

CHAPTER 9

SUBDIVISION AND SITE DEVELOPMENT DESIGN STANDARDS

SECTION **GENERAL PURPOSE** 901

The purpose of good subdivision and site design is to create a functional and attractive development, minimize adverse impacts, and ensure that a project will be an asset to the city. To promote this purpose, the subdivision shall conform to this chapter's standards which are designed to result in a well-planned community without adding unnecessarily to development costs. These design controls shall help insure creation of convenient and safe streets, usable lots, space for public purposes, and will minimize the undesirable features of unplanned, haphazard growth.

SECTION **SUBDIVISION AND SITE DESIGN** 902

Design of the subdivision shall take into consideration the existing comprehensive plan, and shall be based on a site analysis. To the maximum extent practicable, development shall be located to preserve the natural features of the site, to avoid areas of environmental sensitivity, and to minimize negative impacts and alterations of natural features. The following specific areas shall be preserved as undeveloped open space, to the extent consistent with the reasonable utilization of land, and in accordance with the U.S. and Mississippi Constitutions and state or federal regulations:

- A. Unique and/or fragile areas, including wetlands, as may be defined in Section 404, *Federal Water Pollution Act*, as amended; and in Mississippi Department of Environmental Quality standards.
- B. Land in the floodway as identified and mapped using the Federal Emergency Management Agency's Flood Hazard Boundary Maps.

The development shall be laid out to avoid adversely affecting groundwater and aquifer recharge; to reduce cut and fill; to avoid unnecessary impervious cover; to prevent flooding; to provide adequate access to lots and sites; and, to mitigate adverse effects of noise, odor, traffic, drainage, and utilities on neighboring properties. The placement of buildings in residential developments shall take into consideration topography, building height, orientation and drainage.

SECTION **MONUMENTS, MARKERS, AND PINS** 903

- A. Monuments shall be placed at all corners or changes of alignment along the boundary of the subdivision and at all block corners, angle points, or points of curves in street right-

of-way lines. These monuments shall be an iron rod or pipe 3/4 to 1" inch diameter and at least eighteen (18) inches long, driven flush with the surface of the ground.

- B. Markers shall be placed to locate all lot corners or changes in alignment in lot boundaries and driven flush with the surface of the ground. These markers shall consist of iron pipe not less than one-half (1/2) inch in diameter and not less than twenty-four (24) inches in length. Where utility service lines are shown to terminate near each front lot corner, these front corner markers are to be offset along the property line at least 10 feet. Such offset shall be shown on the Final Plat.
- C. Monuments shall be set with the top thereof flush with finish grade. Where farming operations or other land uses might destroy or disturb the monument, it shall be sunk underground and referenced to permanent landmarks.
- D. Elevations (mean sea level datum) shall be established for each monument described in Section 903.A

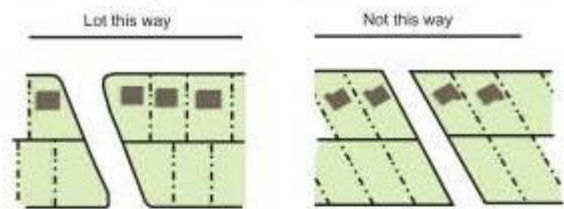
SECTION 904

BLOCKS

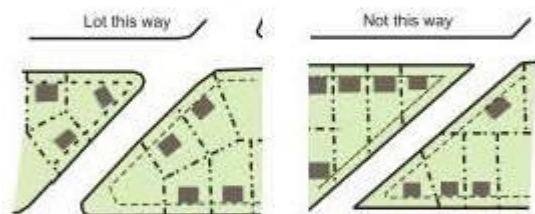
The following regulations shall govern the design and layout of blocks:

- A. The arrangements of blocks shall conform to the street design criteria set forth in these regulations.
- B. Blocks shall be arranged to accommodate lots and building sites of the size and character required by these regulations and any applicable zoning requirements, to provide for adequate community facilities, and with regard of the limitations and opportunities of topography.
- C. Irregularly shaped blocks, blocks intended for cul-de-sacs and loop streets, and blocks containing interior parks and playgrounds may be approved by the Planning Commission if properly designed and located.
- D. No block shall be larger than 1,200 feet, or be less than 400 feet, but the Planning Commission may elect to make exceptions in particular cases. Cross streets shall be provided between blocks.

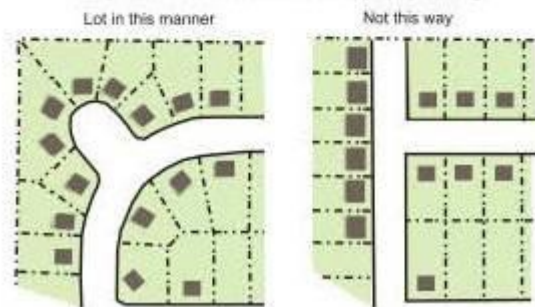
When diagonal streets cannot be avoided



When existing intersecting streets form acute-angled intersections



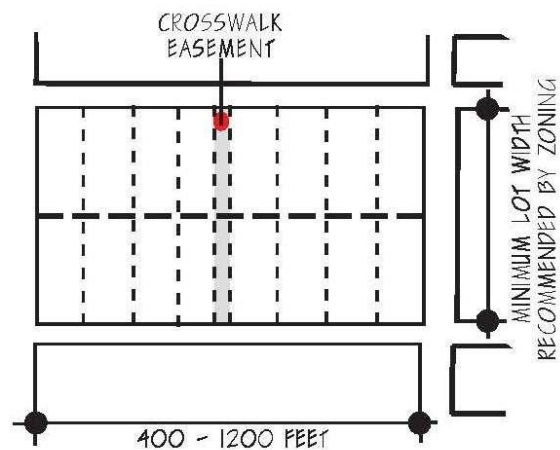
When future street extensions are not required in corners of the property



- E. Where blocks are more than 600 feet in length, a walkway easement not less than 10 feet in width or near the halfway point of the block may be required between streets.
- F. Blocks in the traditional gridiron pattern should consist of two tiers of lots and an easement may be included to separate them.
- G. Through lots (extending from one parallel street to the other) shall be discouraged to avoid problems between adjoining owners, and to reduce the number of streets.
- H. No building lots shall be platted in areas known to be subject to flooding or in areas, which for other reasons, are unsuitable for such use. Areas subject to inundation shall be clearly indicated on the Preliminary and Final Plat.

SECTION 905 EASEMENTS

- A. Location of utility line easements within the road right-of-way shall be located outside of the improved portion of the roadway. Utility easements may also be located along the front of line or centered on the rear or side lot line as necessary for utility lines. Easements shall give access to every lot, park or public grounds. Such easements shall be a total of not less than twenty (20) feet wide at ground level.



- B. Recommendations on the proposed layout of telephone and electric company easements should be sought from all of the utility companies serving the area. It shall be the responsibility of the subdivider to submit copies of the preliminary plat to all appropriate public utility companies.
- C. Where a subdivision is traversed by a water course, drainage way, channel or stream, there shall be provided a storm water easement or drainage right-of-way of not less than fifteen (15) feet conforming substantially with the lines of such water course or an accepted canal or drainage course plus additional width as necessary to accommodate future construction and channel maintenance as recommended by the City Engineer, Road Manager, and the Planning Commission. No fences, poles or any other obstruction will be permitted within the drainage channel. Fences and poles will be permitted along the edge of the drainage easement if such fences and poles will not obstruct the water flow. The plat shall specify the entity or person responsible for maintenance of storm water facilities.
- D. Whenever practicable, the utilities shall be placed underground, according to the standards of the appropriate utility company.

- E. The location of mailboxes and similar structures in the right-of-way of a public or private street shall be constructed so as to not create a hazard to the public and shall be constructed pursuant to standards of the Mississippi Department of Transportation.
- F. Easements across lots or centered on rear or side - lot lines shall be provided for utilities or drainage where necessary and shall be at least twenty (20) feet wide at ground level. Where drainage easements are required and are to be located adjoining utility easements, the combined easement shall be thirty-five (35) feet; twenty (20) feet for utility and fifteen (15) feet for drainage. Drainage easements shall not be combined with utility easements.
- G. Where easements intersect or sharp changes in alignment are necessary, corners shall be cutoff sufficiently to permit equipment access as determined by the City Engineer, Road Manager, and Planning Commission.
- H. No buildings or structures will be placed or permitted within easements.
- I. The City shall maintain only those improvements specifically accepted for public maintenance. Other easements shall stipulate that contiguous owners shall be responsible for general maintenance of such easements. The City and utility companies with lines in such easements shall have full right of access. No structures of any kind (including fences) shall impede access to any parts of the City or utility company's system including water meters, sanitary sewer connections or components thereof (including power and control panels).

**SECTION
906**

LOT ARRANGEMENT AND DIMENSIONS

- A. Lot arrangement, design and dimensions shall be such that all lots will provide satisfactory building sites. Driveway access to buildings on the lot shall be from a dedicated public street (existing or proposed or on a private street meeting public street standards). Lots shall be properly related to topography and the character of the surrounding development, and shall be in compliance with the *Fulton Zoning Ordinance* for the district in which they are located and for the use for which they are intended.
- B. The minimum lot size, width and frontage shall be as specified in these regulations.
- C. Dimensions of corner lots shall be large enough to allow the erection of buildings, observing the minimum front-yard setback from both streets.

**SECTION
907**

LOT ORIENTATION

- A. Residential lots shall front on a dedicated public street (existing or proposed) or on a private street meeting public street standards. All side lot lines where practicable should be at approximate right angles to street lines or radial to curving street lines, unless a variation from these rules will give a better street or lot plan. Variations are permitted to accommodate barriers such as streams and existing utility easements. However, side lot

lines shall not deflect more than (30) degrees from the perpendicular in relation to street center lines. A side lot line shall maintain the same angle of deflection between the front lot line and the minimum building setback line as established by the *Fulton Zoning Ordinance*.

- B. The lot line common to the street right-of-way shall be the front line. All lots shall face the front line and a similar line across the street. Wherever feasible, lots shall be arranged so that the rear line does not abut the sideline of an adjacent lot.

SECTION 908

DOUBLE FRONTAGE LOTS AND ACCESS TO LOTS

- A. Double frontage and reversed frontage lots shall be avoided except where essential to provide separation of residential development from traffic arterials or to overcome specific disadvantages of topography and orientation.
- B. Lots may not be created by dividing land at the end of stub streets in adjacent subdivisions, such stub streets being intended to promote continuity of street systems in adjoining subdivisions.
- C. Fifty (50) feet (minimum) of additional lot depth or a buffer strip in accordance with these regulations may be required where a residential lot in a subdivision backs up to a railroad right-of-way, a natural gas line, open drainage ditch, an arterial street or interstate highway, an industrial area or other existing land use which may have a detrimental effect on the residential use of the property, and where no local street is provided at the rear of such lot.

SECTION 909

STANDARDS FOR NONRESIDENTIAL SUBDIVISIONS

- A. In addition to the principles and standards in these Regulations, the applicant shall demonstrate to the satisfaction of the Planning Commission that the streets, parcels, blocks, and lot patterns proposed are specifically adapted to the uses anticipated and take into account other uses in the vicinity.
- B. Proposed industrial parcels shall be suitable in area and dimension to the types of industrial development anticipated.
- C. Every effort shall be made to protect adjacent residential areas from potential nuisance from a proposed commercial or industrial subdivision, including the provision of extra depth in parcels backing up on existing or potential residential development and provisions for a permanently landscaped buffer strip when necessary.
- D. Blocks intended for commercial and industrial subdivisions shall be designed specifically for such purposes and shall include adequate provision for parking, loading and delivery services. Such blocks shall not be less than (250) feet in width and not less than (500) feet in length.

- E. Lots intended for other nonresidential use shall be specifically noted and designed for such purposes, and shall have adequate provisions for off-street parking, setbacks, and loading and unloading areas.

**SECTION
910**

CLUSTERING

On lots or parcels where significantly environmental resources exist, owners or developers may use or be required to use a land development technique known as clustering.

- A. The concept of clustering involves allowing development on the most suitable parts of a development site (also known as the developable area) while avoiding the environmentally sensitive areas of the site (which is called the preservation area). In order for clustering to be allowed, the following criteria must be met:

1. The resource or preservation area to be protected must be clearly identified.
2. In order to determine the allowable development of a site, the number of units allowed for the entire parcel must be determined, subject to availability of supporting facilities and services such as water and sewer.
3. This number of units will then be allowed on the portion of the parcel that remains after the environmental resources are perpetually preserved. Clustering does not permit the development of duplex or multi-family units in areas not specifically zoned for such use, but does permit the reduction in individual lot size, with Planning Commission approval.

CHAPTER 10

STREET DESIGN AND CONSTRUCTION STANDARDS

SECTION **GENERAL** **1001**

These Regulations shall control the manner in which the road system is arranged on the land to permit the safe, efficient, and orderly movement of traffic; to meet, but not exceed, the needs of the present and future population; to have a simple and logical pattern; to respect natural features and topography; and to present an attractive streetscape.

SECTION **CONFORMITY TO DEVELOPMENT PLANS AND ZONING** **1002**

No subdivision shall be approved unless the area to be subdivided has frontage on and access from an existing street on the official thoroughfare map, or unless such street is an existing state, county, or city highway, road or a street shown upon a plat approved by the Planning Commission and recorded in the Chancery Clerk's office. Such street or highway must be suitably improved as required by these Regulations or guaranteed, with a performance bond, to be improved as required by these Regulations. In addition, no final plat of land within an existing zoning district shall be approved unless it conforms with requirements of the zoning district.

SECTION **ARTERIAL ROAD DESIGN STANDARDS** **1003**

Design standards and required improvements to arterial streets and roads are contained in Table 1. Construction design criteria of these streets are to be determined by the City Engineer when such streets abut or cross the proposed subdivision. Certain improvements may be waived upon recommendation of the City Engineer and after review and approval by the Planning Commission. In all cases right-of-way dedications shall be required for streets leading to new subdivisions. When developing along one side of an existing street or roadway included in the official thoroughfare plan, the subdivider may be responsible for construction or replacement of the entire existing pavement, in accordance with the requirements of the City Engineer.

Table 1003: Street Design Standards for Arterial Roads

R/W Width (feet)	Sidewalks (feet)	Parkway (feet)	Median (feet)	Pavement Width (feet)
80	4	5.5	14	48
110	5	5	16	72

**SECTION
1004**

STREET NAMES

Street name signs or numbers of a type in use throughout the city shall be erected by the subdivider at all intersections. Names of new streets shall not duplicate or nearly duplicate those of existing or platted streets, irrespective of the use of the suffix "street," "avenue," "circle," "boulevard," "drive," etc., and shall be displayed at each street intersection with street signs of the type established by the City. When a new street is a direct extension of an existing street, the name shall remain the same.

Street names shall be subject to the approval of the Planning Commission. The subdivider is responsible for the cost of purchasing and installing all signage.

**SECTION
1005**

STREET AND CIRCULATION SYSTEM DESIGN

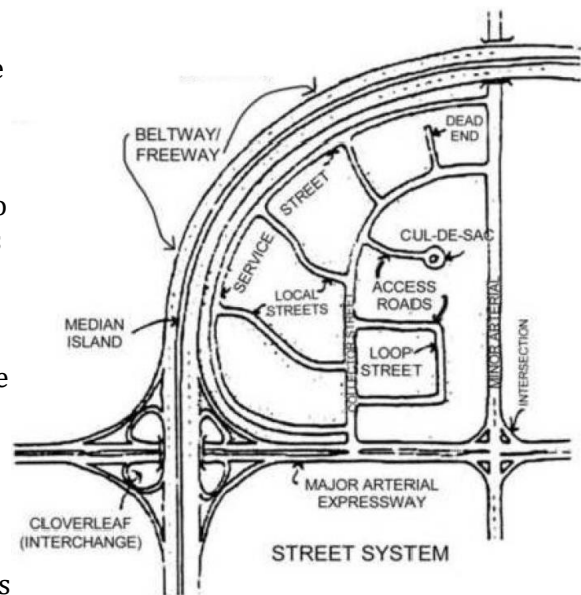
A. The arrangement, character, extent, and location of all streets shall conform to the thoroughfare plan of the City; such streets shall be considered in their relation to existing and planned streets, topographic conditions, public convenience and safety, and in their relation to the proposed uses of land to be served by such streets. The Planning Commission reserves the right to disapprove any street plan which does not represent good design or does not insure continuity of the existing street system.

B. The road system shall be designed to serve the need of the neighborhood and to discourage through traffic in the interior of such subdivision.

Residential driveway access shall not be permitted onto principal arterials. Major subdivisions shall be designed to discourage residential driveway access onto major arterial and collector roadways by using access roads.

Minimizing driveway access points or curb cuts by using access roads shall be encouraged. There shall be no private streets, lanes, roads or ways nor any private easement used for the purpose of primary access to any subdivision, including subdivisions exempt from platting under these Regulations unless constructed and maintained to City

road specifications and standards. The cost of maintenance of such private streets, roadways and easements shall be borne by a mandatory Homeowners Association. The Association shall own and be responsible for the maintenance of the private streets. Lot deeds shall convey membership in the Association and provide for the payment of dues and assessments required by the Association.



- C. Subdivisions shall provide for at least two entrances to furnish proper ingress and egress from established public roads or streets, except in the case of a single street subdivision.

