

ARTICLE V. - ENGINEERING AND CONSTRUCTION STANDARDS

DIVISION 1. - GENERALLY

Sec. 126-611. - Engineering data.

The following engineering data is required for subdivisions; all preliminary plats shall have approximate data.

- (1) *Streets*. Engineering data for streets shall be as follows:
 - a. Complete curve data (L, R, PC, PT) shown on the centerline or each side of the street;
 - b. The length and bearings of all tangents; and
 - c. The dimensions from all angle points and points of curve to an adjacent side lot line.
- (2) *Lots*. Complete bearings and dimensions for front, rear and side lot lines shall be provided.
- (3) *Watercourses and easements*. Data for watercourses and easements shall be as follows:
 - a. Distances shall be provided along the side lot lines from the front lot line to the point where the side line crosses the drainage easement line or the high bank of a stream; and
 - b. The traverse line shall be provided along the edges of all large watercourses in a convenient location, preferably along a utility easement if paralleling the drainage easement or stream.

(Code 1967, § 27-41(m); Ord. No. 3655, § 3, 7-28-83)

Secs. 126-612—126-640. - Reserved.

DIVISION 2. - STREETS

Sec. 126-641. - Standards.

- (a) *Generally*. All subdivision streets will be reinforced concrete pavement on a compacted stabilized subgrade. Concrete pavement shall be provided with either an integral curb poured with the pavement or a separate curb constructed on top of and doweled to the concrete pavement.
- (b) *Grade*. Gutter gradients shall be a minimum of one-quarter of one percent. Crown sections shall slope not less than one-eighth-inch per foot. The minimum drop around curb return will be one-tenth of one foot. All gutter grades shall be above the design water surface of ditches and storm sewers. All grade changes with algebraic differences of one percent or more shall be connected with a vertical curve.
- (c) *Width*. The minimum width back-to-back of curbs of streets and rights-of-way shall be as follows:

	Street Width (feet)	Right-of-Way Width (feet)
Principal arterials and minor arterials	61	80—100
Collector streets	40	60
Local streets	28	50

(d) *Pavement design.* Pavement design shall conform to the city engineer's specifications.

(e) *Concrete pavement.*

- (1) *Standards generally.* Concrete pavement shall conform to the requirements of Harris County standard specifications and the city engineer's specifications. Concrete pavement shall conform to the minimum standards of the pavement design table, which is as follows:

Pavement Design Table			
Class	Thickness	Longitudinal Steel #4 bars	Transverse Steel #4 bars
Local	6"	20.5"	36"
Collector	7"	18"	36"
Collector in LI or HI zoning district*	8"	16"	30"
Minor arterial	8"	16"	30"
Principal arterial	Specialized design	Specialized design	Specialized design
Major thoroughfare	Specialized design	Specialized design	Specialized design

* If trucking volumes are anticipated to exceed 2,500 equivalent single axle loads per week, pavement design shall be by a geotechnical engineer licensed in the state to provide a 25-year minimum pavement design life, as approved by the city engineer.

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- (2) *Subgrade.* All subgrades for concrete pavement shall be at least six inches in depth and compacted to or meet the requirements of 95 percent standard proctor density. The subgrade shall be lime stabilized when the plasticity index of the subgrade exceeds 19. The rate of application of lime shall be in accordance with the owner's geotechnical report as prepared by or under the supervision of a licensed engineer in the state. Compaction shall be accomplished by the use of approved and acceptable compacting equipment, and testing shall be performed by a testing laboratory as approved by the city engineer.
- (f) *Barrier curb and gutter.* The barrier curb and combination barrier curb and gutter shall be constructed of reinforced concrete. Barrier curbs are required in the curb radius of street intersections and for all esplanades, islands, stormwater inlets and non-residential streets. Residential streets may be constructed with either barrier or mountable curbs.
- (g) *Mountable curbs.* Mountable curbs shall be constructed of reinforced concrete and are permitted to be constructed on residential streets unless barrier curbs are required as specified in subsection (f) of this section. The transition between barrier and mountable curbs shall be accomplished in accordance with the standards on file with the city engineer.

