the pipe's manufacturer shall be used.

d. *ABS Schedule 40 Cellular Core (Foam Core) Pipe and DWV Fitting System:* Pipe and fittings shall be manufactured from ABS compound with a cell class of 42222 for pipe and 32222 for fittings as per ASTM D 3965 and conform with National Sanitation Foundation (NSF) standard 14. Pipe shall be iron pipe size (IPS) conforming to ASTM F 628. Fittings shall conform to ASTM D 2661.

All pipe and fittings to be produced by a single manufacturer and to be installed in accordance with manufacturer's recommendations and local code requirements. **WARNING!** Never test with or transport/store compressed air or gas in ABS pipe or fittings. Solvent cement shall conform to ASTM D 2235. The system to be manufactured by Charlotte Pipe and Foundry Co. or equivalent and is intended for non-pressure drainage applications where the temperature will not exceed 160°F.

2. Hydraulics

a. Coefficient of friction "n" shall be 0.013

b. Minimum velocity shall be 2 feet per second

c. Maximum velocity shall be 8 feet per second

3. Design Capacity

a. Collection System Capacity Required (Q):

Q = [Average Daily Flow (QADF) x Peak Factor (PF)] + Rainfall Inflow and Infiltration (I/I) + Groundwater Infiltration (GWI)

Based on the 2009 Sewer Master Plan update:

PF = 1.45

I/I = 970 Gallons per Day (GPD)/Net acre[a]

GWI = 320 GPD/Net acre.

b. Average Daily Flow Generation Factors:

Commercial:	Town Center	1,700 GPD/Net Acre
	Mixed Use	1,500 GPD/Net Acre
	All Other	1,000 GPD/Net Acre
Industrial:	Industrial Park	400 GPD/Net Acre
	Manufacturing/Warehousing	600 GPD/Net Acre

Single Family:	Very Low	330 GPD/DU
	Low	330 GPD/DU
	Medium	315 GPD/DU
	Hillside	330 GPD/DU
Multiple Family:	Very High	245 GPD/DU
	High	245 GPD/DU
	Medium	310 GPD/DU
Mobile Homes:		110 GPD/DU

Transit Area (high density): Residential with required retail: 3,000 GPD/Net acre

Commercial mixed use: 2,000 GPD/Net acre

d. New pipe design shall be based on maximum allowable d/D of 0.8 for peak hour.

[a] **Net acre is defined as area excluding major private streets, freeways and railroad.**

The above provides criteria for minimum required capacity. Note that engineering judgments shall be used for small and some individual developments since the capacity determined by calculations may be inadequate.

4. Easements

Minimum 10 feet wide. Trees and deep-rooted plants are not permitted within easements.

5. Pipeline Locations

a. Street centerline, when a landscaped median is located on centerline, no deep-rooted plants or trees shall be permitted within the median.
b. The minimum pipe crossing clearance with other utilities is one foot. Where the minimum clearance cannot be met, encasement or cap shall be designed by the developer's engineer and approved by the City Engineer.
c. Also, refer to Exhibit C of the potable water section for California Department of Public Health guidance criteria for minimum separation distance between potable, storm, and recycled water lines, dated October 16, 2003.
d. Sewer pipes shall be constructed through the development to serve upstream properties, and include capacity for the upstream area.
e. Provide stubs for future extensions.

6. Manholes

a. Manholes are required every 500 feet at a minimum.
b. Manholes are required at all changes of flow direction, including the terminus, and at all changes of pipe size.
c. Allow 0.2 foot drop around a 90° bend in manhole. Allow 0.1 foot drop for all others.

7. Pipe Cover

5 feet minimum cover is required.

8. Pipe Size (minimum)

a. Mains

1. Residential = 6 inches
2. Industrial/Commercial = 8 inches

b. Laterals

1. Residential = 4 inches
2. Industrial/Commercial = 6 inches

9. Lateral Grade (minimum)

Lateral grade = 1/4" per foot. Cleanout shall be constructed to grade. Sewer backflow device may be required by the Chief Building Official (refer to City Standard Drawing No. 624 for more information). Manholes may be required in lieu of cleanouts.

10. Pre-treatment

Special pre-treatment may be required per City code for discharge of industrial or commercial wastewater to the sewer. Inquire with the San Jose/Santa Clara Water Pollution Control Plant at (408) 793-5300 to determine if an Industrial Wastewater Discharge Permit is required.

11. Guidelines for High-Density Development

Sewer systems located within high-density projects shall be privately owned, operated and maintained. Building foundation design shall take into account placement of underground utilities and shall accommodate future excavation for repair and replacement. Project CC&R's shall include sufficient language to cover City bill payment, minimum standards for operation and repair, regulatory requirements and distribution of costs among tenants. Sewer backflow devices are required on each lateral. Grease traps are required for food service establishments.

12. See Section titled Plans General Requirements for more information.

B. Construction Criteria

1. Air Test

An air test is required prior to the City's acceptance of sewer improvements. The contractor shall plug all lateral sewers. The sewer main ends shall be plugged and

braced where needed, and if buildings have been connected, cleanouts shall be plugged also.

The contractor will supply the necessary metering equipment and hoses for the test and a blower or compressor with adequate capacity to perform the test.

The line shall be supplied with air until 4 psig has been reached, at which time the flow to the pipe shall be shut off. The inspector will then determine the time of loss of 1 psi pressure in the range from 3.5 psig to 2.5 psig.

The minimum time allowable for loss of 1 psi shall be computed by use of the following table or formula.

> (Diameter of pipe in inches)^2 x 0.0109 seconds per linear foot of pipe equals time required to lose one pound of air pressure (from 3.5 pounds to 2.5 pounds) at a loss rate of 3 cubic feet per minute.

For computation, the following table will apply:

Size of pipe	Seconds per linear foot of pipe
4”	0.17
6”	0.39
8”	0.70
10”	1.09
12”	1.57
15”	2.45
18”	3.53
21”	4.81
24”	6.28
27”	7.95
30”	9.82
33”	11.88
36”	14.14

Any pipe test section losing a pound of air in less than this time will leak more than 3.5 cubic feet per minute and shall be rejected.

The amount of water that will infiltrate at six foot head through this opening will vary from 10 to 60 gallons per hour, depending on the size and shape of hole or holes.