**SECTION
1006**

STREET VACATION

The Planning Commission shall not recommend the vacation of any street dedicated to and accepted by the public if such vacation will adversely affect the proper functioning of the existing street system or any future street plan prepared by, or approved by, the Planning Commission. The procedure to vacate a street or alley shall require replatting of the property and the applicant must follow the platting procedures that are required in Section 307 of these Regulations.

**SECTION
1007**

RIGHTS-OF-WAY

- A. The right-of-way shall be measured from lot line to lot line and shall be sufficiently wide to contain the roadway, curbs, sidewalks, utilities, graded areas and shade trees, if required.
- B. The right-of-way of a new street that is a continuation of an existing street shall in no case be continued at a width less than that of the existing street.
- C. The right-of-way for roads shall be in accordance with the major thoroughfare plan, and shall provide for future development.

Table 1007: Right-of-Way Standards by Types of Road

Street Type	R-O-W Width (feet)	Street Type	R-O-W Width (feet)
Major Arterial	100-300	Local Street/Road	50-60
Minor Arterial	50-100	Access Street	28-36
Major Collector	50-70	Alley	30
Minor Collector	50-60	Cul-de-Sac	50
Local Industrial	60-80		

**SECTION
1008**

SPECIAL STREET TYPES

The following requirements shall apply to special street types:

- A. **One way streets:** One-way streets are permitted in new subdivisions if the Planning Commission determines that such streets are properly integrated with the existing and proposed street system in the area.
- B. **Permanent dead-end streets** shall not be permitted. Temporary dead-end streets shall be permitted only as a segment of a continuing street plan subject to extension into undeveloped acreage. Temporary dead-end streets shall extend to the boundary of such undeveloped acreage and shall be provided with an interim turnaround satisfactory to

the Planning Commission in design. The Planning Commission shall reserve the right to limit the length of such a dead-end street based on principles of proper planning, and the Planning Commission may require a street along the boundary between a proposed subdivision and the undeveloped acreage to provide for future development.

- C. Cul-de-sac streets** shall not exceed a length of seven hundred (700) feet in length for medium to high density traffic and 1,000 feet for low density traffic. The terminus may be circular with a minimum driving surface radius of forty (40) feet measured from a point on the street center line. Other termini types, such as “T”s or vegetated islands, are acceptable and subject to review and approval by the City Engineer and Planning Commission. Cul-de-sacs may exceed 1,000 feet with an intermediate turnaround depending upon the total number of lots served by the road.
- D.** The dedication of new **half-streets** shall not be permitted. If a parcel to be subdivided exists adjacent to a dedicated or platted and recorded half-width street or alley, the other half-width of such street or alley falling within the proposed subdivision shall be platted, provided that in the opinion of the Planning Commission such right-of-way is necessary for the proper development of the area.
- E.** Where a subdivision adjoins an arterial street, a **marginal access street** shall be designed to control access from lots fronting on it. Points of access to the arterial street shall be spaced at a minimum of thirteen hundred twenty (1320) feet. A planting strip having a minimum width of twenty (20) feet shall be provided between the pavement of the marginal access street. The minimum width of the marginal access right-of-way shall be fifty (50) feet. In addition, the Planning Commission may also require the provision of buffer planting strips, the platting of loop streets or cul-de-sacs connected to such parallel streets, or any combination thereof.
- F. Easements or reserve strips controlling access to streets** shall be prohibited except where deemed necessary by the Planning Commission and where their control is definitely placed with the city.
- G.** In subdividing land along existing streets or roads and within a proposed subdivision, provisions for the dedication of land for one or more access streets to undeveloped land not fronting on an existing street or road shall be incorporated. Said access streets shall be spaced not less than eight hundred (800) feet, nor more than one thousand four hundred (1,400) feet apart.
- H. Alleys** may be approved in residential subdivisions when justified by subdivision street design, to provide vehicular access to parking areas. Alleys may be approved in commercial and industrial subdivisions if no other provisions can be made for adequate service access. The minimum right-of-way widths for alleys shall be thirty (30) feet and they shall be dedicated to the public.
- I. Alley intersections** and sharp changes in alignment shall be avoided, but, where necessary, corners shall be cut off sufficiently to permit safe vehicular movement.
- J. Dead-end alleys** shall be avoided where possible but, if unavoidable, shall be provided with adequate turnaround facilities at the dead-ends as determined by the Planning Commission.

**SECTION
1009**

STREET DESIGN STANDARDS

The design and improvement standards contained in Table 1009.1 are minimums for all local streets and collector streets in residential subdivisions.

Table 1009.1: Street Design Standards for Local and Collector Streets

Terrain Classification	Local Street		Collector Street	
	Level	Rolling	Level	Rolling
Right-of-way (ft)	50*	50*	60	60
Pavement Width	24	24	36-40	36-40
Minimum Stopping Sight Distance (ft)	200	150	250	200
Maximum Grade	4%	8%	4%	8%
Maximum Spacing when intersected with an arterial (ft)	-	-	1,320	1,320
Maximum Center Line Radius of Streets with an angle of turn of:				
(1) Between 80 and 100	50	50		
(2) Less than 80 or more than 100	200	200		
Minimum Center Line Radius	250	175	350	350

* A utility easement ten (10) feet in width may be required along each side of the street right-of-way for these streets.

Note: Exceptions to the standards contained in this table are permitted under certain conditions for large lots.

The design and improvement standards contained in Table 1009.2 are minimums for all cul-de-sac and loop type local streets in residential subdivisions. Cul-de-sacs are required whenever a street is intended to be permanently dead-ended.

Table 1009.2: Street Design Standards for Cul-de-Sacs and Loop-Type Streets

Terrain Classification	Level	Rolling
Right-of-way (ft)	50*	50*
Pavement Width	24	24
Minimum Stopping Sight Distance (ft)	200	150
Maximum Grade	4%	8%
Maximum cul-de-sac length	1,000 (50%)	1,000 (50%)
Maximum cul-de-sac radius (row)	50	50
Maximum cul-de-sac radius (pavement)	40	40
Maximum Center Line Radius of Streets with an angle of turn of:		
(1) Between 80 and 100	50	50
(2) Less than 80 or more than 100	200	200

*A utility easement ten (10) feet in width may be required along each side of the street right-of-way for these streets.

**SECTION
1010**

INTERSECTION DESIGN STANDARDS

- A.** The design and improvement standards for intersections are suggested minimums for all street intersections in subdivisions. All such intersections shall be designed and constructed in accordance with standards as specified in Table 1010.

Table 1010: Intersection Design Standards

Terrain Classification	Level	Rolling
Maximum Approach Speed (mph)	25	25
Clear Sight Distance (ft, length along each approach leg)	90	90
Vertical Alignment with Intersection	Flat	2%
Minimum Angle of Intersection Streets	90 degrees	90 degrees
Minimum Curb Radius (ft)		
a. local-local	25 – all classes	25 – all classes
b. local-collector	25 – all classes	25 – all classes
c. collector-collector	30 – all classes	30 – all classes
d. collector, marginal access-arterial	35 – all classes	35 – all classes
Minimum Centerline Offset of Adjacent Intersection (ft)		
a. local-local	125 – all classes	125 – all classes
b. local-collector	150 – all classes	150 – all classes
c. collector-collector	200 – all classes	200 – all classes
d. collector, marginal access-arterial	1,320 – all classes	1,320 – all classes

- B.** Multiple intersections involving junctions of more than two (2) streets shall not be permitted.
- C.** Proposed streets shall intersect one another as nearly at right angles as topography or other limiting factors will permit. No intersection of streets on angles less than seventy-five (75) degrees shall be approved unless justified by extreme topographical conditions. In such a case, special provisions as deemed necessary by the Planning Commission shall be made.
- D.** Low points which would result in water ponding or poor visibility shall not be permitted.
- E.** All Streets intersecting other streets shall either intersect directly opposite to each other, or shall be separated by at least a one hundred-fifty (150) foot offset between centerlines, measured along the centerline of the street being intersected.
- F.** All Street intersections shall be located at least one hundred-fifty (150) feet from the right-of-way of any railroad, measured from the center point of the intersection to the railroad right-of-way line nearest the intersection.

**SECTION
1011**

STREETS FOR COMMERCIAL SUBDIVISIONS

Streets serving business developments and accessory parking areas shall be planned to connect with arterial streets so as not to generate traffic on local streets. The intersection of driveways from parking areas with arterial or collector streets shall be located so as to cause the least possible interference with traffic movement on the streets, and shall be located not less than one hundred (100) feet from the intersection of an arterial or collector street with any other street, and shall be located not less than one hundred (100) feet from the intersection of an arterial or collector street with any other street, and shall be spaced not less than two hundred (200) feet from each other. The Planning Commission may require marginal access streets to provide maximum safety and convenience.

**SECTION
1012**

STREETS FOR INDUSTRIAL SUBDIVISIONS

Collector streets for industrial subdivisions shall be planned to serve industrial areas exclusively and shall connect with arterial streets so that no industrial traffic will be directed into any residential streets. The intersections of service streets from parking areas, with arterial or collector streets shall not be less than one hundred (100) feet from the intersections of the arterial or collector street with any other street. Streets shall be planned to be extended to the boundaries of any adjoining land planned for industry, except if severe physical conditions prevent this or if the Planning Commission finds such extension is not in accord with the approved plan of the area.

**SECTION
1013**

DRIVEWAYS

- A. A private driveway may be used to provide vehicular access to no more than four single family detached dwelling units. The Planning Commission may require passing lanes, turnarounds, and overhead and width clearances as necessary to accommodate fire and emergency vehicles. A homeowner's association shall be formed to provide for the long-term maintenance of any private access way. Common driveways shall have a maintenance agreement acceptable to the Planning Commission. Any driveway serving more than four (4) single-family dwelling units shall be considered a street and shall be designed and constructed according to these Regulations.
- B. Access roads or vehicular ways within subdivisions containing single-family attached dwelling units or multifamily dwellings shall be considered streets and designed and constructed according to these Regulations.
- C. When adequate frontage is available on a non-limited access highway, two driveways to a property used for a single purpose may be permitted.
- D. Driveways should have a maximum grade of (15) percent. Driveways and curb cuts shall be located not less than three (3) feet from the side lot line. Curb cuts for straight curbs and the flare for rolled curbs shall be three (3) feet wider than the driveway on each side. The subdivider or developer shall place the approved drainage structures under

intersecting roads, drives, lanes or property entrances and at other locations where required.

E. In all areas where open ditch drainage is allowed, all driveway culverts shall be furnished and installed by the Sub-divider. Required sizes of driveway culverts shall be shown on the construction plans for the Subdivision.

F. Driveways shall be designed so as to drain into the roads ditch and not into the roadway surface. Smooth transitions of driveways must be done not to impede drainage.

**SECTION
1014**

ACCELERATION, DECELERATION, AND TURNING LANES

A. Deceleration or turning lanes will be required where the proposed subdivision will intersect a major street or an arterial unless determined unnecessary by the City Engineer.

B. Deceleration lanes shall be designed to the following standards:

1. The lane width shall be the same as the required width of the roadway moving lanes.
2. The lane shall provide the full required land width for its full length. It shall not be tapered.
3. The minimum lane length shall be as follows:

Table 1014: Deceleration Lane Length

Design Speed of Road	Minimum Deceleration Lane Length
30 mph	165 feet
40 mph	230 feet
50 mph	310 feet

C. Acceleration lanes are only required when indicated as needed by a traffic impact study. The design shall be as per the recommendation of the City Engineer. Where needed, a paved taper shall be provided for right hand turns.

**SECTION
1015**

SIDEWALKS AND GRADED AREAS

A. Sidewalks may be required in all subdivisions. Where the average lot line frontage is 100 feet or less, sidewalks may be required on both sides of the street. Where the average lot line frontage is greater than 100 feet, sidewalks may only be required on one side of the street. Where the average lot line frontage is greater than 150 feet, sidewalks may not be required. Such determination shall be made by the approval authority for the proposed development (Planning Director for minor subdivisions, Planning

Commission for major subdivisions), and may be appealed to the Board of Aldermen as described in Section 204.

B. In conventional developments, sidewalks shall be placed in the right-of-way, parallel to the street, unless an exception has been permitted to preserve topographical or natural features or to provide visual interest, or unless the applicant shows that an alternative pedestrian system provides safe and convenient circulation. In commercial and in high-density residential areas, sidewalks may abut the curb.

C. Pedestrian-way easements ten (10) feet wide may be required by the Planning Commission through the center of blocks to provide circulation or access to schools, playgrounds, shopping or other community facilities.

D. Sidewalks shall measure four (4) feet in width; wider widths may be necessary near pedestrian generators and employment centers. Where sidewalks abut the curb and parked cars overhang the sidewalk, widths shall be five (5) feet. The width of graded areas shall be the same as for sidewalks.

E. All sidewalks shall meet the requirement of the *Americans with Disabilities Act*.

F. Sidewalks cross slope shall not exceed 2%, and the running slope shall not exceed 5%.

G. Curb ramps shall be installed at all roadway intersections and designated pedestrian crossings. Ramps shall be installed in accordance with the *Mississippi Department of Transportation's standard detail sheet – working number SDCCR-1, latest revision*.

H. Sidewalks and ramps shall be constructed in accordance with the *Federal Highway Administration publication, "Accessible Sidewalks and Street Crossings – An Internal Guide", FHWA-SA-03-019*.

I. Sidewalks and graded areas shall be constructed according to the specifications set forth in these Regulations.

J. Public sidewalks may be required for commercial and industrial lots. Such determination shall be made by the approval authority for the proposed development (Planning Director for minor subdivisions, Planning Commission for major subdivisions), and may be appealed to the Board of Aldermen as described in Section 105.

SECTION 1016

CULVERTS and BRIDGES

Where natural drainage channels intersect any street right-of-way, it shall be the responsibility of the subdivider to have satisfactory bridges and/or culverts constructed. Where culverts are required, minimum requirements shall be observed as follows:

A. All culverts shall extend for an adequate distance to accommodate the required roadway embankment slopes. The cover over the culvert and its capacity shall be determined by the developer's professional engineer and approved by the City Engineer. The minimum diameter of the culvert pipe shall be eighteen (18) inches. Depending on the existing

drainage conditions, head walls may be required. Where driveway culverts are wholly or partially in the street right-of-way, they shall have a minimum length of twenty (20) feet and minimum diameter of fifteen (15) inches. The driveway culverts shall be laid so as to maintain the flow lines of the ditch or gutter.

- B. Culverts shall be designed in accordance with the *Mississippi Department of Transportation Design Manual* along with *HDS #5, Publication No. FHWA-NHI-01-020*.

SECTION **STREET IMPROVEMENTS**
1017

All streets and thoroughfares shall be graded to their full width, including side slopes, and improved in conformance with the standards given or referred to in these Regulations. These standards are considered minimum and are subject to change where deemed necessary. All materials and construction procedures shall be in accordance with the *MDOT Construction Manual*.

SECTION **STREET WIDTH**
1018

Minimum street pavement widths shall conform to the standards of these Regulations. Where pavement widths greater than those specified are deemed necessary by the City Engineer and approved by the Planning Commission, the subdivider shall bear the extra cost of providing the width beyond the requirements of these Regulations.

SECTION **STREET SUBGRADE**
1019

Soil borings shall be obtained by the developer from a licensed Geotechnical firm of sufficient quantity to identify the soil characteristic of the road subgrade. Soil borings will be required every 300 feet along the proposed centerline of any proposed roadway and will also be required at the center of every proposed cul-de-sac. In addition, soil borings will be taken at minimum depths of eight (8) feet below ground and will be required at the entrance of the proposed subdivision and at all low areas. A report shall be included recommending the methods to be used for the street design.

SECTION **STREET BASE COURSE**
1020

The developer has the option of using any of the following base courses, based on recommendations of the City Engineer as to soil and traffic conditions: aggregate, bituminous aggregate, asphalt, concrete, or equally suitable base course. Thickness shall be determined by the Developer's Geotechnical Engineer and approved by the City Engineer, and Road Manager, based upon the physical properties of the base course used and the physical properties of the roadbed.

**SECTION
1021**

STREET CONSTRUCTION DESIGN

- A. The subdivider shall construct streets including all grubbing, grading, laying of sub-base, base, pavements, curbs and gutters, culverts, bridges, storm sewer mains, and structures in accordance with the *MDOT standards*. The design of the work shall be submitted to the City Engineer and the Road Manager prior to the construction of the work.
- B. All pavement or surfacing designs shall be based on a twenty (20) year life and must be approved by the Planning Commission before any construction is undertaken to insure adequate design for the existing soil conditions and proposed use to which it is to be subjected. Design calculations for the road surfacing and base shall be submitted to the City Engineer, and Road Manager for approval.

**SECTION
1022**

HOT MIXED ASPHALT STREETS

- A. Design thickness for combined surface and base material shall be based on the subgrade condition, the ADT factor and the magnitude of equivalent 18,000 pounds axle load where estimated ADT of 100 vehicles per day.
- B. Design guides provided by the *AASHTO, National Asphalt Pavement Association* and the *Asphalt Institute* shall be used.
- C. Surface material shall be at least three inches (3") in thickness. Base material may consist of soil cement, limestone, clay gravel, crushed gravel, or hot mix asphalt base and shall extend a distance of one (1) foot beyond the curb limit. The design mix of the asphalt shall conform to local accepted material or according to Mississippi Department of Transportation specifications.