(Code 1967, § 27-71; Ord. No. 3655, § 3, 7-28-83; Ord. No. 7904, § 1, 2-27-97; Ord. No. 8296, § 1, 5-28-98; Ord. No. 8852, § 1, 3-9-00; Ord. No. 9053, §§ 2, 3, 12-14-00; Ord. No. 10,770, § 1, 12-13-07; Ord. No. 11,866, § 26, 2-23-12)

Sec. 126-642. - Streetlights.

Developers shall be required to install ornamental metal standard and high pressure sodium vapor lamps on public streets in subdivisions within the city limits as follows:

- (1) The location and minimum number of streetlights shall be determined by the director of planning and community development. A developer may appeal the determination of the director of planning and community development to the commission if the developer wishes to install a lesser number of streetlights.
- (2) Underground installation charges for the subdivision shall be based on the cost to Houston Light and Power and shall be paid to the city by the developer. Any other charges related to the installation of streetlights shall be paid by the developer. Upon payment of all installation charges, the city will pay the monthly service for the streetlights.
- (3) Streetlights shall be located so as to be of general benefit to the surrounding neighborhood.
- (4) A developer commits an offense if he intentionally or knowingly fails to pay for street lighting as required and approved by the director of planning and community development within 30 days after notice by the director of planning and community development that electrical power service is available for street lighting.
- (5) For those subdivisions where citizens would like additional street lighting for midblock locations, when the electrical service is provided at the rear of properties, the requestor shall be responsible for providing the required easement to the street.
- (6) When additional street lighting is requested at intersections, the city will provide only the monthly charge for the light. Requests for additional street lighting at either midblock locations or intersections shall be made to the director of planning and community development, who shall consider the benefit of the streetlight to the surrounding area, the cost of service of the streetlight to the city and any other factors he deems necessary to approve or disapprove the

request. The decision of the director of planning and community development may be appealed to the city council by the requestor.

(Code 1967, § 27-74; Ord. No. 3655, § 3, 7-28-83)

Sec. 126-643. - Street name signs.

Street name signs approved by the director of planning and community development shall be provided and installed by the developer for all intersections in the subdivision.

(Code 1967, § 27-75; Ord. No. 3655, § 3, 7-28-83)

Sec. 126-644. - Access management.

The access management standards set forth in subsection 18-126(b) of this Code are applicable to all nonresidential developments within the extraterritorial jurisdiction of the city, which are subject to the platting requirements of this chapter. Plats for nonresidential developments must be accompanied by a site plan of the locations and sizes of proposed driveways.

(Ord. No. 11,419, § 2, 8-26-10)

Secs. 126-645—126-670. - Reserved.

DIVISION 3. - STORMWATER DRAINAGE

Sec. 126-671. - Required.

Adequate drainage shall be provided within the limits of the subdivision. The protection of adjoining property will be considered in the review of the plans submitted.

(Code 1967, § 27-72; Ord. No. 3655, § 3, 7-28-83; Ord. No. 4000, § 1, 11-8-84)

Sec. 126-672. - Size.

In a subdivision, the sizing of inlets, storm sewers, outfalls, culverts and drainage ditches will be based on the following:

- (1) *Design storm.* The design storm will be based on the rainfall intensity-frequency data used by the county flood control district. The interior drainage system will be designed for a storm with a frequency of occurrence of once in five years. The intensity of a 60-minute rainfall on this frequency is 2.80 inches. Major drainage ditches and structures will be designed for a storm with a frequency of occurrence of once in 25 years. The intensity of a 60-minute rainfall on this frequency is 3.75 inches.
- (2) *Runoff computation.* To determine the runoff rates for various areas, the standard rational method will be used, utilizing the following formula:

$$Q = CIA$$

Where:

Q	=	Rate of runoff in cubic feet per second
C	=	Runoff coefficient
I	=	Rainfall intensity for the particular duration in inches per hour
A	=	Drainage area in acres

Drainage areas will be computed by considering the location of high and low points on street grades, drainage divides in area and the general configuration of existing and finishing grades. Calculations for each major storm sewer line shall be shown on a drainage data sheet and shall be included in the proposed plans. All pertinent information (i.e., drainage areas, time of concentration, rainfall intensity, runoff coefficients, etc.) shall be listed on the data sheet.

