CITY OF FULSHEAR

1.00 DESIGN AND CONSTRUCTION STANDARDS

1.01 Minimum Requirements

The intention of these standards is to define minimum requirements for street, utility, and drainage construction in new subdivisions within the jurisdiction of the City of Fulshear. These standards are supplementary to the City's subdivision development ordinance, including subsequent amendments.

1.02 Street Paving

The following minimum standards apply to subdivision street paving:

1. Type. Six (6) inches of reinforced concrete surface with concrete curb and gutter.

2. Pavement Width.

    a. Major streets – Forty-four feet (44') to sixty-four feet (64') between back of curbs.

    b. Secondary streets – Thirty-eight feet (38') to forty-four feet (44') between back of curbs.

    c. Residential streets – Twenty-eight feet (28') to thirty-two feet (32') between back of curbs.

3. Cross Section. A standard cross section for a residential street is shown in the City's standards paving detail sheet. Cross sections for secondary and major streets shall be proportioned similarly. At intersections, curb return radius shall be twenty-five feet (25'); at cul-de-sacs, forty-five feet (45').

4. Concrete.

    a. Reinforcing Steel.

        1) Material – open hearth new billet steel.

2) Yield strength – 60,000 psi, minimum.

3) Splices – twenty-four (24) bar diameters.

4) Bar size and spacing – No. 3 bars at eighteen inch (18") centers, each way, minimum. Street should be designed based upon the subgrade and load use of street.

5) Bar support – metal or plastic "chairs" shall be used to hold bars in position during placement of concrete.

b. Concrete Mixture.

1) Compressive Strength – 3,000 psi, minimum at twenty-eight (28) days.

2) Slump – four and one-half inches (4-1/2") maximum.

3) Cement factor – 5.0 bags per cubic yard, minimum.

c. Cement. Type I (Normal) Portland Cement, or with city engineer's approval, Type III (High Early Strength).

d. Aggregate. Coarse and fine aggregate shall meet the requirements of Texas Highway Department Standard Specification "Item 360" for concrete pavement.

e. Jointing.

1) Expansion joints with sleeved load transmission dowels – at intersections. Also every eighty (80) linear feet, minimum.

2) Wood joints – sound heart redwood.

3) Joint seal – O.A. 90 asphalt or other types with approval.

f. Curing. Curing method shall retain at least ninety-seven percent (97%) of moisture at twenty-four (24) hours, at least ninety-five percent (95%) at three (3) days, and at least ninety-one percent (91%) at seven (7) days. (ASTM procedure C-5).

g. Test. Compressive strength – three (3) cylinders every 50 cubic yards of concrete or portion thereof. Testing lab is to be supplied by the developer.

h. Placement. Concrete shall not e placed on frozen subgrade; when air temperature is thirty-eight (38) degrees F or below; when air temperature is below forty-two (42) degrees F and declining; when finishing cannot be completed during natural daylight.

5. Subgrade.

a. Rolling machinery – all subgrade shall be rolled.

b. Density required – at least ninety-five (95%) percent of maximum density (Standard Proctor Density Test).

c. Lime stabilization – required when Plasticity Index (P.I.) of subgrade soil exceeds 18.

d. Cement stabilization – Required when low P.I. "spongy" or wet soils.

e. Subgrade shall not be allowed to dry before concrete or base is placed, not shall concrete or base be placed on frozen subgrade.

f. Density tests – at two hundred (200) linear foot intervals, or closer when requested by city engineer. Density tests shall be "staggered" across the width of the pavement. At no point should density tests be taken in a straight line. At least one density test must be taken on the outside edge of the pavement in cul-de-sacs.

6. Large Lot Subdivision

Where every lot in a subdivision is in excess of one (1) acre in size and the natural grade of the tract to be subdivided has at least 3 feet of drop per 1,000 feet, and open ditch cross-section of road will be allowed.

a. Pavement type.

1) Concrete meeting Item 1.02.

2) Asphalt cross-section.

aa) 1-1/2 inches of hot mix asphalt Type D meeting TxDOT Item 340 (24-foot width).

bb) 8 inches of compacted limestone meeting TxDOT Item 247, Type A, Grade 2 (25-foot width).

cc) Subgrade meeting Item 1.02-5.

b. Pavement width.