**SECTION
1023**

STREET CURBS AND GUTTERS

The requirements for curbs and gutters will vary according to the character of the area and the density of development. In areas with substantial flash flooding or heavy rain runoff, curbs shall be required on all streets designed for areas where the existing or anticipated residential density of the area surrounding the proposed subdivision equals or exceeds three (3) dwelling units per net acre. In commercial developments, or where other similar intensive urban uses exist or are anticipated, curbs shall be required. Where curbs exist on abutting properties, their extension shall be required throughout the proposed subdivision. Curbs and gutters shall be constructed in conformance with the current *Constructions and Material Specifications of the State of Mississippi Department of Transportation*.

SECTION **OPEN DITCHES AND SLOPES**
1024

Open ditch construction for roadside drainage shall be permitted in areas zoned A and R-1, and constructed according to Mississippi Department of Transportation specifications. Minimum depth of ditches shall be two (2) feet below the edge of pavement, and one (1) foot minimum at top of hill and toe of bank. All ditches shall be protected against erosion. The designer shall utilize the *Federal Highway Administration Hydraulic Engineering Circular No. 15 (HEC 15)* to calculate and determine channel lining requirements for all proposed roadside ditches and open channels. Concrete linings will be required in areas determined by the City Engineer and the Road Manager. All open ditches will be concreted or curb and gutter with storm drain will be required.

SECTION **ENTRANCE DESIGN STANDARDS**
1025

- A. Any private street with an access control gate shall have a minimum uninterrupted pavement width of twenty-four (24) feet at the location of the access control device. All restricted access gates shall be approved by the particular Fire Department servicing the area and meet access requirements for emergency vehicles.
- B. Overhead barriers shall not be allowed.
- C. Internal storage for three (3) vehicles shall be provided between the right-of-way line and the point of the access control device. An additional setback between the point of the access control device and the access gate shall be required to allow a vehicle which is denied access to safely turn around and exit onto a public street.
- D. On lots adjacent to access gates, screening walls may exceed thirty (30) inches in height, up to a maximum of eight (8) feet within the front yard setback of the adjacent lot.

CHAPTER 11

STORMWATER MANAGEMENT

SECTION **GENERAL** **1101**

1101.1 Stormwater Report Required. All preliminary site and subdivision plans submitted for approval shall be accompanied by a narrative describing how stormwater entering, traveling within, and leaving the site will be managed and to what extent the development will impact existing conditions on-site and off-site. All final site plan and construction drawing submittals shall be accompanied by a Stormwater Report prepared by the developer's engineer.

Every applicant shall provide for stormwater management as required by this chapter, unless a written request is filed and granted by the city to waive this requirement.

Requests to waive the stormwater management plan requirements shall be submitted to the Planning Director for approval.

1101.2 Exemptions and Waivers. When considering a waiver to the Stormwater Management requirements, the Planning Director shall only grant such a waiver, provided that at least one of the following conditions apply:

1. Provisions are made to manage stormwater by an off-site facility. The off-site facility is required to be in place, to be designed and adequately sized to provide a level of stormwater control that is equal to or greater than that which would be afforded by on-site practices and there is a legally obligated entity responsible for long-term operation and maintenance of the stormwater practice.
2. The city engineer finds that meeting the minimum on-site management requirements is not feasible due to the natural or existing physical characteristics of a site.
3. Nonstructural practices, such as pervious pavers and green roofs, will be used on the site that reduce:
 - A. The generation of stormwater from the site;
 - B. The size and cost of stormwater storage; and
 - C. The pollutants generated at the site.

SECTION **METHODS** **1102**

Methods used for computing runoff and generating hydrographs must be by one of the following methods:

1) Rational Method for drainage areas up to one hundred (100) acres or

2) Soil Conservation Service (SCS) Method (TR55) for small and medium size water sheds containing up to ten thousand (10,000) acres.

Other methods may be used upon prior approval of the City Engineer.

SECTION 1103

DESIGN

1103.1 Street and Local Drainage Facilities. All street and local drainage facilities shall be designed using the twenty-five (25) year storm guidelines unless more stringent requirements apply. Piped Drainage Structures shall have a minimum size of fifteen inches (15") in diameter. Inlet and outlet headwalls and toewalls are required for all pipes. Velocities for all pipes shall be kept to a minimum and, if practical, should not exceed four (4) feet per second when flowing full; however, if outlet velocities exceed five (5) feet per second, then energy dissipation devices and vegetative channel protection must be provided.

1103.2 Cross Drains. Pipes and box culverts used for cross drains shall be designed to carry at a minimum the twenty five (25)-year storm discharge, but should also be checked against the one hundred (100)-year storm to insure that the maximum headwater depth (HW) is six inches (6") below the centerline grade of the roadway. Street catch basins may be designed for gutter spread using the ten (10)-year storm provided a four (4) minute time of concentration is used and the remainder of the system is designed for the twenty five (25)-year storm assuming each inlet captures one hundred percent (100%) of the flow (to provide additional capacity for future additions to the system and off site drainage). Inlet capacity at sags, where relief by curb overflow is not provided, shall allow for debris blockage by providing twice the computed opening for the ten (10)-year storm. Curb inlets in the roadway shall be placed in such a way that the spread of water from the ten (10)-year storm does not exceed one half of a lane width on two or three lane streets and one lane width on wider streets. When the typical section includes a full shoulder or parking lane, no encroachment onto the travel lane will be allowed.

1103.3 Drainage Structures within Special Flood Hazard Areas. All drainage structures that lie within streams designated as Special Flood Hazard Areas (SFHA) as defined on the National Flood Insurance Program (NFIP) maps must be designed using the one hundred (100)-year (1% chance) flood event. Designs for structures lying within these streams shall be accompanied by a no-rise certification analysis by the Professional Engineer. All no-rise certifications shall be conducted in accordance with FEMA guidelines.

1103.4 Development within Special Flood Hazard Areas. The floodplain boundary information must be obtained using Federal Emergency Management Agency (FEMA) guidelines. Proposed developments located in approximate "A" zones that will be greater than fifty (50) lots or five (5) acres, whichever is lesser, must provide one hundred (100)-year base flood elevation data. This data should be obtained using appropriate methodologies accepted by FEMA.

SUBDIVISION WITHIN FLOOD PLAIN

There shall be no platting or subdivision of land allowed by the Board within the area defined as a floodplain unless the following conditions are met:

- A) It is determined after receipt of additional hydrological or grade studies from the subdivider or appropriate federal or state agencies that the lands to be developed are no longer subject to be covered by flood water of a 100-year frequency flood, or
- B) The location, grade, and flood-proofing of all proposed water mains and wastewater collectors which are to be extended into or through any portion of the flood plain to serve the proposed development shall first be approved by the City Engineer, prior to the extensions of such utilities into the flood plain area.
- C) That any proposed use which is located within a flood plain shall not include buildings which are inhabited and will be limited to such uses as open space, streets, and parking areas on that portion of the land within the flood plain where significant damage to life and property from flooding is more likely to occur. Any use approved to be located on land which is included within an area designated as a flood plain shall be approved only where the following factors have been considered and arrangements have been made which are satisfactory to the Board of Aldermen.
 - 1. The danger to life and property by water which may be backed up or diverted by such obstruction or land use;
 - 2. The danger that the obstruction or land use will be swept downstream to the injury of others;
 - 3. The availability of alternate locations;
 - 4. The construction or alteration of the obstruction in such a manner as to lessen any danger;
 - 5. The permanence of the obstruction or land use;
 - 6. The anticipated development in the foreseeable future of the area in which the proposed subdivision is to be located which may be affected by the obstruction or land use; and
 - 7. Any additional conditions adopted by the Board of Aldermen to ensure proper use of the areas within the flood plain.
- D. That the development of any land located within the flood plain will be accomplished so as to completely protect all areas of habitation and employment by raising of the ground elevation to the minimum freeboard requirement of the *Fulton Flood Damage Prevention Ordinance*. The raising of the ground shall be accomplished in such a manner that the general flow and storage of water is not unduly restricted or limited and will not cause flood hazards to other lands and developments, either within the proposed subdivision

or otherwise, and that said protection shall be accomplished without creating the need of significant public expenditures for flood control. This may require a detailed study to ensure the site raising will not cause flood hazards.

- E. The proposed center line grade of streets, roads, or private roadways located within the floodplain that are necessary to serve the proposed development shall not be more than one (1) foot below the 100-year frequency flood elevation.
- F. Any area within a flood plain from which fill is taken shall be hydrologically designed and maintained to reduce the likelihood of becoming refilled by silt. The subdivider must make arrangements satisfactory to the Board binding his/her successors and assigns, to regrade or remove such silt as is necessary to return any area to its approved design after flooding has occurred. Any area from which fill is taken within a flood plain shall be at a grade that will continue to permit adequate drainage into the stream or watercourse. If a water area is to be maintained within the flood plain, consideration shall be given to the effect the water area may have upon the flooding of both the land within the flood plain and other lands outside of the flood plain.

The subdivider shall obtain the approval of the City Engineer for any modifications in the location or design of the borrow area within the flood plain.

SECTION 1105

STORMWATER RETENTION AND DETENTION

1105.1 Stormwater Retention and Detention Required. Whenever the Stormwater Report indicates that an adverse stormwater runoff related impact is expected to result from the development of a property, that project shall be required to provide a stormwater detention facility or facilities so that peak flows from the developed site do not exceed those associated with the pre-developed site.

1105.2 Detention Facility Design. The detention facility shall be designed to accommodate a twenty five (25)-year post development event with the discharge structure designed to release the ten (10)-year pre-development flow. Larger projects, in excess of fifteen (15) acres, may be designed to release the twenty five (25)-year pre-development flow. Detention and retention ponds shall be designed with adequate freeboard to protect against overtopping of the dam or levee from the one hundred (100)-year storm. A variety of methods of achieving stormwater management goals are acceptable in providing detention facilities.

The type of facility provided shall be based on the following criteria:

1. The type of development for which the detention facility is intended to protect.
2. Volume of stormwater to be stored.
3. Origin and magnitude of the flows to be managed.
4. Topographic opportunities and limitations.

5. Safety considerations.
6. Maintenance requirements.
7. Aesthetic considerations.
8. Likelihood of facility operation interfering with access to public or private facilities.
9. Proximity of facility to property lines, utilities, buffers, etc.
10. Similar site-specific constraints as necessary.

The use of detention structures, which are greater than four feet (4') in depth, is strongly discouraged. When a detention structure is over four feet (4') deep and in a location that constitutes a danger to human habitation, a permanent fence or barrier and warning signs shall protect it.

1105.2.1 Fencing. When required, fences shall be a minimum of five feet (5') in height with a ten foot (10') wide gate. All fencing must be decorative wood or dark coated metal, such as aluminum picket or powder coated chain-link, and must be specifically approved, along with a plan of access and appropriate easements, by the City during the plans review process. Detention areas shall be dedicated as public infrastructure to the City, or may be owned and maintained by the neighborhood home owner's association and protected by subdivision covenants.

1105.3 Existing Tree Credit. In addition to standard stormwater facilities, credit may be given to developers for preserving mature trees to be used in a detention or stormwater quality facility on a development site. Mature native trees are an integral part of the stormwater treatment process and should be preserved and maintained where applicable. Stormwater storage credits will be given in the amount of one half (½) cubic foot per inch (caliper inch at breast height) of mature trees preserved on site. For example, if ten (10) mature trees with a diameter of twelve (12) inches were preserved in an open, pervious area of the site (or other greenspace that is not in parking lots), the developer would receive credit for sixty (60) cubic feet of storage saved. Credits would be given at the discretion of the Planning Director or designee based on location, size and type of trees. It shall be the responsibility of the developer to provide adequate information concerning the location, size, quality, and type of all trees to be preserved. Such information can be provided by means of a survey or other similar and pertinent documentation.

1105.4 Drainage Easements. Drainage easements suitable for the construction and maintenance of the drainage system shall be provided. A minimum of twenty feet (20') in width will be required for any drainage easement along a drainage pipe, ditch, stream or other area that is designated for stormwater to flow. No obstruction shall be built; constructed or planted that would inhibit proper function of the drainage system. All detention facilities shall be accessible from a public street by a minimum twenty foot (20') access easement, and there shall be an easement for the detention facility including twenty feet (20') beyond the toe of the side slope of the containment berm of the structure. No fences or planting of shrubbery shall be allowed on access easements. Fences and/or

shrubbery may be placed within a piped drainage easement, if an indemnification agreement is provided to the City.

1105.5 Slope Requirements. Drainage channels and detention/retention facilities should have maintained banks with slopes no steeper than three linear feet (3') per one vertical foot (3:1). Channel protection should be provided in vegetative form unless otherwise unsuitable. Where vegetative protection is proposed, the use of temporary or permanent erosion control material is required. At a minimum, the use of excelsior mats, or on approved equal, with sod or seed is required.

Whenever a drainage ditch or channel has a depth of five (5) feet or more, or a bank slope of two (2) feet horizontal to one (1) vertical or steeper, a five (5) foot high masonry wall or a five (5) foot high chain link fence may be required by the Planning Commission.

SECTION 1106

STORMWATER POLLUTION PREVENTION

1106.1 General. Prior to beginning development work, sediment control measures shall be established by the developer to prevent stormwater pollution. Structural practices shall be implemented to divert flows from exposed soils, temporarily store flows, or otherwise control runoff in order to prevent pollutants from leaving development project sites and rights-of-way.

The City will not issue approval for work to begin on a project without the proper permits on file. It shall be the responsibility of the developer to apply for, obtain, and maintain applicable stormwater permits from the **Mississippi Department of Environmental Quality**. Permits shall remain on site at all times for inspection by City and/or MDEQ personnel.

1106.2 Stormwater Permits Required. Before beginning projects that will encompass a disturbed area greater than five (5) acres, the developer/builder shall submit a Stormwater Pollution Prevention Plan (SWPPP) to the Mississippi Department of Environmental Quality (MDEQ) for a Large Construction Stormwater General Permit. A copy of the approved SWPPP plan must be provided to the City with construction plans.

Projects that will have a total disturbed area of less than five (5) acres, but greater than one (1) acre shall be covered under a Small Construction Stormwater General Permit.

Projects that disturb an area of less than one (1) acre that may not be required to obtain stormwater pollution prevention permits shall follow best management practices regarding erosion and sediment control.

1106.3 Minimum Erosion Control Requirements. As a minimum, the developer / contractor shall provide straw bales or silt fences as a temporary structural practice to minimize erosion and sediment runoff. Straw bales and silt fences shall be properly placed to effectively retain sediment in each independent runoff area; then, as work progresses, shall be removed/replaced/relocated as needed. Erosion control measures must remain in place until vegetative establishment has occurred across the newly developed drainage area.

SECTION
1107

PIPE CULVERTS AND STORM SEWERS

1107.1 General. The minimum diameter for pipe culverts and storm drain pipe shall be fifteen inches (15"), and when used as a culvert, the length shall be such that the ends project at least four feet (4') beyond the edge of the pavements or beyond the back of the curb.

1107.2 Design. The design of stormwater drainage systems shall insure adequate control of stormwater runoff through the use of properly sized and positioned drainage structures including but not limited to curb and gutter, curb and grate inlets, raised grates, stormwater sewer pipe, box culverts, intersectional drains, open ditches, and bridges. Some such structures may also be required at side and rear lot lines.

The design of all stormwater drainage systems (including main channels) shall be in accordance with the City's plan (if any) for the basin in which the development is located and shall provide for potential affects to upstream and downstream developments in the basin. Drainage facilities shall be designed to meet all City ordinances and prevent excessive runoff onto adjacent properties. Cross drains shall be provided to accommodate all natural water flow and shall be of sufficient length to permit construction of a full width roadway including side slopes. Headwalls or flared end sections, aprons, channel bottom, and slope protection shall be provided at the upstream and discharge end of the cross drains. The use of excelsior mats or an approved equal will provide adequate protection.

1107.2.1 Design Frequencies. The following stormwater design frequencies shall be used in computing design distribution:

100-Year: All major streams, channels, bridges, open ditches, or drains within the jurisdictional limits of the City.

50-Year: Minor streams, channels, open ditches, or sub-drains from tributary to main streams.

25-Year: Side drains and miscellaneous culverts where flooding would cause minor adverse affects.

1107.2.2 Storm Drainage Pipe and Culverts. The following design criteria shall apply to all storm drainage pipe and culverts:

- A.** Calculation of design flows for drainage areas less than ten (10) acres: All pipes, side drains, and open ditches shall be designed using the accepted methodologies. The minimum storm drainage pipe size shall be ten inches (10") and shall be obtained using the Rational Formula.
- B.** Storm sewer design velocities shall not exceed ten feet (10') per second. For small, compact drainage basins less than ten (10) acres, the peak runoff shall be computed from the Rational Formula.

C. Calculation of design flows from drainage areas greater than ten (10) acres: Design flows shall be obtained by using accepted methodologies suitable for urbanized streams.

D. All pipes, side drains and open ditches shall be designed using the applicable frequency curve.

1107.2.3 Streets, Curb and Gutter, and Inlets. The following requirements shall apply to the construction of streets, curb and gutter, and inlets.

A. The horizontal and vertical alignment of streets shall be compatible with the stormwater runoff system and drainage design.