- (3) *Sizing of storm sewers.* Sewers shall be sized to carry the discharge (Q) derived from the formula in subsection (2) of this section. Capacity of storm sewers will be determined by the use of Mannings formula on the basis of hydraulic gradients rather than the physical slope of the pipe.
- (4) *Sizing and spacing of inlets.* Inlets shall be spaced so that maximum travel distance of water in a gutter will not exceed 600 feet, unless otherwise approved at all low points in the gutter gradient. Inlets will be sized using an allowable capacity of one cubic foot per second per foot of opening for a throat height of five inches. Inlet design shall conform to standards on file with the city engineer.

(Code 1967, § 27-72(a); Ord. No. 3655, § 3, 7-28-83; Ord. No. 4000, § 1, 11-8-84)

Sec. 126-673. - Design.

Design of storm sewers, outfalls, culverts and drainage ditches in a subdivision will conform to the following:

- (1) *Manholes.* Manholes (inlets or junction boxes) shall be provided at all changes in grade or alignment, sewer intersections, street intersections and at a minimum of 1,000 feet on straight lines. Design of manholes shall follow acceptable engineering practice and shall be constructed of reinforced concrete sections in accordance with ASTM C-478 or clay brick conforming to the latest revision of ASTM C-32, grade MM, or concrete brick conforming to the latest revision of ASTM C-55, grade G-11;
- (2) *Pipe.* Pipe for storm sewers shall be concrete pipe in sizes as shown on the approved plans. All pipe shall be reinforced concrete pipe (RCP) conforming to the latest revision of ASTM C-76, class III. Where, in the opinion of the city engineer, added strength of pipe is needed for traffic loads over minimum cover or for excessive height of backfill, concrete pipe shall be ASTM C-76, class IV or V. Bituminous-coated corrugated galvanized metal pipe (CGMP) may be used in the place of reinforced concrete pipe, provided such use is in accordance with the Texas Department of Highways and Public Transportation Standard Specifications for Construction of Highways, Streets and Bridges, item 460. The gauge of the pipe used, however, shall be the next heavier gauge than the minimum required by item 460. The use of corrugated galvanized metal pipe under streets is prohibited. Pipe shall have a minimum cover of not less than one foot over the top of the pipe;

- (3) *Ditches.* Drainage ditches, when required, may be used for outfalls to natural or major drainage channels. The city engineer or the flood control district may require that drainage ditches be used for outfalls to natural or major drainage channels when the use of such ditches will improve drainage of the development. Ditches shall have a minimum grade of not less than 0.10 percent and side slopes not steeper than 3:1;
- (4) *Outfalls.* Outfalls from sewers and ditches into natural drainageways shall enter at a grade of the natural drainage channel. If necessary, drop-type outfall structures shall be used to prevent erosion;
- (5) *Major drainageways and structures.* Design of major drainageways shall be coordinated and approved in writing by the appropriate flood control district or the county engineer; and
- (6) *Improvements.* All drainage improvements shall be designed to ensure that when a 100-year rainfall event, as defined by the county flood control district, occurs, the drainage from the planned subdivision will not increase the water level in any existing creek, stream or bayou above the water level previously associated with such 100-year rainfall event.

(Code 1967, § 27-72(b); Ord. No. 3655, § 3, 7-28-83; Ord. No. 4000, § 1, 11-8-84)

Sec. 126-674. - Detention facilities.

The detention facility for a subdivision shall be designed for easy maintenance. Every consideration shall be given to designing the facility for multipurpose use such as playground, ball field, minipark, etc., to ensure that maintenance will be accomplished. The design shall include the following:

- (1) An earthen detention basin shall have minimum side slopes of 3:1 and a minimum bottom width of ten feet;
- (2) A five-foot wide, six-inch thick reinforced concrete trickle channel shall be constructed through the basin bottom to accommodate low flow and allow fast drying;
- (3) The bottom of the detention basin shall have a minimum two-tenths-percent cross slope to facilitate quick drainage;
- (4) Inlets and outlets and required trash racks shall be located so as to be easily accessible;
- (5) The detention basin, maintenance roadway and right-of-way shall be hydromulched with Bermuda seed and watered to facilitate full grass coverage; and
- (6) Ingress/egress, including a dedicated right-of-way if necessary, shall be provided to the detention basin.