1) Residential streets – 24 feet edge to edge.

2) All other streets require concrete meeting Item 1.02-2.

c. Cross-section.

A standard cross-section for a residential street is shown on the City's standard paving detail sheet.

1.03 Sidewalks

Sidewalks shall meet the following minimum standards:

a. Dimensions.

1) Width – four feet (4'), zero inches (0"), minimum.

2) Thickness – zero feet (0"), four inches (4"), minimum.

b. Subgrade. Two inches (2") of compacted sand.

c. Cross Slope. One-fourth inch (1/4") per foot, toward curb. Slopes on sidewalks must be ADA compliant.

d. Reinforcing shall be #3 rebar at no greater than 18" C-C or #10-6x6 welded wire mesh supported by either chairs or c.m.u. bricks.

e. Load transmission devices (dowels) shall be #4 rebar, 12" long, embedded 6" either side of expansion joint, one end shall be sleeved. Set load transmission devices 12" C-C, maximum.

f. Expansion joints are t be spaced 10' C-C and are to be sound heart redwood, ¾" thick with OA 90 asphalt or approved sealer.

g. Control joints are to be cut (1/4 x ½") at no greater than 5' C-C spacing.

h. Location. As per Figure I, as shown on standard detail sheet.

1.04 Water System

The following minimum standards apply to water system extensions within the City of Fulshear:

1. Main Lines.

   a. Minimum diameter – six inches (6").

   b. Depth – three feet (3'), six inches (6") of cover below final grade.

   d. Material – C-900 PVC DR18.

   e. Location – as shown on Standard Detail Sheet. Mains shall be looped, with no dead ends serving more than four (4) lots.

   f. Mains shall be looped with no dead end serving more than four (4) lots.

2. Valves.

   a. Locations – At tees: two (2) valves. At crosses: three (3) valves. At each connection to existing water system: one (1) valve.

   b. Type – non-rising stem, O-ring seals, Mueller or Clow brand. Counter-clockwise opening, mechanical joint.

3. Fire Hydrants.

   a. Locations – at each street intersection and cul-de-sac end. Single family residential areas: six hundred foot (600') intervals, maximum, Commercial, including reserves: three hundred foot (300') intervals, minimum.

   b. Type – Mueller brand, 3-way 5-1/4" barrel with 4-1/2 " steamer (pumper) nozzle and two (2) 2-1/2 inch hose nozzles. Counter-clockwise opening,

mechanical joint. Each fire hydrant is to have an individual gate valve (with adjustable riser box) located within 4 feet of the fire hydrant.

4. Fittings.

a. Material – cast iron, cement lined, mechanical joint. All fittings are to be thrust blocked with concrete. All fittings are to be wrapped with plastic or similar materials to prevent concrete from adhering to the mechanical joint connection components.

b. Pressure rating – 250 psi.

5. Services.

a. Corporation stop – Mueller H-15000.

b. Curb stop – Mueller H-15275, ending in an approved concreted or plastic meter box. (All boxes in new development are to be of the same material).

c. Meter nipple required – Mueller H 10890G.
d. Pipe material – soft copper.

e. Size – 1", one per each residential lot.

f. Concrete or plastic meter box of appropriate size is required.

g. All curbs are to be marked to indicate the location of the water services for each individual lot.

6. Backfill.

a. Under streets – wrap water line with 6" layer of bank sand; remainder of trench to be filled with 1.0 sack (100psi) per cubic yard cement stabilized sand, compacted to 95% Proctor.

b. Other locations – wrap water line with a 6" layer of bank sand; remainder of trench to be filled using compacted native soil. Sandy soil must be water jetted; other soils may be compacted by rolling with a "Caterpillar" tractor or similar method.

c. All trenches are to be compacted to 95% Standard Proctor.

1.05 Sanitary Sewer System

All homes must be connected to the city's central sanitary sewer system. The following minimum standards apply to sanitary sewer extensions within the City of Fulshear.