B. Street Grades shall be coordinated with lot drainage as proposed in the grading plan. Street grades shall be above the one hundred (100)-year frequency flood level.

C. The hydraulic capacity of curb inlets shall be determined by generally accepted engineering procedures taking into consideration roughness and street cross slope. The design depth of flow in the curb and gutter section shall not exceed four inches (4").

D. The hydraulic capacity of curb inlets shall be determined by generally accepted engineering procedures taking into consideration inlet geometry and characteristics of the gutter flow. Curb inlets shall be spaced to limit the spread of water to not more than one quarter ($\frac{1}{4}$) of the street width during a design storm of ten (10) year return period and fifteen (15) minute duration. Inlets shall also be placed at all low points in the gutter grade, at intersections where necessary to prevent gutter flow from crossing traffic lanes of an intersecting street or at points of special concern designated by the Planning Director or Designee.

E. Finished grades of all buildings shall be a minimum of one foot (1') above the one hundred (100)-year flood elevation.

F. The structural design of all box culverts or bridges shall conform to the standard plan of the Mississippi State Highway Department for a load capacity of HS-20 minimum.

G. All culverts, cross drainage, and storm sewers shall be constructed in accordance with the technical specifications contained herein.

1107.3 Materials. All materials and construction practices shall conform to the requirements of the *Mississippi Standard Specifications for State Aid Road and Bridge Construction (2004 Edition)*.

Head walls or flared end sections shall be provided on all eighteen inch (18") pipes and larger.

Plastic Pipe and fittings shall conform to the requirements of Type "S" High Density Polyethylene (HDPE) corrugated pipe under AASHTO M 294. It shall be "N-12 Pipe", as manufactured by Advance Drainage Systems, Hilliard, Ohio, or equal. Couplings used at pipe joints shall provide a watertight connection and gaskets shall conform to the requirements under ASTM F-477.

Reinforced concrete pipe shall conform to ASTM C-76.

1107.4 Installation. Pipe shall be installed according to the Manufacturer's recommendations. Excavation shall be true to line and grade within 0.05 feet. Excavation carried below the grade shall be backfilled at the Contractor's expense with selected materials. Unsuitable materials excavated from the trenches shall not be used for backfill and shall be disposed of as directed by the Developer's Engineer. Any material encountered in way of pipe trenches, including buried drainage structures and obstructions, shall be excavated.

The trench width shall not be less than twelve inches (12") greater than the outside diameter of the pipe. The Contractor shall do such trench bracing, de-watering, sheathing, or shoring necessary to perform and protect the excavation, and shall remove such material as backfill progresses.

The pipe shall be firmly and accurately set to line and grade so that the invert will be smooth and uniform, and any pipe which is not in true alignment, or which shows any settlement after laying, shall be taken up and re-laid. Pipe shall be laid on a prepared bed which will provide a full bearing for the barrel and which is uniformly firm throughout its entire length.

Concrete pipe shall be used beneath all paved areas.

1107.5 Backfilling. The backfill material shall be approved by the Developer's Engineer. Great care shall be used to obtain thorough compaction under the haunches and along the sides to the top of the pipe. The backfill shall be placed in loose layers not exceeding six inches (6") in depth and successive layers shall not be placed until thorough compaction is obtained. Trenches under areas to be paved shall be compacted to ninety-five percent (95%) Standard Proctor density.

1107.6 Connections. Where the plans call for connections to existing or proposed structures or lines, these connections shall be watertight and made so that a smooth uniform flow line will be obtained.

The joints of all pipe culverts to other drainage structures shall be caulked and filled with mortar. Joints shall be thoroughly wet before applying mortar, and sufficient mortar shall be used to form a bead around the outside of the joint and to fill the whole joint to the inside of the connection. The inside of the joint shall be wiped and finished smooth. After the initial set, the mortar on the outside shall be cured with a cover of thoroughly wetted earth or burlap.

STORMWATER SYSTEM CONSTRUCTION RECORDS

The following records must be provided prior to approval of the Final Plat or release of the Construction Bond:

- A. A certification letter from the Developer's Engineer that the improvements were constructed in substantial conformance with the approved construction plans and specifications, accompanied by inspection documentation records and construction inspection photographs. The Developer, or his Designee, is responsible for maintaining inspection records to ensure that all improvements were constructed according to approved plans.
- B. RECORD DRAWINGS shall accurately represent the completed construction including locations of appurtenances. Provide four (4) printed sets and two (2) sets on CD or other media in PDF or other acceptable machine-readable file format.
- C. Copies of the manufacturer's literature necessary for reference in operating and maintaining the facilities including but not limited to manufacturer's product descriptive literature for materials incorporated into the work, operation and maintenance manuals for equipment, copies basic warranty information, etc.
- D. Contact information for the source of supply.
- E. Other information as may be requested by the Planning Director.

CHAPTER 12

WATER DISTRIBUTION SYSTEMS

SECTION GENERAL 1201

1201.1 Water Distribution Required. The developer of all developments and subdivisions shall provide a water distribution system designed, approved and installed in accordance with these Regulations. Water distribution systems for subdivisions and developments shall be connected to a public water supply.

The water distribution system shall meet the minimum requirements of the Mississippi Department of Health and conform to the applicable standards of the City including the current Water Use Policy.

The developer shall be fully responsible for the design, installation, and oversight of any physical improvements necessary to connect to existing public infrastructure.

1201.2 Waiver and Exception. In the event it is determined by the Director of the Water and Sewer Department that it is not possible, or is not feasible, to provide access to the public water supply system, the developer may request a waiver from providing a public water distribution system. Such request shall be in writing and be presented to the Planning Director prior to Preliminary Plat Approval.

The Board of Aldermen shall have sole authority in granting or denying such a waiver.

Should the Board of Aldermen grant a waiver to the developer from providing a public water distribution system, the developer shall install a private individual water supply system for each lot within the proposed development or subdivision.

1201.2.1 Individual Water Supply. Individual water supply systems shall be designed and installed in accordance with the *Mississippi Department of Health*, and *National Groundwater Association (NGWA)* standards.

1201.3 Plans and Specifications Approval. Prior to advertising for bids, or prior to beginning construction where bids are not received on a new public water system, or for extensions or modifications to an existing public water system, plans and specifications shall be provided to the Planning Director.

Plans and specifications shall be prepared, sealed, and signed by a professional engineer registered to practice in Mississippi.

Such plans shall be forwarded to the Mississippi Department of Health for review and approval. Such plans shall not be approved by the City, until approved in writing by the Mississippi Department of Health, Division of Water Supply.

1201.4 System Design. Unless otherwise recommended by the City Engineer, the distribution system shall be designed to maintain a minimum dynamic pressure of twenty (20) psi. Maximum static pressure shall not exceed eighty (80) psi.

Water mains shall be designed based on hydraulic analysis using an appropriate friction coefficient, but shall not be less than six inches (6"). The maximum Hazen-Williams C value to be used is one hundred twenty (120).

The minimum water main size supplying fire hydrants with pumper connections shall be as determined by hydraulic analysis using calculated fire flows.

1201.5 Materials. All materials not specifically referenced herein shall be non-toxic and approved for use in potable water systems by American Water Works Association (AWWA), U.S. Environmental Protection Agency (EPA), Underwriters Laboratory (UL), National Sanitation Foundation (NSF), or other appropriate organization.

Ductile iron pipe and fittings shall only be allowed for open ditch crossings and similar surface layments, and shall be approved by the Water and Sewer Director prior to installation. When allowed, ductile iron pipe shall comply with the latest application standards issued by the AWWA.

All water distribution mains shall be Polyvinyl Chloride (PVC) pipe and shall meet the latest revised requirements of AWWA C-900.

1201.6 Installation. Pipe installation shall comply with generally accepted standards of good workmanship, including applicable AWWA and industry standards, along with, but not limited to the following:

- A. A continuous uniform bedding shall be provided, free of injurious stones or debris within six inches (6") of the pipe in the bedding and cover material.
- B. There shall be a minimum of thirty-six inches (36") of cover.
- C. Except for street and driveway crossings, water lines shall be located outside of paved areas. Exceptions will be considered on a case-by-case basis. Water lines shall be installed a minimum of five feet (5') behind the back of the curb.
- D. While under construction, unattended exposed pipelines must have the ends capped.
- E. Adequate separation from other utilities for maintenance and/or repair should be provided.
- F. Water mains shall be laid at least ten feet (10') horizontally from any sanitary sewer or manhole. Where local conditions prevent ten feet (10') horizontal separation, the City may allow the water line to be laid closer to the sewer line if the following requirements are met:
 - 1. The developer must obtain written approval from the Mississippi State Health Department.

2. If local conditions prevent ten feet (10') horizontal separation, the water main may be laid closer to the sewer line provided they are in a separate trench and the bottom of the water line is eighteen inches (18") above the top of the sewer lines.
 3. Where this ten foot (10') horizontal separation cannot be maintained, the water line should be ductile iron with water line joints located at the maximum distance possible from sewer line joints. PVC pipe may be used if it is protected by a steel casing.
 4. Where water lines cross sewer lines, the pipe segments should be centered to provide maximum spacing of joints of both water and sewer lines. A vertical separation of at least eighteen inches (18") should be maintained (water over sewer).
 5. No water pipe shall pass through or come into contact with any part of a sewer manhole. In places where the water line passes underneath a sanitary sewer line, the water line shall be installed so the midpoint of a full pipe length of water line is centered on the sanitary sewer.
- G. Water lines crossing ditches where less than thirty-six inches (36") of cover is maintained or crossing streams shall be either ductile iron pipe (when approved by the Water and Sewer Director), or protected by a steel casing. Adequate support and anchorage shall be provided on both sides of the ditch.
 - H. Pipe lines including main and service lines that cross roadways shall be protected by a steel casing. Casings for service lines under collector and local streets installed by open cut may be PVC pipe or steel pipe.
 - I. Encasements for all main lines shall be welded steel encasement pipe.
 - J. All water users shall be supplied individually from a service line extended directly from the main line.
 - K. A sufficient number of valves shall be provided to limit the number of meters isolated during line maintenance and repairs. Valves shall be located and lines looped so that not more than twenty-five (25) meters will be isolated at a time. Valve location spacing shall not exceed one thousand feet (1,000') along any segment. Valves shall be provided at each fire hydrant.
 - L. Pressure and leakage tests should be completed and conform to the current AWWA Standard, C 600 Section 5. Provide records of test results indicating witness by the developer's engineer or a city representative.
 - M. There shall be no physical connection (cross connections) between the distribution system and any pipes, pumps, hydrants, or tanks whereby unsafe water or any contaminants may be caused to enter the water system. An appropriate backflow prevention device shall be installed on each service extension where an existing or potential health hazard exists or where a hazardous hydraulic condition may be allowed to exist. Where backflow

prevention devices are required, they must be installed inside of an associated building, or equipped with a prefabricated exterior housing to be approved by the Administrator or designee. These devices should be located in a serviceable area but screened away from the public view. Prior to service being connected to a public water system, all wells or water sources owned or used previously by the potential customer shall be physically disconnected from the plumbing to be supplied by the public water system.

N. All dead end mains shall terminate with one of the following:

1. A two inch (2") flushing hydrant may be installed, serviced by a two inch (2") brass tapping saddle with corporation stop and curb stop. A main line valve and pipe bell with cap shall be placed beyond the tap for the flushing hydrant.
2. A fire hydrant may be installed. Hydrant type and installation shall be per the specifications herein, at the discretion of the Planning Director.

SECTION 1202

WATER PIPE LINES

1202.1 Size and Materials. Except as otherwise provided, water mains shall be minimum six inch (6") PVC. Ductile Iron Pipe for water pipe lines, where permitted, shall be in accordance with ANSI/A21.50 and ANSI/A 21.51 mechanical or push-on jointed and shall be cement lined in accordance with ANSI/A 21.4. Rubber gasket joints shall be in accordance with ANSI 21.11. The pressure classes for ductile iron pipe shall be: PC 350 for eight to twelve inch (8"-12") pipe.

Plastic Pipe shall be rigid polyvinyl chloride pipe AWWA C-900 Class 150 (DR18) with integral bell for gasketed slip joints. "O"-ring joints and glue joints will not be accepted. Gasket joints shall be in accordance with ASTM D-3139. All plastic pipe shall be installed within one (1) year of the date of manufacture indicated on the pipe.

1202.1.1 Pipe Fittings. Fittings for ductile iron and PVC pipe shall be ductile iron mechanical joint fittings, ANSI Specification A21.53, A21.11 as applicable. Fittings shall be rated for a working water pressure of 350 psi. Ductile iron fittings shall be uniformly coated on the inside with cement-mortar lining conforming to ANSI Specifications A21.4. Mechanical joint fittings with Ebaa Iron Megalug glands and gaskets or Uni-Flange Series 1400 restrained joint device may be used where restrained joint fittings are specified. Pipe Fittings for Flanged Connections shall be ANSI Specifications A21.10, Class 125, ductile iron fittings.

1202.1.2 Thrust Blocks: Concrete thrust blocks, or similar method approved by the City Engineer, shall be installed around fittings at the locations and of the volume and strength required to withstand thrust reactions at the test pressure. Where directional changes occur in a vertical plane, approved mechanical retainers shall be used.

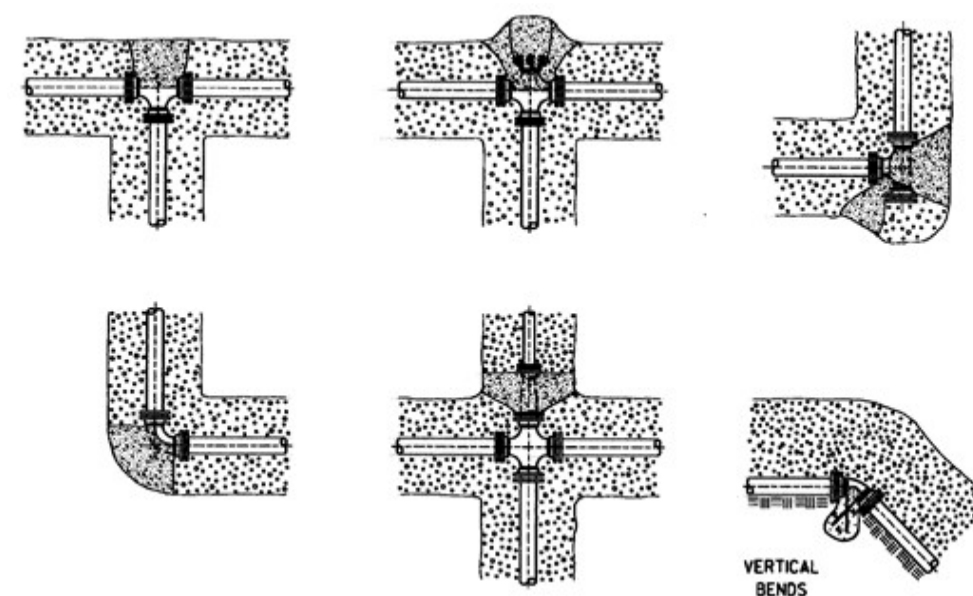


ILLUSTRATION 1202.1.2 - THRUST BLOCKING

1202.2 Jointing.

Ductile Iron Pipe – When permitted, all joints shall be in accordance with the manufacturer's instructions exercising extreme care to clean all parts before assembly. Joints shall be made under dry conditions. Underground flanges shall be wrapped with 8 mil black polyethylene material conforming to ANSI A21.5 and taped in place before backfilling.

Plastic Pipe - Joints in plastic pipe shall be rubber gasket push-on type. Push-on joints shall be made in accordance with the manufacturer's instructions. The resulting joints shall be clean and watertight.

1202.3 Encasements. Encasement for water lines at roadway crossings shall be new black steel pipe per ASTM A252, Grade 2, ASTM A53, Grade B or better. Minimum wall thickness shall be 0.188" for sizes 12" and less and 0.250" for 14" and above. Joints shall be welded. Trenching and backfilling shall be performed in conformity with the Water Pipe Lines standard.

1202.4 Pipe Laying. The pipe shall be lowered into the trench in such a manner as to prevent damage to the pipe or pipe coating. It shall not be dropped or dumped during unloading or laying. Foreign matter and dirt shall be prevented from entering the pipe. A minimum cover of thirty-six inches (36"), measured from the top of the pipe shall be provided.

1202.5 Tracer Wire. Twelve gauge (minimum) insulated single-strand solid copper tracer wire shall be installed with all plastic mains and service lines to facilitate location with a pipe locator. The tracer wire shall be laid in the trench with the plastic pipe.

The tracer wire shall be brought up and terminated in a tracer wire test station at each valve and at intervals along pipelines not to exceed five hundred feet (500'). Tracer wire test stations shall be Rhino TriView Flex with internal test station as manufactured by REPNET, Inc. or equal. The tracer wire station shall be installed by sliding it over a six foot (6') long 1-1/2 lb. per foot U-channel post driven eighteen to twenty four inches (18" - 24") into the ground and securing it with a bolt or rivet as recommended by the manufacturer. Where utilities are located in the front or side yard, use "snakepit" style tracing wire system with six inch (6") top flange in-grade locator markers. Identification decals shall be affixed to all three sides of the post.