(Code 1967, § 27-72(c); Ord. No. 3655, § 3, 7-28-83; Ord. No. 4000, § 1, 11-8-84)

Sec. 126-675. - Construction.

Construction of all storm sewers, outfalls, culverts, drainage ditches and detention facilities in a subdivision will conform to the city engineer's specifications or the appropriate flood-control specifications.

(Code 1967, § 27-72(d); Ord. No. 3655, § 3, 7-28-83; Ord. No. 4000, § 1, 11-8-84)

Secs. 126-676—126-705. - Reserved.

DIVISION 4. - UTILITIES^[4]

Footnotes:

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Cross reference— Utilities generally, ch. 98.

Sec. 126-706. - Utility location standards.

For subdivisions, developers and utility companies will be required to locate utility lines within easements in accordance with city utility location standards. These standards are on file with the city clerk and city engineer.

(Code 1967, § 27-76; Ord. No. 1764, § 1, 3-13-75; Ord. No. 3655, § 3, 7-28-83)

Sec. 126-707. - Water and sewer systems in extraterritorial jurisdiction.

Water and sewer systems proposed for developments in the extraterritorial jurisdiction shall be in accordance with appropriate county standards and the Texas Natural Resource Conservation Commission Construction Standards for On-site Sewerage Facilities, effective January, 1988, or as periodically amended.

(Code 1967, § 27-73(c); Ord. No. 3655, § 3, 7-28-83; Ord. No. 5117, §§ 1, 2, 10-13-88; Ord. No. 5263, § 3, 4-27-89; Ord. No. 7256, § 1, 3-9-95)

Sec. 126-708. - Certification of water and sewer systems.

The developer may be required to submit a letter to the city engineer from the department of health resources approving the water and sanitary sewer systems. Such letter will serve as certification of the water and sewer system by the Texas Natural Resource Conservation Commission. The developer of the subdivision shall provide all water and sewer lines necessary to properly serve the subdivision. A metallic plastic tape located directly above all underground piping a minimum of one foot below grade and a minimum of two feet above the pipe shall be required.

(Code 1967, § 27-73; Ord. No. 3655, § 3, 7-28-83; Ord. No. 5117, §§ 1, 2, 10-13-88; Ord. No. 5263, § 3, 4-27-89; Ord. No. 7256, § 1, 3-9-95)

Sec. 126-709. - Private water and sewer lines.

Private water and sewer lines may not cross property lines unless installed in a recorded easement. Each service connection to a city line may serve only one tract.

Sec. 126-710. - Sanitary sewer system.

- (a) *Materials.* Sanitary sewer lines in a subdivision shall be of polyvinyl chloride (PVC) and fittings conforming to the latest revision of ASTM D-3034, and ASTM D-1784, having a cell classification of 12454-B and a minimum SDR of 35. Pipe shall have flexible elastomeric gasket joints approved by the city engineer.
- (b) *Construction.* Sanitary sewers shall be constructed according to the latest revision of ASTM C-12, ASTM D-2321 and the city engineer's specifications as to trenching, bedding, alignment, grade, installation, backfill and compaction.