1. Main Lines.

   a. Minimum diameter – six inches (6").

   b. Minimum depth – four feet (4'), zero inches (0"). Exceptions may be made on depth with City of Fulshear Public Works Director approval.

   c. Material –

      1) Pipe – SDR 26 PVC.

      2) Fittings – same class as pipe, with rubber gaskets.

      All sanitary sewer lines must be air-tested and pass deflection testing 30 days (or longer) after installation. The City reserves the right to require filming of any sewer installation, at the developer's expense.

2. Manholes.

   a. Size –

      1) Four feet (4'), zero inches (0") inside diameter.

      2) Thirty-two inch (32") diameter opening in cone section for access to the sanitary sewer for cleaning and maintenance.

   b. Spacing – three hundred feet (400') maximum and at changes in direction or size of main line.

   c. Material –

      1) Pre-cast concrete manhole meeting ASTM C478 (latest revision).

2) Cast-in-place manholes shall be 4000 psi concrete with wall thickness of no less than five inches (5”). The base shall be no less than twelve inches (12”) thick.

d. Pipe connection – each pipe connection to sanitary sewer manholes shall be made water tight by either:

1) Approved flexible connectors; or

2) Water tight grout

e. Foundations – place manhole base on twelve inches (12”) minimum of compacted cement stabilized sand.

f. Manhole ring and lid –

1) Install thirty-two inch (32”) diameter cast iron ring using approved sealant.

2) In pavement – adjust ring and cover to grade. (The City may require infilteration prevention measures, to be decided on a case by case basis. If they are required, the developer must pay for them).

3) In unpaved areas – adjust ring and cover to at least six inches (6”) above surrounding grade, sloping grade away from the manhole.

4) Manhole lid is to have “Sanitary Sewer” cast into it. No other reference is to be cast into the lid.

3. <u>Services.</u>

a. Minimum sizes –

1) Residential: single service – four inches (4”); double service – six inches (6”).

2) Commercial: Six inch (6”) minimum.

b. Material – Sch. 40 or SDR 26 PVC.

c. Fittings required – wye, bend, and plug.

d. Stack required – where sewer depth exceeds six feet (6'), zero inches (0").

e. Marking – "As built" plans required showing locations, with 4" x 4" oak timber marking each service and extending two feet (2') above ground. Painted with a bright color paint. (Capped four inch (4") diameter PVC pipe may be used in lieu of oak timber). Curb is to be marked to indicate the location of the sanitary sewer service.

f. Bedding – cement stabilized sand (one sack per cubic yard). Thickness to be one half (1/2) of the pipe diameter beneath the pipe (in no case less than 6" thickness) and to the centerline of the pipe.

4. Backfill. Same as for water systems.

5. Location. Except in unusual circumstances and after recommendation by the city engineer and approval of Planning Commission, sanitary mains shall be located in front of lots. They shall be placed within street rights-of-way opposite water mains. If authorized to be placed at rear of lot, mains shall be no closer than five feet (5') to the easement boundary.

1.06 Drainage

The following minimum standards apply to drainage construction within new subdivisions. The City of Fulshear has adopted the Fort Bend County Drainage District's Criteria Manual and all drainage calculations and plans shall be approved by the Drainage District.

1. Storm Sewers and Culverts.

a. Minimum diameter – twenty-four inches (24"); eighteen inches (18") for pipe serving one (1) inlet.
b. Minimum slope – storm sewers: 0.1%. Culverts shorter than one hundred feet (100'): 0.1 foot.

c. Material –

1) Class III reinforced concrete pipe.

2) High density polyethylene (HDPE) corrugated smooth lined thermoplastic pipe may be used when approved by the city engineer.

3) Texas Highway Department standard box culverts and headwalls.

d. Joints –

1) Class III Reinforced Concrete Pipe – bell and spigot joints with "O" ring type gaskets.

2) High Density Polyethylene Pipe – bell and spigot joints with "O" ring type gaskets.