1202.6 Backfilling. Trenching and excavation shall be backfilled immediately after the pipes are laid. The initial backfill shall extend to twelve inch (12") above the pipe. The initial backfill shall be thoroughly and carefully tamped before the next layer is placed. The remainder of the backfill shall be as follows:

In areas not be paved, the backfill may be fine, loose soil, free from large clods, stones, frozen earth, debris or any material with an exceptionally high void content. The backfill may be accomplished by dozing in layers of approximately one foot each. A windrow shall be left over the trench and bladed and shifted as necessary as settling occurs. For graveled areas, after maximum settlement has been reached, excess material shall be hauled away and washed gravel or crushed stone added as necessary.

In areas to be paved, the trench soils shall be tested by the design engineer to determine their suitability for use as backfill material. If the trench soils are found to be unsuitable, they shall be replaced with suitable materials. Backfill in areas to be paved shall be placed in twelve inch (12") lifts and each lift compacted to ninety five percent (95%) Standard Proctor density. Backfill shall extend to the top of the subgrade.

The location of backfill density tests shall be at the discretion of the design engineer. Generally, one sample will be taken mid-trench depth and one on top of the material each two hundred feet (200')+ along the trench. In the event of failed density tests, the compaction shall be continued and water added until the optimum moisture content is reached and the samples meet or exceed the specified minimum density.

1202.7 Pressure Testing. After the pipe has been laid, all newly laid pipe and selected valved sections shall be subjected to a hydrostatic pressure equal to one and one-half (1-1/2) times the normal static water pressure, but not less than 100 psi. All pressure tests must be conducted in the supervision of the Developer's Engineer or representative.

Test Pressures shall:

- A. Not exceed pipe or thrust-restrain design pressures (Backfill pipe trenches sufficiently and provide reaction blocking hydrostatic testing.)
- B. Be of at least 2-hour duration.
- C. Not vary by more than + 5 psi for the duration of the test.
- D. Not exceed the rated pressure of the valves when the pressure boundary of the test section includes closed, resilient-seated gate valves.

Each valved section of pipe shall be slowly filled with water. The specified test pressure shall be applied, by means of a pump connected to the pipe in a satisfactory manner. Valves

shall not be operated in either the opening or closing direction at differential pressures above the rated pressure. The system shall be allowed to stabilize at the test pressure before the leakage test is conducted.

Before applying the specified test pressure, air shall be expelled completely from the section of pipe under test. If permanent air vents are not located at all high points, corporation stops shall be installed at such points so that the air can be expelled as the line is filled with water. After all the air has been expelled, the corporation stops shall be closed and the test pressure applied. At the conclusion of the pressure test, the corporation stops shall be left in place and record of their location provided.

Damaged or defective pipe, fittings, valves, or hydrants that are discovered following the pressure test shall be repaired or replaced and the test shall be repeated until satisfactory results are obtained.

A leakage test shall be conducted concurrently with the pressure test. Leakage shall be defined as the quantity of water that must be supplied into a pipe to maintain pressure within five (5) psi of the specified test pressure after the pipe has been filled with water and the air has been expelled. Leakage shall not be measured by a drop in pressure in a test section over a period of time.

No pipe installation will be accepted if the leakage is greater than the allowable leakage at various pressures as shown in the table below.

Table 1202.7. Allowable Leakage per 1000 ft (GPH)

Avg. Test Pressure (PSI)	Nominal Pipe Diameter (inches)									
	3	4	6	8	10	12	14	16	18	24
180	0.31	0.41	0.61	0.81	1.01	1.21	1.41	1.61	1.82	2.42
175	0.30	0.40	0.59	0.80	0.99	1.19	1.39	1.59	1.79	2.38
150	0.28	0.37	0.55	0.74	0.92	1.10	1.29	1.47	1.66	2.21
125	0.25	0.34	0.50	0.67	0.84	1.01	1.18	1.34	1.51	2.01
100	0.23	0.30	0.45	0.60	0.75	0.90	1.05	1.20	1.35	1.80

Note: If the pipeline under test contains sections of various diameters, the allowable leakage will be the sum of the computed leakage for each size.

Acceptance shall be determined on the basis of allowable leakage. If any test of installed pipe discloses leakage greater than that specified, repairs shall be made as necessary until the leakage is within the specified allowance.

All visible leaks are to be repaired regardless of the amount of leakage. Tests must be observed by the Planning Director or designee and certification of such observance must appear on the test record.

1202.8 Disinfection and Bacteriological Testing. Disinfection shall be in valved sections and may be done concurrently with pressure testing. Flushing and disinfection shall be in accordance with AWWA Specification C651. After completion of the disinfection, arrangements shall be made to collect a least one sample from every dead-end line and every major looped line for bacteriological examination. The sample shall be collected by a representative of the Mississippi State Department of Health, the registered professional

Engineer in charge of the project, or a certified water operator authorized by the City. Water being collected for testing shall not have a chlorine residual higher than is normally maintained in other part of the distribution system.

1202.8.1 Test Results Required. No coliform bacteria and no confluent growth indication shall constitute a satisfactory sample when analyzed by the Mississippi Department of Health or a laboratory certified by the State of Mississippi. A copy of the test results shall be furnished to the City.

SECTION 1203

VALVES AND BOXES

1203.1 Materials. Gate valves shall be resilient seated gate valves conforming to AWWA Standard C509, iron body, bronze mounted, non-rising stem with O-ring seals, opening counterclockwise, M&H Valve Company. All cast iron parts, inside and out except contact or bearing surfaces of resilient seated valves, shall be coated with an approved surface tolerant hi-solids catalyzed epoxy coating. Buried valves shall have an AWWA wrench nut; mechanical joint ends, but may have flanged ends (ANSI B16.1) - (125 lb.) where necessary.

Valve boxes for underground installation of valves shall be fine grain gray iron castings, 5-1/4 inch shaft, screw type, adjustable height, round base, Vulcan V8460, Fastech or equal per ASTM Specification A48 Class 30B. Shaft extension pieces shall be installed where necessary. Valve boxes shall have the word "WATER" cast into the top of the cover. Valve boxes shall not be painted.

1203.2 Installation. Valves and boxes shall be installed truly vertical. Joints and leakage shall be as specified under the Water Pipe Lines standard. The valve box shall not transmit shock or stress to the valve and shall be centered and plumb over the wrench nut of the valve. In unpaved areas, an 18"x18"x6" reinforced, formed concrete pad shall be provided at the finished grade around the top of the box. The top of the valve box should be flush with grade.

Tracer wire shall be terminated in a test station only and not in the valve box.

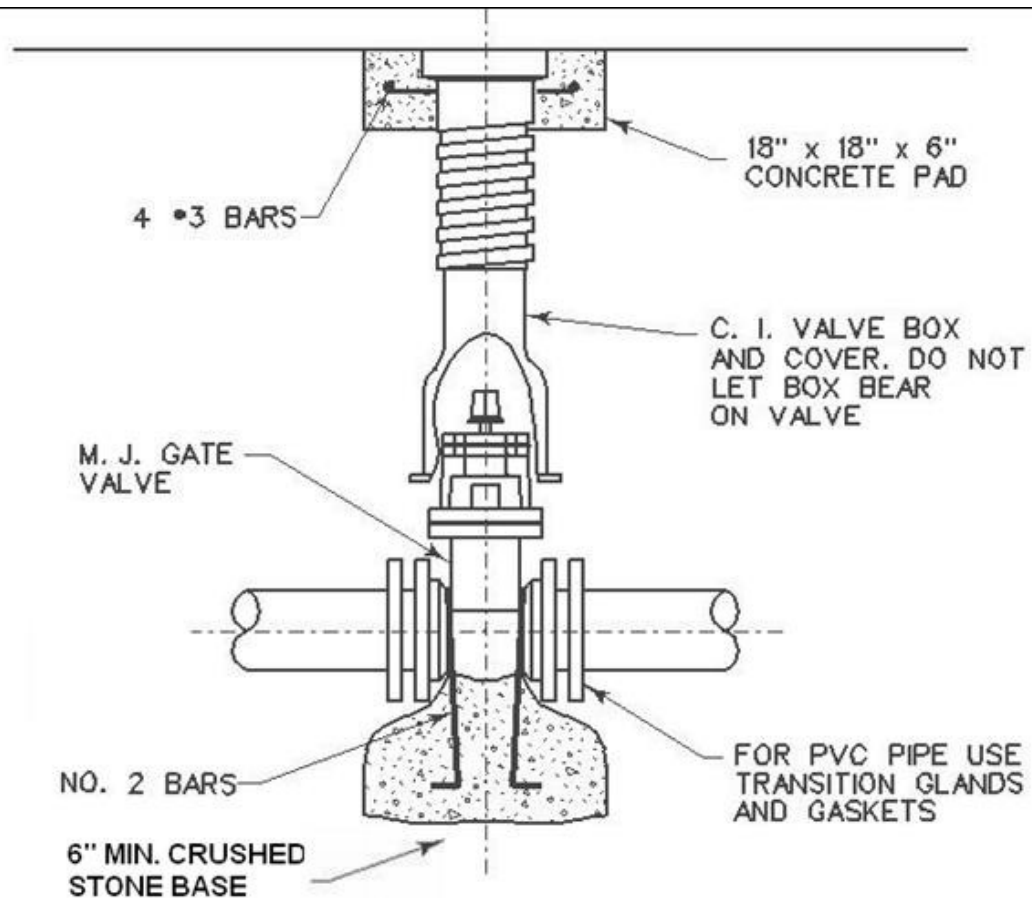


ILLUSTRATION 1203.2 - TYPICAL VALVE INSTALLATION

SECTION 1204 FIRE HYDRANTS

1204.1 Materials. Fire hydrants shall conform to AWWA Standard C-502. Hydrants shall be Mueller "Super Centurian - 250" or M & H "Style 129" or equal for a minimum of 200 psi working pressure. Hydrants shall be of the 5-1/4" valve size for connections to mains with 6" mechanical joint connections, with 42" minimum cover and shall be fitted with 2-1/2" hose connections and one 4-1/2" steamer connection with National Standard threads. Stems shall be provided with "O"-ring seals. The above ground part of the hydrant shall be given a prime coat then two coats of an approved, weather-proof paint. Hydrants shall be of the traffic model type. The riser shall be designed so that if breakage occurs, the breakage flange, ring, or bolts and the stem will break before damage is done to the riser and the hydrant can be restored to service by replacing the breakage parts.

1204.2 Installation. Hydrants shall be set perpendicular and the base braced against the water pressure at the shoe with concrete blocking, or similar method approved by the Planning Director or designee. Three cubic feet of washed gravel shall be placed around the drain port to provide the water absorption to prevent freezing. Concrete blocking shall not interfere with hydrant drainage.

Hydrants shall be spaced at not more than 500 feet (500') in residential developments and at not more than 300 feet (300') in commercial and industrial developments. Such measurements shall be made solely along the routes of existing or proposed streets. Hydrants shall not be located more than twelve feet (12') from a street or road. Hydrants shall be installed with the hose connections in the proper direction for attachment to the fire hose. A clear space shall be provided around all fire hydrants defined by a circle with a minimum radius of three feet (3').

Hydrants shall be marked with a sign or reflector affixed to the roadway surface, as approved by the Fire Chief. In addition, at the discretion of the Fire Chief, hydrants shall be color coded or otherwise marked in an approved manner indicating the available flow capacity.

Hydrants subject to vehicular damage, and not located within a public right-of-way, shall be protected from damage with barriers, bollards, or similar methods, as approved by the Fire Chief.

The collision ring of hydrants shall be set flush with (not below) the finished grade surface or not more than six inches (6") above the finished surface. Barrel extension sections shall be installed where necessary.

A valve shall be provided to isolate each hydrant from the main line. The valve shall be furnished and installed in accordance with Section 603.

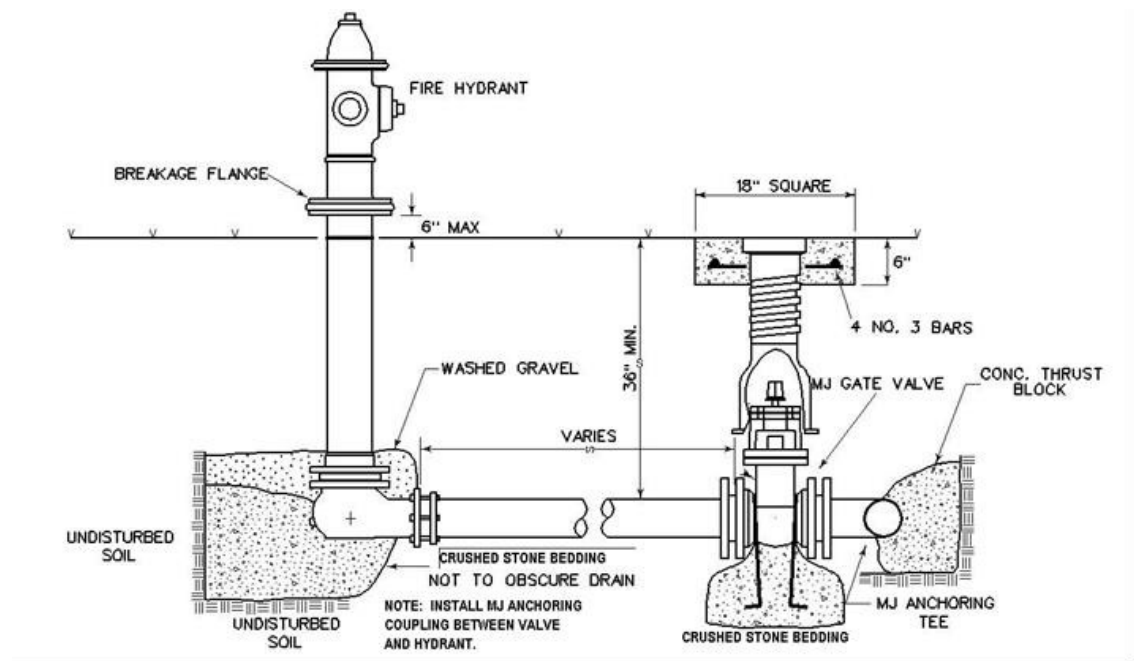


ILLUSTRATION 1204.2. – FIRE HYDRANT INSTALLATION

**SECTION
1205**

WATER SERVICE CONNECTIONS

1205.1 General. This standard covers the installation of a corporation stop in the water main, the water service line extending from the water main outward towards the road right-of-way line, and the meter valve at the line terminus.

1205.2 Connection to Main Waterlines. Connection to water mains shall be made with the service line horizontal and watertight using an approved sealer on all screwed joints. Corporation stops shall be set in an up-45 degree position. Two-inch service lines shall be connected using a PVC Schedule 80 female adapter (IPT/Socket).

For three quarter inch ($\frac{3}{4}$ ") and one inch (1") services, a properly sized, hinged, single strap, bronze service clamp equal to Ford (#) series shall be installed with a bronze corporation stop with compression connection equal to Ford (#) or packing nut. For two inch (2") services the corporation stop equal to Mueller H-9969 shall be installed in a service tee.

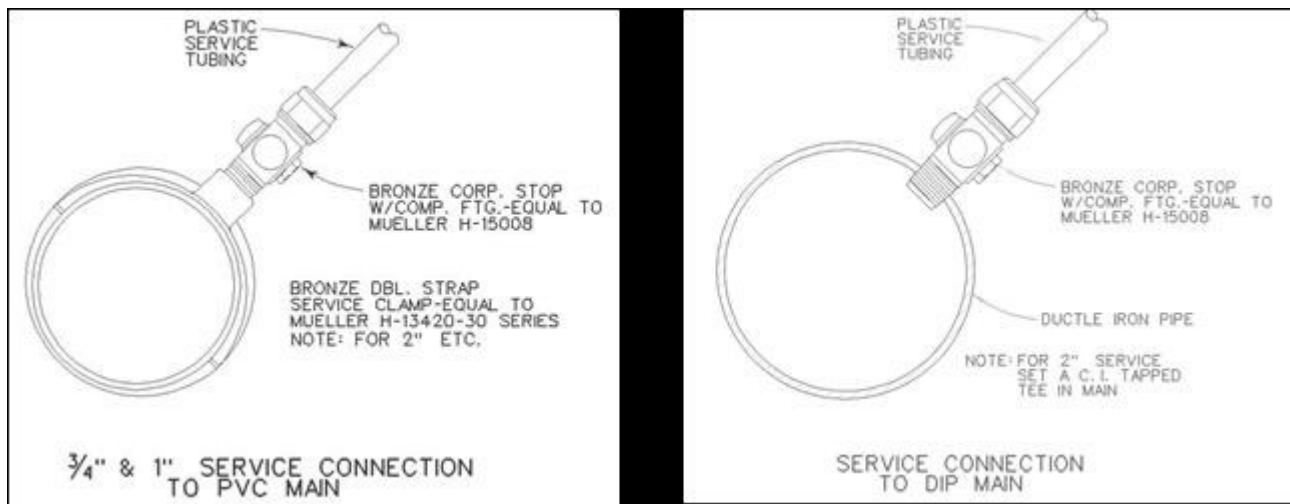


ILLUSTRATION 1205.2 - SERVICE CONNECTION DETAILS

1205.3 Water Service Lines. Water service lines shall be polyvinyl chloride Class 200 pipe or greater. All tubing and pipe shall have the manufacturer's name and NSF logo identification number. Generally, service lines shall be installed with a minimum bury of twenty-four inches (24") and shall be laid to conform roughly to the topography of the ground. Under ditches, the minimum bury shall be twenty-four inches (24") (measured from the bottom of the ditch). Trenching, backfilling, and pipe laying shall be performed in conformity with the Water Pipe Lines standard. Water meters shall be installed with either a three-quarter inch ($\frac{3}{4}$ ") or one inch (1") riser.