- (c) *Manholes.* Manholes shall be spaced a distance not to exceed 400 feet and shall conform to the city engineer's specifications. Manholes shall be constructed of precast cast-in-place reinforced concrete manhole sections in accordance with the latest revision of ASTM C-478 or of fiberglass in accordance with the city engineer's specifications. Manhole rings and covers shall be 23½ inches in diameter, shall be constructed of cast iron and shall have a minimum of two three-fourths-inch holes in the covers.
- (d) *Force mains.* Force mains shall be constructed of the following materials:
 - (1) Ductile iron pipe conforming to the latest revision of ASA A-21 encased in polyethylene tubing.
 - (2) Polyvinyl chloride (PVC) class 150 SDR-26, conforming to the latest revision of ASTM D-2241.
 - (3) Polyethylene (PE) plastic pipe (SDR-PR) based on outside diameter conforming to the latest revision of ASTM F714.
- (e) *Lift stations.* Lift stations should conform to minimum design criteria of the state natural resource conservation commission (TNRCC) and the city's standard specifications on file with the city engineer. An all-weather access road, three-phase service and potable water shall be provided. All structures located aboveground shall be enclosed as approved by the city engineer.
- (f) *Testing.* All sanitary sewer lines shall be tested in accordance with the city engineer's specifications. All material, labor and equipment necessary for testing shall be provided by the developer. All test results shall be submitted in writing to the city engineer.

(Code 1967, § 27-73(a); Ord. No. 3655, § 3, 7-28-83; Ord. No. 5117, §§ 1, 2, 10-13-88; Ord. No. 5263, § 3, 4-27-89; Ord. No. 7256, § 1, 3-9-95)

Sec. 126-711. - Water system.

- (a) *Materials.* For a subdivision, all pipe and fittings shall be approved by the American Water Works Association for carrying potable water. Water lines shall be constructed of the following materials:
 - (1) Prestressed concrete pressure pipe, steel-cylinder type conforming to AWWA C-301;
 - (2) Reinforced concrete pressure pipe, steel-cylinder type conforming to AWWA C-300;
 - (3) Reinforced concrete pressure pipe, steel-cylinder type, pretensioned conforming to AWWA C-303;
 - (4) Steel water pipe conforming to AWWA CD-200 with protective coating approved by the city engineer;
 - (5) Ductile iron pipe conforming to AWWA C-151 class 50 with protective cement-mortar lining conforming to AWWA C-104;
 - (6) Cast iron pipe conforming to AWWA C-101 with protective cement-mortar lining conforming to AWWA C-104;
 - (7) Polyvinyl chloride and fittings conforming to the latest revision of AWWA C-900, class 150; and/or
 - (8) Cast iron fittings shall conform to the latest revision of ASA A-21.10 and ASA A-21.11.
- (b) *Valves.* All valves shall conform to the latest revisions of AWWA C-500 and shall open left. All valves shall be provided with an approved adjustable valve box and cover. At intersections of water distribution lines, the number of valves will be one less than the number of radiating lines.
- (c) *Hydrants.* All fire hydrants shall be Mueller A423, Super Centurion 200, American Darling B848, American Darling B62B with extension, or Clow Medallion meeting latest revision of AWWA 502. Hydrants shall be three-way with National Standard threading. Hydrants shall be located on six-inch or larger lines, looped with six-inch or larger lines. Hydrants shall be spaced every 300 feet along

accessways in commercial and industrial areas and every 500 feet along streets in residential areas. The maximum distance from the nearest fire hydrant to the most remote exterior point of any single-family dwelling shall be 500 feet. The maximum distance from the nearest fire hydrant to the most remote exterior point of any residential or commercial dwelling unit shall be 500 feet. The distance shall be measured on a roadway surface meeting the fire department access requirements of the fire prevention code adopted by the city. There shall be a gate valve between the main and the fire hydrant.

- (d) *Size.* All water mains shall be a minimum of six inches in diameter, except where approved by the city engineer. All water mains along streets classified as minor arterials or higher on the major thoroughfare plan shall be a minimum of eight inches in diameter.
- (e) *Construction.* Water lines shall be constructed according to the city engineer's specifications as to trenching, bedding, alignment, grade, installation, backfill and compaction.
- (f) *Testing.* Bacterial analysis samples shall be taken by the utilities department before the new water system is connected to existing city lines. All water lines shall be tested in accordance with the city engineer's specifications. All materials, labor and equipment necessary for testing shall be provided by the developer. All tests shall be submitted in writing to the city engineer.

(Code 1967, § 27-73(b); Ord. No. 3655, § 3, 7-28-83; Ord. No. 5117, §§ 1, 2, 10-13-88; Ord. No. 5263, § 3, 4-27-89; Ord. No. 7256, § 1, 3-9-95)