3) Box Culverts – "Ram-Nek" type asphaltic sealer or approved equal with joints to meet Texas Department of Highway specification.

e. Bedding – All storm sewer is to be bedded with one and one-half (1-1/2) sack per cubic yard of cement stabilized sand, compacted to twelve inch (12") thickness, minimum.

f. Backfill – All storm sewer piping shall be backfilled to a minimum of twelve inches (12") over the top of the pipe with one and one half (1-1/2) sack per cubic yard cement stabilized sand, compacted by mechanical means. When using HDPE pipe, caution shall be taken to insure proper bedding and backfill to meet the manufactures recommendations to provide the structural support necessary.

g. Junction Boxes and Manholes –

1) Size: nominal pipe size plus twelve inches (12").

2) Material: reinforced concrete, designed for the load. Minimum wall thickness – 5".

3) Location –

aa) At changes in pipe size or direction.

bb) At distances not to exceed four hundred feet (400').

4) Access Covers: twenty-four inch (24") diameter cast iron ring and cover with the word "Storm" cast into the cover.

h. Inlets –

1) Minimum throat size: six inches (6") high X five feet (5') long.

2) Material: reinforced concrete, designed for load.

3) Wall thickness: five inches (5").

4) Access: twenty-four inch (24") diameter cast iron ring and cover (see 1.06.g.4 above).

2. Open Channels.

a. Unlined ditches – side slopes: three (3) horizontal, one (1) vertical. Bottom slope: 0.05% minimum. Easement width: top width plus sixteen feet (16') on one (1) side plus six feet (6') on other side.

b. Lined channels – bottom slope: 0.05% minimum. Lining material: five inches (5") thick concrete with #3 bars at eighteen inches (18") center to center. With approval of the City, pre-cast concrete pavement may be used in lieu of concrete. Concrete characteristics: same as for street paving. Easement width: top width plus twelve feet (12') on one (1) side and four feet (4') on the other side.

3. Design Criteria.

a. Storm period: twenty-five (25) years.

b. Runoff coefficient:

1) Single family residential area – fifty percent (50%).

2) Commercial areas – eighty percent (80%).

1.07 Street Signs

For uniformity, street signs shall be ordered through the City of Fulshear. Cost of signs and erection are the responsibility of the developer. Signs are required at each street intersection.

1.08 Regulations and Other Entities

These construction standards are not intended to replace the regulations of state or federal governmental entities whose jurisdiction includes new subdivisions within the jurisdiction of the City of Fulshear.

2.00 RESPONSIBILITY FOR STREET AND UTILITIES INSTALLATION

2.01 Developer Responsibilities

In general, the subdivider or developer shall be required to construct at his expense, all streets, alleys, sidewalks, crosswalks, street markers, sanitary sewers, sewage lift stations or other sewage facilities, water mains, and water systems, drainage culverts, storm sewers, bridges, street lights and other appurtenances in strict accordance with Article 1.00, necessary and required to adequately serve the subdivision or addition to be developed by him.

2.02 Street, Utilities and Appurtenances to Become Property of City

All streets, utilities and other appurtenances constructed by the developer shall become the property of the City of Fulshear upon completion and acceptance by the city engineer and the city council.

2.03 When City to Assist Developer

Upon the passage of these standards, it will be the policy of the City of Fulshear to assist the developer in recovering the cost of construction of such facilities where sizes and capacities of facilities are required to service urban development of a larger area than that being subdivided or areas extending beyond the limits of the proposed subdivision to the extent hereinafter set forth; but the City reserves the right to consider each facility on its own merits.

3.00 PARKS, PLAYGROUND, SCHOOLS, AND OTHER PUBLIC FACILITIES

3.01 Parks and Playgrounds

A subdivider shall be required to provide open space for park purposes or dedicate funds for parks as set out in this ordinance.

3.02 Schools

The location, size and shape of any proposed school site shall be in accordance with the master plan of the City of Fulshear and/or Fort Bend County as amended or

supplemented, as approved by the planning commission and finally accepted by the city council and Lamar Consolidated Independent School District.

3.03 Public Facilities and Other Special Land Uses

The location, size and shape of any proposed public facility or other special land use site shall be in accordance with the comprehensive plan for the City of Fulshear and/or Fort Bend County, as amended and supplemented, as approved by the planning commission and finally accepted by the city council.