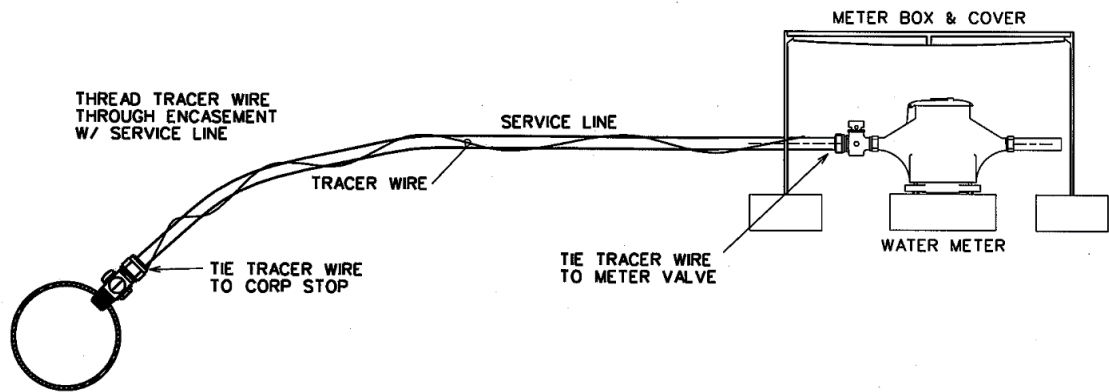


ILLUSTRATION 1205.3 – WATER SERVICE LINE DETAILS

1205.4 Encasements. Encasement for service lines at roadway crossings shall be two inches (2") Schedule 40 PVC with solvent weld couplings. Trenching and backfilling shall be performed in conformity with the Water Pipe Lines standard.

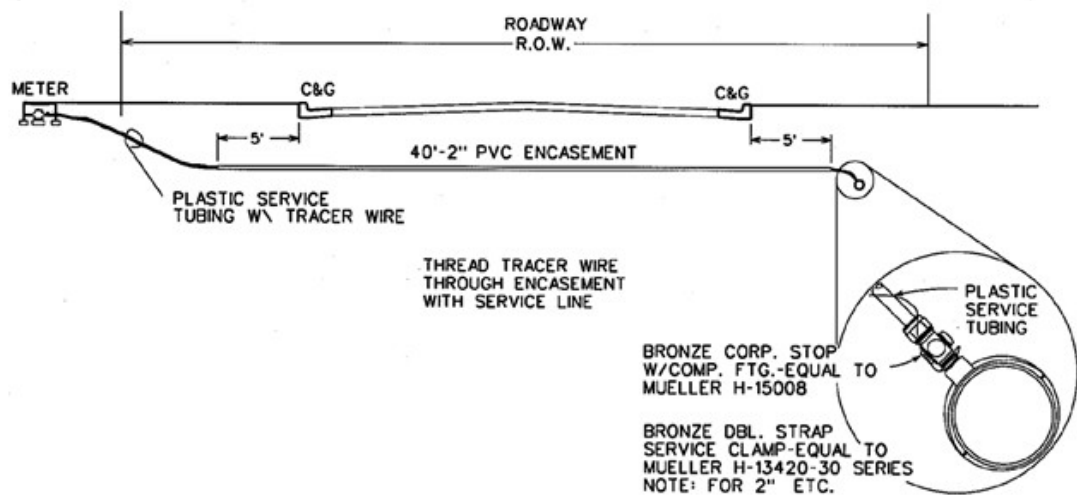


ILLUSTRATION 1205.4 – SERVICE LINE ENCASEMENT DETAILS

1205.5 Water Service Line Terminals. Each three quarter inch ($\frac{3}{4}$ ") and one inch (1") service shall terminate with a bronze meter valve with packing nut or compression connection/meter coupling equal to Mueller H-14348 and brass meter coupling equal to Mueller H-10890, set in a meter box near the right-of-way line. All joints shall be watertight.

For two inch (2") services a two inch (2") bronze meter valve with inside IPT/Meter-Flange equal to Mueller H-14337 shall be installed.

A teaspoon or one (1) tablet of HTH powder shall be placed in each service connection before setting.

Meter boxes shall be cast iron or plastic of an approved type. Set a t-post guard at each meter box.

Water meters shall be installed with either a three-quarter inch ($\frac{3}{4}$ ") or one inch (1") riser.

1205.6 Tracer Wire. Twelve gauge minimum insulated solid copper wire shall be installed with all plastic mains and service lines to facilitate location with a pipe locator. The tracer wire shall be laid in the trench with the pipe and threaded through encasements. Tracer wire shall be tied to the corporation stop, threaded through encasements where applicable and extended into the meter box. Tracer wire shall also be required on water connection service lines to the connection point at the structure.

1205.7 Flushing. After completion of the service assembly installation, each service shall be thoroughly flushed with chlorinated water. During sterilization of the mains, the meter stop shall be opened to allow chlorinated water to pass through each service.

SECTION 1206

CONNECTIONS TO EXISTING WATER MAINS

1206.1 General. Connections to existing water mains shall be made in cooperation with the Water and Sewer Department Director. Schedule taps so as to interfere as little as possible with the operation of the system.

Connections to existing water mains shall be made as follows:

- A.** Connections to existing water mains shall be made by machine taps except as directed otherwise.
- B.** A City permit will be required for each main line tap. The tap shall be made in the presence of the Director of the Sewer and Water Department or designee after MSDH approval is provided.
- C.** A connection fee will be required for each service tap.
- D.** The Director of the Sewer and Water Department or designee must be present for each tap. No work will be permitted without an inspector present.
- E.** All work shall conform to applicable requirements of these Regulations and any other applicable City Ordinance.
- F.** Surfaces shall be restored in accordance with City Standards.
- G.** Damages shall be repaired at no cost to the City.
- H.** The developer's contractor shall be liable for the cost of the removal of contaminants introduced into the system as a result of the work.

1206.1.1 Tapping Mains under pressure. Where the water cannot be cut off on a line to be tapped, make the tap under pressure using a tapping sleeve and a tapping valve in accordance with the tapping machine manufacturer's instructions. It shall be the Contractor's responsibility to furnish the tapping machine required for a machine tap under pressure. Tapping sleeves for machine taps to PVC mains shall be stainless steel body Mueller H-304, JCM432, or approved equivalent.

1206.1.2 Machine Tap Valves. Valves for machine taps shall be resilient wedge tapping valves conforming to ANSI/AWWA C509 with stainless steel nuts and bolts on the stuffing box and valve bonnet. Mueller T-2360 MJFL, or approved equivalent.

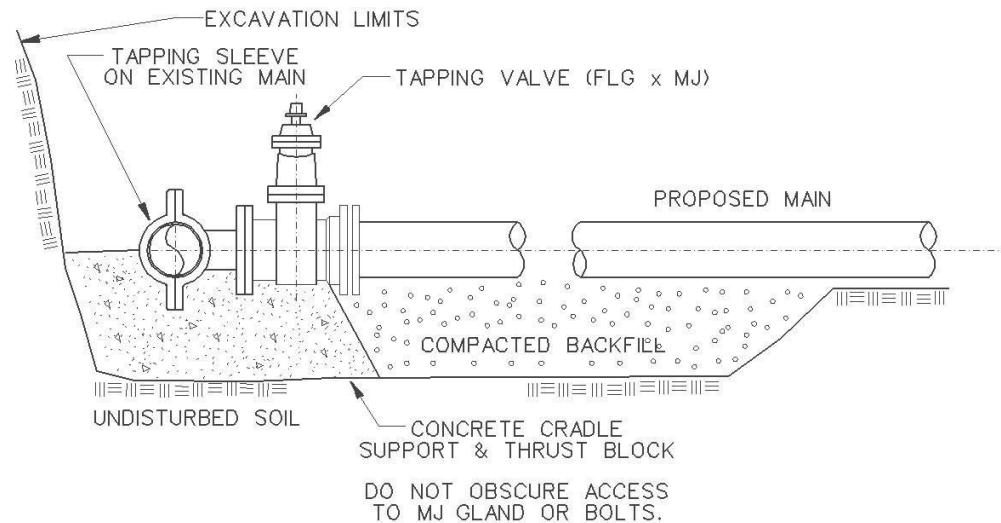


ILLUSTRATION 1206.1 - MACHINE TAP DETAIL

**SECTION
1207**

WATER SYSTEM CONSTRUCTION RECORDS

The following records must be provided prior to approval of the Final Plat or release of the Construction Bond:

- A.** A copy of the Mississippi State Health Department's final approval letter.
- B.** A certification letter from the developer's engineer that the improvements were constructed in substantial conformance with the approved construction plans and specifications, accompanied by inspection documentation records and construction inspection photographs of all mechanical joints, assemblies and pipe deflection joints as constructed in the field. The developer's engineer, or his designee, is responsible for maintaining inspection records to ensure that all improvements were constructed according to approved plans.
- C.** RECORD DRAWINGS shall accurately represent the completed construction including locations of service stub outs, valves, fire hydrants, flushing hydrants, and other

appurtenances. Provide four (4) printed sets and two (2) sets on CD or other media in PDF or other acceptable machine-readable file format.

D. Copies of the manufacturer's literature necessary for reference in operating and maintaining the facilities including but not limited to manufacturer's product descriptive literature for materials incorporated into the work, operation and maintenance manuals for equipment, copies of basic warranty information, etc.

E. Contact information for the source of supply.

F. Copies of Mississippi State Department of Health bacteriological test results; and

G. Other information as may be requested by the Planning Director or designee.

CHAPTER 13

SANITARY SEWER SYSTEMS

SECTION GENERAL 1301

1301.1 Sanitary Sewer Required. The developer of all developments and subdivisions shall provide a sanitary sewer system designed, approved and installed in accordance with these Regulations. Sanitary sewer systems for subdivisions and developments shall be connected to a public sewer.

The sanitary sewer system shall meet the minimum requirements of the Mississippi Department of Environmental Quality and conform to the applicable standards of the City.

The developer shall be fully responsible for the design, installation, and oversight of any physical improvements necessary to connect to existing public infrastructure.

1301.2 Waiver and Exception. In the event it is determined by the Director of the Water and Sewer Department that it is not possible, or is not feasible, to provide access to the public sanitary sewer system, the developer may request a waiver from providing a public sanitary sewer system. Such request shall be in writing and be presented to the Planning Director prior to Preliminary Plat Approval.

The Board of Aldermen shall have sole authority in granting or denying such a waiver.

Should the Board of Aldermen grant a waiver to the developer from providing a public sanitary sewer system, the developer shall install an individual onsite wastewater system for each lot within the proposed development or subdivision.

1301.2.1 Individual Onsite Wastewater System. Individual onsite wastewater systems shall be designed and installed in accordance with the **Mississippi Department of Health** requirements.

1301.3 Plans and Specifications Approval. Prior to advertising for bids, or prior to beginning construction where bids are not received on a new public sewer system, or for extensions or modifications to an existing public sewer system, plans and specifications shall be provided to the Planning Director.

Plans and specifications shall be prepared, sealed, and signed by a professional engineer registered to practice in Mississippi.

Such plans shall be forwarded to the Mississippi Department of Environmental Quality for review and approval. Such plans shall not be approved by the City, until approved in writing by the Mississippi Department of Environmental Quality, Office of Pollution Control.

1301.4 System Design. Sewer mains shall be of sufficient size to serve all residents of the subdivision but shall not be less than eight inches (8") in diameter. The lines shall be designed and constructed to give mean velocities, when flowing full, of not less than two feet (2') per second, based on Kutter's formula using an "n" value of 0.013. Where velocities of over fifteen feet (15') per second are attained, special provision shall be made to protect against displacement. Sewers shall be laid with straight alignment and uniform slope between manholes.

All sewers shall be designed to prevent damage from superimposed loads. Proper allowance for loads on the sewer shall be made because of the width and the depth of trench. Where necessary to withstand extraordinary superimposed loading, special bedding, concrete cradle, or special construction may be used.

Except for street and driveway crossings, sewer lines shall be located outside of paved areas. Exceptions will be considered on a case-by-case basis.

Construction specifications shall contain appropriate requirements based on the criteria, standards and requirements of the City.

1301.5 Materials. Sewer mains and fittings shall be constructed of Rigid Polyvinyl Chloride Pipe (PVC).

1301.6 Installation. The width of the trench shall be ample enough to allow the pipe to be laid and jointed properly and to allow the backfill to be placed and compacted as needed. When wider trenches are dug, appropriate bedding class and pipe strength shall be used.

The installation of joints and the materials used shall be included in the specifications.

Sewer joints shall be designed to minimize infiltration and to prevent the entrance of roots throughout the life of the system.

Manholes shall be installed in accordance with Section 1304 and as follows:

1. at the end of each line;
2. at all changes in grade, size or alignment;
3. at all intersections; and
4. at distances not greater than four hundred feet (400') for sewers fifteen inches (15") or less, and five hundred feet (500') for sewers 18 inches to 30 inches (18" to 30"), except the distances up to six hundred feet (600') may be approved in special cases.

Manholes shall be inspected for water-tightness prior to placing into service.

The minimum diameter of manhole shall be forty eight inches (48"). Manholes shall be of the pre-cast concrete (ASTM C478) or poured-in-place concrete type. Manhole steps shall be provided. Manholes shall be waterproofed on the interior and to twelve inches (12") below grade on the exterior.

The bottom of manholes shall be reinforced concrete and the flow channel (invert) through manholes shall be made to conform in shape and slope to that of the sewers.

Inlet and outlet pipes shall be jointed to the manholes with a gasketed flexible watertight connection that will allow differential settlement of the pipe and manhole wall to take place.

Watertight manhole covers shall be used for manholes (1) located in paved or traveled areas, (2) with tops set flush with the surrounding ground or (3) located in areas subjected to flooding by surface runoff or high water. The tops of manholes with vented covers shall be raised above the surrounding finished grade, three inches (3") minimum and shall not be subjected to surface runoff or flooding. Locked manhole covers may be required in isolated easement locations or where vandalism may be a problem. An access of twenty two inches (22") diameter (minimum) shall be provided.

Stub outs or house laterals (Schedule 40 PVC) shall be laid out and in place ahead of the gas and water lines so that variances in the depth or grade of the line will not be required to accommodate to allow for water or gas lines or stub outs. All sanitary sewer mains shall have stub outs installed, one per lot and be stubbed out to a sufficient distance to insure that the pavement of a street need not be cut in order to connect thereto. Each stub out shall include a service cleanout. Multiple lots may not be serviced by a common service line.

Sewers shall be laid at least ten feet (10') horizontally from any existing or proposed water main. The distance shall be measured edge to edge. In cases where it is not practical to maintain a ten foot (10') separation, the Water and Sewer Director may allow deviation on a case-by-case basis. Sewers crossing water mains shall be laid to provide a minimum vertical distance of eighteen inches (18") between the outside of the water main and the outside of the sewer. The crossing shall be arranged so that the sewer joints will be equidistant and as far as possible from the water main joints. Where a water main crosses under a sewer, adequate structural support shall be provided for the sewer to prevent damage to the water main. When it is not possible to obtain proper horizontal and vertical separation as stipulated above, the sewer shall be designed and constructed equal to the water pipe, and shall be pressure tested to assure water tightness prior to backfilling.

SECTION 1302

GRAVITY SEWER LINES

1302.1 Materials. PVC Sewer Pipe and fittings shall be rigid polyvinyl chloride pipe in accordance with ASTM D-1784, cell classification 12454 and applicable portions of ASTM D-3034. Wall thickness shall be minimum SDR 26 and be in accordance with ASTM F-679 (PS46). The pipe shall have an integral bell for elastomeric gasket joints per ASTM 3212 with seals per ASTM F-477. All fittings and accessories shall have bell and spigot configurations identical to that of the pipe.

Rubber gasket joints shall be in accordance with ANSI/A21.11. Push-on joint pipe shall be used unless otherwise shown on the plans. Flanged joint pipe shall be in accordance with ANSI/A21.10 and ANSI/21.15.

1302.2 Pipe Material Testing. Each piece of pipe and fitting shall bear the stamp of certification of the manufacturer that the pipe conforms to the standard specifications requirements.

1302.3 Installation. PVC sewer pipe shall be installed in accordance with ASTM Standard D-2321 as modified herein. PVC pipe shall be installed within one (1) year of the date of manufacture indicated on the pipe.

A. Bedding and Haunching. Crushed stone, or sand shall be used to support the pipe as shown on the drawing of typical trench section in this standard. Prior to pipe installation, the bedding material shall be brought to grade along the entire length of pipe to be installed. For pipe with bells or couplings, bell holes shall be formed at each joint to provide full length support and prevent point loadings.

B. Pipe Laying. The necessary equipment and supports shall be provided to insure installation of the pipe to the proper line and grade. The pipe shall be lowered into the trench so that neither the pipe nor the trench will be damaged. The pipe shall be protected from lateral displacement. The pipe shall not be laid in water. The pipe shall be laid in the finished trench starting at the lowest point and laying the pipe upgrade. The pipe shall be set firmly and accurately, with ends abutting, to line and grade so that the invert will be smooth and uniform. The pipe lines shall be drained as the work progresses so that no water will be trapped in the lines.

C. Making Joints. Joints shall be watertight in accordance with the jointing standards of the manufacturer. All oil, grease, asphalt, mud, and debris shall be cleaned from the joint before it is made. Solvents or lubricant shall be applied as required. The pipes shall be pressed home using mechanical means if necessary so that a full bearing surface is obtained all around the joint. Out-of-round sections shall be culled.

D. Connections. Connections to manholes or other structures shall be watertight and shall conform to a smooth and uniform flow line. Commercial lengths of pipe shall be cut along neat lines as required. All gravity sewer lines shall begin and end at a manhole.

E. Backfilling. Trenching and excavations shall be backfilled immediately after the pipe is laid, in the manner described below:

In unpaved areas, the backfill may be excavated materials except that debris, frozen materials, large clods or stones, organic matter or other unsuitable materials shall not be used for backfill within two feet (2") of the top of the pipe. The initial backfill shall be placed in six inch (6") lifts using materials as for bedding and haunching. Each lift shall be thoroughly and carefully tamped before the next layer is placed. The remainder of the backfill may be accomplished with bulldozers and tampers by dozing twelve inch (12") thick layers into the trench then tamping each layer firmly before placing the next layer. A windrow shall be left over the trench and bladed

and shifted as necessary when settling has occurred. For graveled areas, after maximum settlement has been reached, excess material shall be hauled away and washed gravel or crushed stone added as necessary.

In areas to be paved, the trench soils shall be tested by the Developer's engineer or designee to determine their suitability for use as backfill material. If the trench soils are found to be unsuitable they shall be replaced with suitable materials. Backfill in areas to be paved shall be placed in eight inch (8") lifts and each lift compacted to ninety five percent (95%) Standard Proctor density. Backfill shall extend to the top of the subgrade.

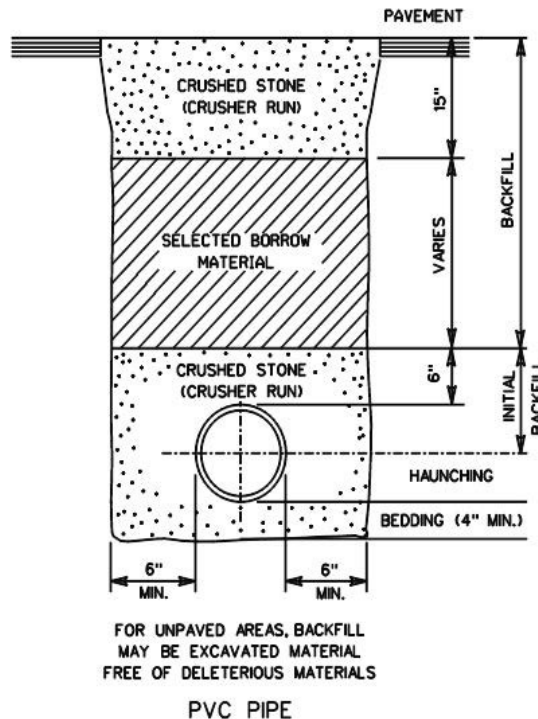


ILLUSTRATION 1302.3.A – SEWER LINE TYPICAL BACKFILL DETAILS

F. Wye or Tee Branches. Wye or Tee Branches shall be of the same material and size as the sewer line. The branch opening shall be either six inches (6") or four inches (4"). Branches shall be installed in the "up 45 degree" position. A watertight plug shall be set in each branch unless a service line is attached at the time of construction. The plug shall be set so that removal will not injure the wye or tee. Each branch without a service line attached shall be permanently marked on top of the curb for ease of future location.

G. Testing. All gravity sewer line piping shall be tested, as follows, at the time of installation:

Deflection Testing: The alignment and grade of sewer pipe intended to be straight shall be so true that a section of laid line will show a full circle of light when viewed from the other end. PVC sewer pipe shall be tested after backfill and trench settlement (but not less than thirty (30) days after

installation) with an approved go/no-go five percent (5%) deflection testing mandrel. The mandrel shall be pulled by hand without mechanical pulling devices.

Leakage Testing: Infiltration/exfiltration shall not exceed fifty (50) gallons per inch of pipe diameter per mile per day for any section of the system. Test all pipe lines for infiltration/exfiltration using the air test method described in ASTM F1417, "Standard Testing Method for Installation Acceptance of Plastic Gravity Sewer Lines using Low-Pressure Air."

The air test procedure shall be as follows:

1. Clean the section of pipe to be tested using an approved method.
2. Plug all pipe outlets with suitable test plugs. Brace each plug securely.
3. The seal at one end of the pipe section being tested shall have an orifice through which air can be injected into the pipe. The air supply line shall contain an on-off air valve and a pressure gauge. The pressure gauge shall have minimum division of 0.10 psi and shall have an accuracy of +five percent (+5%).
4. If the pipe section being testing is submerged in water, insert a pipe probe, by boring or jetting, into the backfill material adjacent to the center of the pipe and determine the pressure in the probe when air passes slowly through it, which is the back pressure due to ground water submergence. Increase all gauge pressures in the test by this amount. Alternately, if the depth of pipe submergence below the ground water is known, gauge pressures may be adjusted by adding 0.433 psi for each foot of submergence.
5. Add air slowly to the portion of the pipe installation under test until the internal air pressure is relaxed to four (4.0) psi.
6. Check exposed pipe and plugs for abnormal leakage by coating with a soap solution. If any failures are observed, bleed off air and make necessary repairs.
7. After an internal pressure of four (4.0) psi is obtained, allow at least two (2) minutes for air temperature to stabilize, adding only the amount of air required to maintain pressure.
8. After the two minute period, disconnect air supply.
9. When pressure decreases to three and a half (3.5) psi, start stopwatch. Determine the time in seconds that it required for the internal air pressure to reach two and a half (2.5) psi. This time interval should then be compared with Table 1302.3.B: Pressure Test Allowances.

10. If the time lapse is greater than that specified in Table 7, then that section has passed the test and the test may be discontinued at that time. However, if the time is less than that specified in Table 7, the line has not passed the test and the Contractor will be required to repair and prepare the line for retest.

11. The Sewer and Water Department Director or designee must be present to witness the tests.

Table 1302.3.B: Pressure Test Allowances
(Minimum Specified Time Required for a 1.0 PSIG Pressure Drop
for Size and Length of Pipe Indicated for Q = 0.0015)

Pipe Diameter (in.)	Minimum Time (min:sec)	Length for Minimum Time (ft.)	Time for Longer Length (sec)	Specification Time (min:sec) for Length L Shown Below in Feet							
				100	150	200	250	300	350	400	450
4	3:46	597	0.380 L	3:46	3:46	3:46	3:46	3:46	3:46	3:46	3:46
6	5:40	398	0.854 L	5:40	5:40	5:40	5:40	5:40	5:40	5:42	6:24
8	7:34	298	1.520 L	7:34	7:34	7:34	7:34	7:36	8:52	10:08	11:24
10	9:26	239	2.374 L	9:26	9:26	9:26	9:53	11:52	13:51	15:49	17:48
12	11:20	199	3.418 L	11:20	11:20	11:24	14:15	17:05	19:56	22:47	25:38
15	14:10	159	5.342 L	14:10	14:10	17:48	22:15	26:42	31:09	35:36	40:04
18	17:00	133	7.692 L	17:00	19:13	25:38	32:03	38:27	44:52	51:16	57:41
21	19:50	114	10.470 L	19:50	26:10	34:54	43:37	52:21	61:00	69:48	78:31
24	22:40	99	13.674 L	22:47	34:11	45:34	56:58	68:22	79:46	91:10	102:33
27	25:30	88	17.306 L	28:51	43:16	57:41	72:07	86:32	100:57	115:22	128:48
30	28:20	80	21.366 L	35:37	53:25	71:13	89:02	106:50	124:38	142:26	160:15
33	31:10	72	25.852 L	43:05	64:38	86:10	107:43	129:16	150:43	172:21	193:53
36	34:00	68	30.768 L	51:17	76:55	102:34	128:12	153:50	179:29	205:07	230:46

NOTE: Consult with pipe and appurtenance manufacturer for maximum test pressure for pipe size greater than 30 inches in diameter.

1302.4 Flushing. The completed gravity sewer lines shall be free of all mud, siltation, and other foreign matter deposited or collected during construction. The lines shall be flushed prior to testing. Flushing shall be started at the upstream end of the completed system and shall continue downstream manhole to manhole. Water used in flushing shall not be permitted to enter into the system but shall be collected and disposed of in an approved manner. Also mud and other solids shall be similarly collected and disposed of.

1302.5 Video Inspection and Records. Prior to acceptance of the sewer system, the City shall require video records to prove that the system has been installed in accordance with these guidelines. Closed circuit television or other method shall be used to record the condition of each segment of gravity sewer line. The Planning Director or designee must be present while video scoping takes place. Provide a DVD recording for each segment of gravity sewer line. A camera capable of pan and tilt shall be used to document the location and condition of each sewer connection. The location of service connections shall be indicated by measured distance from the downstream manhole.

SECTION
1303

SEWER SERVICE LINES

1303.1 Materials. Sewer service lines and fittings shall be PVC.

PVC Sewer Pipe and fittings shall be Schedule 40 rigid polyvinyl chloride pipe in accordance with ASTM Specification D-1784, (cell classification 12454) and ASTM D-2665.

1303.2 Installation. Service lines shall be laid to the same requirements as specified for Gravity Sewer Lines. All pipe must be laid to a positive grade; with minimum slope of one foot (1') per one hundred feet (100'). Services lines shall terminate to such an elevation that the abutting premises may be served as intended.

Adapters required to make a watertight connection to the wye or tee branch and elbows as required for proper service shall be installed.

Each service line shall incorporate a cleanout as indicated. Tracer wire shall be installed from the sewer tap to the cleanout. Tracer wire shall also be required on sewer connection service lines.

The end of each new service not connected to a customer service line shall have a watertight plug installed in such a manner that the plug may be removed without injury from the pipe. The plug shall be blocked or secured in such a manner that testing can be completed as specified for Gravity Sewer Lines.

The end of each new service shall be clearly marked by a 4" x 4" x 36" treated post, or a "T" post, which may be removed after the service connection has been completed.

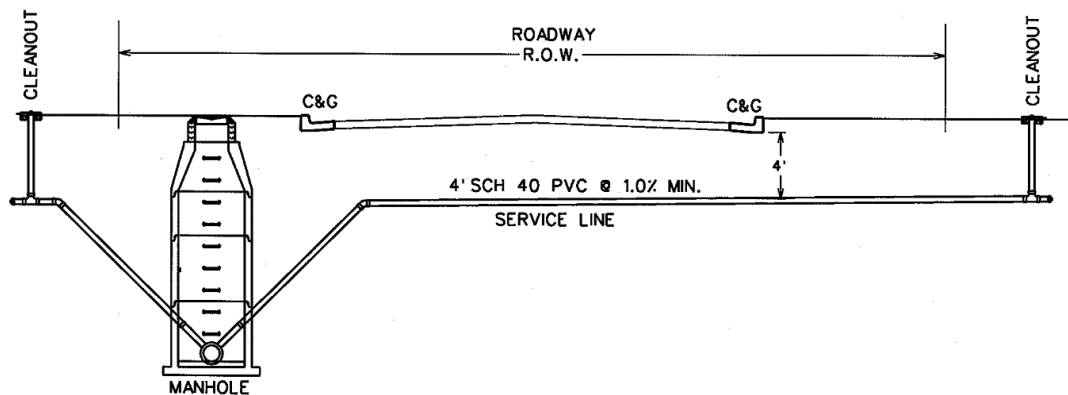


ILLUSTRATION 1303.2 A – SEWER SERVICE LINE DETAIL

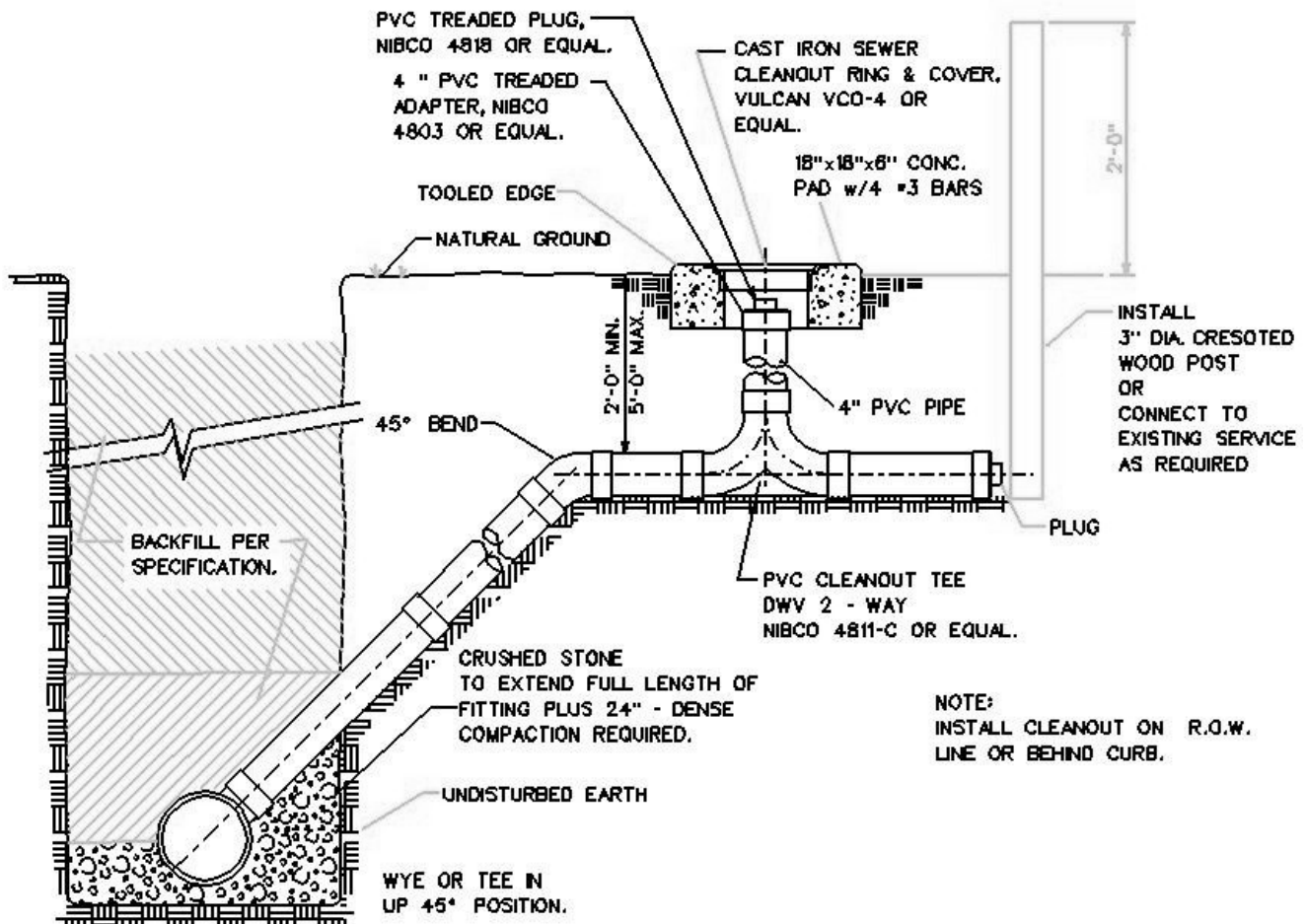


ILLUSTRATION 1303.2 B- TYPICAL CLEANOUT INSTALLATION DETAIL

SECTION **SEWER MANHOLES** 1304

1304.1 Materials. Manhole barrels may be constructed of precast concrete manhole units or concrete poured-in-place. The bottom of all manholes shall be reinforced concrete.

Precast concrete manholes shall conform to the requirements of ASTM C-478 and shall be constructed using concrete with a minimum twenty eight (28)-day compressive strength of four thousand (4000) psi. The mixture shall contain not less than six (6) bags of Portland Cement per cubic yard.

Rubber gaskets shall conform to the requirements of the latest edition of ASTM Specification C-443. Lubricants shall be as recommended by the gasket manufacturer.

Manhole pipe seal gaskets for precast manhole units shall be similar to "Kor-N-Seal" as manufactured by the Kor-N-Seal Co., Milford, NH.

Preformed joint compound shall be a butyl compound similar to "EZ Stik" as manufactured by Concrete Products Supply Co., Fort Wayne, IN. Primer, when required for use with the

preformed joint compound, shall be as recommended by the manufacturer of the joint compound.

Sealer compound shall be similar to "Drycon" as manufactured by IPA Systems, Inc., Philadelphia, PA or Tamm's "Tamoseal".

Patching material shall be similar to "Octocrete" as manufactured by IPA Systems, Inc., Philadelphia, PA or Tamm's "Speed Crete Blue Line".

Manhole steps shall be made of injection molded copolymer polypropylene encapsulating a one half inch ($\frac{1}{2}$ ") diameter grade sixty (60) steel reinforcing rod. The steps shall be of such cross-sectional area and configuration that they will withstand a single concentrated live load of three hundred pounds (300 lbs.). They shall be in conformance with ASTM Standard C-478 Paragraph 11 except as herein modified.

Manhole frames and covers shall be sound gray iron castings (ASTM A48 Class 30B). The castings shall be true to pattern, free from faults, sponginess, cracks, blowholes, and other defects affecting their strength. The minimum clear opening shall be twenty two inches (22") in diameter. The frame and cover shall be machined to a non-rattle fit. The standard manhole frame and cover for installations not subject to flooding, may be non-traffic type weighing approximately three hundred pounds (300 lbs.).

Manhole frames and covers for manholes in streets and paved areas shall be watertight traffic model type; similar to Vulcan Pattern V-2407-2 pattern without vent holes and weighing approximately three hundred fifty pounds (350 lbs.). The cover shall have a rubber "O" ring gasket and be fastened to the ring with four stainless steel hexagonal-head bolts. Covers for areas subjected to runoff shall be watertight. Manhole covers shall have the word "SANITARY SEWER" cast into the face.

1304.2 Installation. Manhole inverts shall be constructed on line and grade of concrete, concrete and split pipe or with invert builder blocks and mortar. The invert shall be formed smoothly and accurately so as to assure the free, unobstructed flow of sewage through the manhole.

Precast manholes shall be constructed of precast units with concrete bottoms. The bottom unit shall be set level on a six inch (6") layer of medium crushed stone bedding. The frame shall be placed on a grout bed or a grout and brick riser. Joints in brick risers shall not exceed five eights inch ($\frac{5}{8}$ ") in thickness. Exterior joints of manhole units shall be wiped with grout and sealed entirely inside and outside with sealer compounds. The exterior surface may be sealed prior to installation.

Form fins shall be removed on the entire interior and, on the exterior, to below one-foot grade. The inside of these manholes shall be sealed with sealer compounds. After installation, the manhole interior shall be coated with two (2) one eighth inch ($\frac{1}{8}$ ") thick coats of sealer compound. The exterior shall be coated in the same manner to twelve inches (12") below finished grade.

"Doghouse" style manholes shall not be allowed.

Manhole steps shall be installed at sixteen inches (16") o.c. vertically. The deepest step shall be located not more than twenty four inches (24") above the manhole invert.

The cast iron frame and covers shall be installed to grade, set in a grout bed. Grout shall lap up one inch (1") minimum on the frame vertical. In streets, the manhole covers shall be set no more than to one inch (1") above the street grade and parallel to the plane of the street.

All visible leaks in manhole bottoms, barrels, and connection shall be stopped.

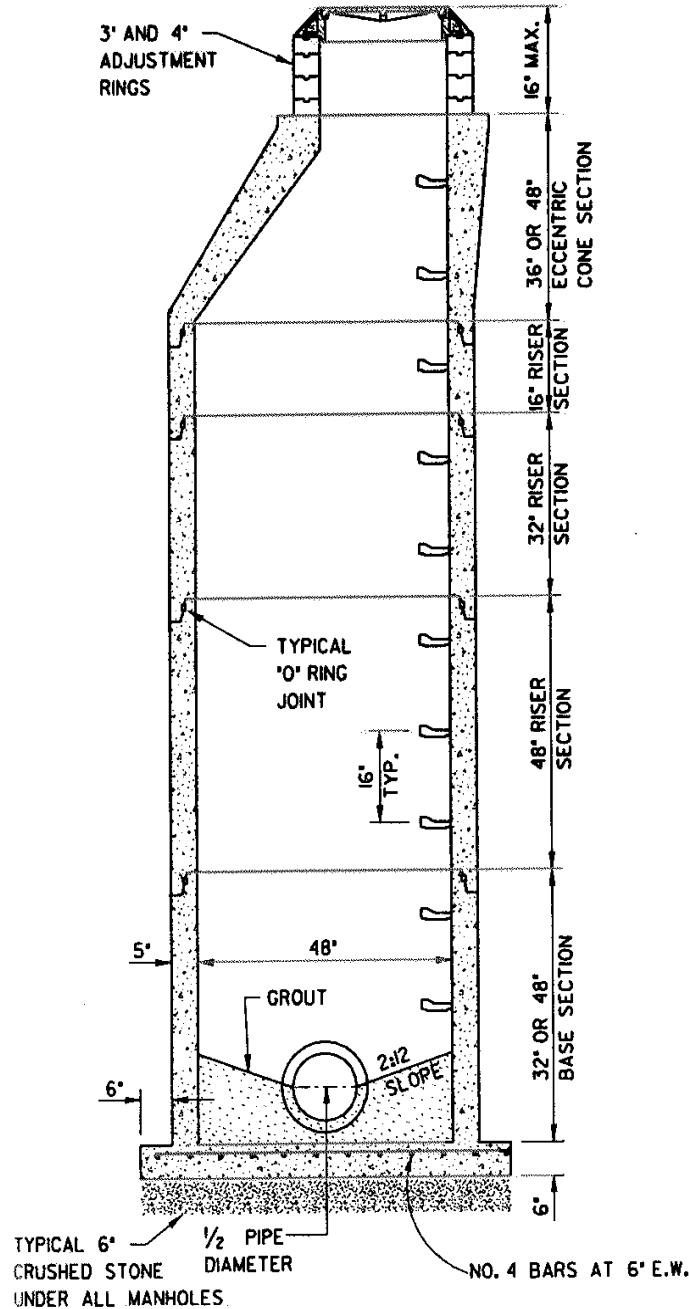


ILLUSTRATION 1304.2 A - SEWER MANHOLE DETAILS

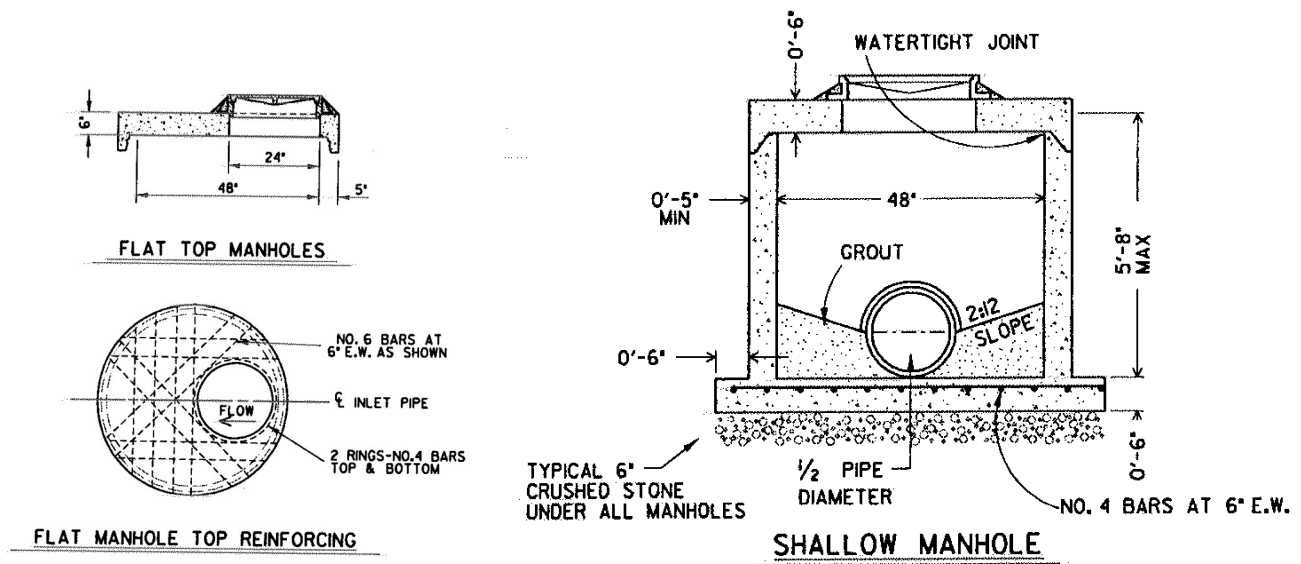


ILLUSTRATION 1304.2 B - SEWER MANHOLE DETAILS

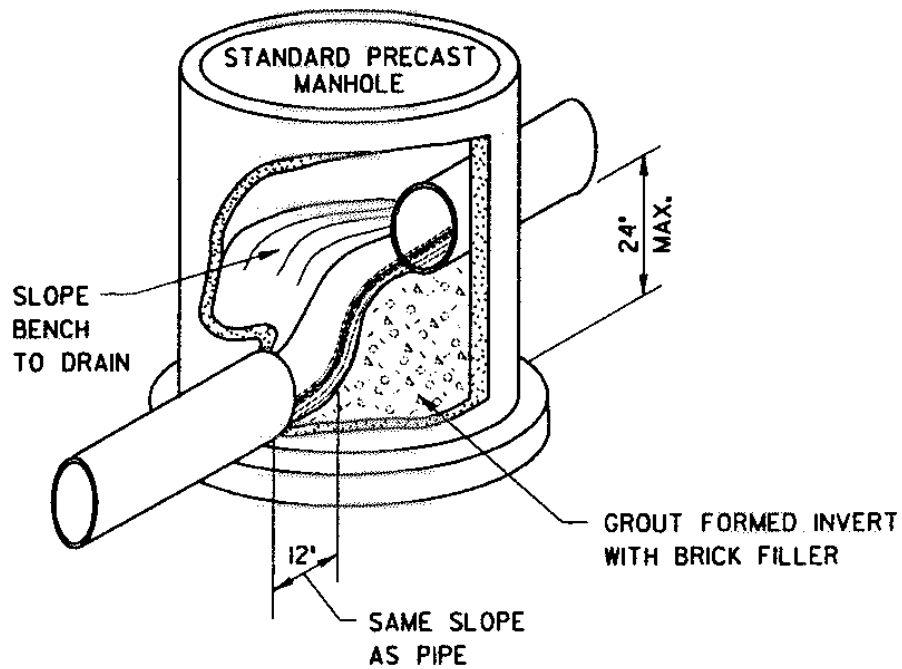


ILLUSTRATION 1304.2 C - SEWER MANHOLE DETAILS

SEWAGE LIFT STATIONS

1305.1 General. Sewage lift stations are not encouraged, but will be permitted where gravity sewer options are unavailable. The burden of proof shall be on the developer to show that all other options have been reviewed and that a station is necessary. Where lift stations are proposed, the applicant must consider future development of city infrastructure and expansion options of adjacent properties when specifying the proposed system.

Sewage lift stations shall be factory built and tested as complete units and shall meet the requirements of the Mississippi Department of Environmental Quality Guidelines as modified herein.

The discharge from the Sewage lift station shall be routed to a point on the City's collection system that is acceptable to the City.

Sewage lift stations shall be designed for above ground suction lift pumps where hydraulically feasible. Other types of pumps will be considered on a case-by-case basis only.

Sewage lift stations shall be prefabricated stations manufactured by the Gorman-Rupp Company of Mansfield, Ohio and must have a secondary (backup) pump that is equipped with an alarm to notify officials in the event of failure.

Design calculations shall be provided for all Sewer Lift Stations.

Sewage lift stations serving a single unit structure may be privately owned and maintained, provided the lift station is designed and installed in accordance with section 705.1 and shall be approved by the Sewer and Water Department Director, in writing, prior to connecting to the City's collection system. All sewage lift stations serving multiple properties, or one or more multi-tenant properties shall be dedicated as public infrastructure.

1305.2 Features. Control panels shall be fabricated by the Lift Station manufacturer. Control Panels shall be equipped with City approved electric surge protection for main and branch circuits. An automatic pump alternator shall be provided with a manual lead/lag selection switch. A run light and elapsed time meter for each pump shall be included in the control panel. An adjustable high water visual/audible alarm with silencing switch shall be provided.

Wet wells shall be constructed of reinforced concrete pipe ASTM C-76, Class III, Wall B. Station piping shall be SDR-26 PVC with flanged connections.

If submersible pumps are approved, discharge valve arrangements shall be installed in a separate vault accessible from ground level. Valve vaults shall have bottoms sloped to drain and the drain (if routed to the wet well) shall be fitted with a pinch type check valve to prevent water from entering the vault from the wet well. Separate conduits with seal fitting are required for each power conductor and float switch cable. Conduits shall be extended from the control panel to the wet well and shall be fitted with seal fitting on the inside of

the wet well. Conduit ends in the wet well shall be set within easy reach from above ground but in no case more than eighteen inches (18") below the top of the wet well.

1305.3 Lift Station Startup. The developer shall arrange for a factory trained representative to perform field-testing and to instruct City operating personnel in the operation and maintenance of the sewage lift station.

A manufacturer's O & M Manual shall be provided for each sewage lift station.

1305.4 Access. Access to within ten feet (10') of the lift station shall be by paved access road. Access roadways shall be constructed as set out for local streets, except that access roads widths shall be twelve feet (12'). Curb and gutter are not required for the access road.

1305.5 Security. All lift stations shall be fenced for security. Landscaping, shrubs, and/or architectural treatments for concealing lift station equipment are encouraged, but shall not be set closer than ten feet (10') to the station enclosure and shall not obscure access. Structures to enclose pumping equipment shall be considered for approval on a case-by-case basis. Security fencing must be dark colored, vinyl-coated chain link, or approved equal with a minimum height of six feet (6').

1305.6 Structures. Permanent structures for lift stations should match adjacent architecture styles, or character, or must be fully screened by an evergreen buffer with a minimum height of six feet (6') at the time of installation.

SECTION 1306

PRESSURE SEWER LINES

1306.1 Materials. Pressure sanitary sewer lines shall be of either PVC, or restrained joint pipe and shall meet the requirements of this section.

Plastic Pipe shall be rigid polyvinyl chloride pipe in accordance with ASTM Specification D1784 (Cell Classification 12454). Pipe shall be Class 200 (SDR 21) per ASTM D-2241 with gasketed slip joints. "O"-ring joints will not be accepted. Gasket joints shall be in accordance with ASTM D-3139.

Rubber gasket joints shall be in accordance with ANSI/A21.11. Push-on joint pipe shall be used unless otherwise shown on the plans. Flanged joint pipe shall be in accordance with ANSI/A21.10 and ANSI/21.15.

Restrained Joint Pipe shall be rated for 250-PSI minimum. The joints, gaskets, and accessories for restrained joints shall meet applicable requirements of ANSI/A21.11. Retainer glands for mechanical joint pipe shall be Megalug Ebba Iron or Uni-Flange Series 1400 restrained joint devices.

Restraint Devices for PVC Pipe shall be manufactured of ductile iron conforming to ASTM A-536. Bolts and connecting hardware shall be in accordance with ASNI A21.11. All restraint devices shall have a pressure rating equal to that of the pipe on which it is used.

Restraint devices shall be Uni-Flange Block Buster Series 1300, Ebaa Iron Series 2000PV, or City approved equal.

1306.2 Installation.

A. Jointing. Joints in plastic pipe shall be rubber gasket push-on type. Make push-on joints in accordance with the manufacturer's instructions. The resulting joint shall be clean and watertight.

B. Pipe Laying. The pipe shall be lowered into the trench in such a manner as to prevent damage to the pipe or pipe coating. It shall not be dropped or dumped during unloading or laying. Foreign mater and dirt shall be prevented from entering the pipe. A minimum cover of thirty-six inches (36"), measured from the top of the pipe shall be provided. Plastic pipes not encased and under vehicular grade paved streets shall be covered at least forty-eight inches (48").

C. Concrete Thrust Block. Concrete thrust blocks shall be provided at all bends in pipe lines greater than twenty two and a half (22-1/2) degrees. Concrete thrust blocks are to be installed according to the plan dimensions and details, placed between the fitting s and undisturbed soil.

D. Tracer Wire. Twelve-gauge minimum insulated solid single-strand copper tracer wire shall be installed with all plastic mains and service lines to facilitate location with a pipe locator. The tracer wire shall be laid in the trench with the plastic pipe.

The tracer wire shall be brought up and terminated in a tracer wire test station at each air release valve and at intervals along pipe lines not to exceed five hundred feet (500'). Tracer wire test stations shall be Rhino TriView Flex with internal test station as manufactured by REPNET, Inc. or equal. The tracer wire station shall be installed by sliding it over a six feet (6') long 1-1/2 lb. per foot U-channel post driven eighteen to twenty four inches (18"-24") into the ground and securing it with a bolt or rivet as recommended by the manufacturer. Identification decals shall be affixed to all three sides of the post.

E. Underground Warning Tape. Warning tape shall be installed in the trench above the pressure sewer lines after the initial backfill is placed and compacted. Underground warning tape shall be manufactured of polyethylene, green in color, and imprinted with the words "CAUTION - BURIED SEWER LINE BELOW". Underground warning tape shall be four (4) mils thick and three inches (3") wide as manufactured by SETON Identification Products, Branford, CT or approved equal.

F. Backfilling. Trenching and excavations shall be backfilled immediately after the pipes are laid. The initial backfill shall extend to twelve inches (12") above the pipe. The initial backfill shall be thoroughly and carefully tamped before the next layer is placed. The remainder of the backfill shall be as follows:

In areas not to be paved the backfill maybe fine, loose soil, free from large clods, stones, frozen earth, debris, or any material with an exceptionally high void

content. The backfill may be accomplished by dozing in layers of approximately one foot (1') each. A windrow shall be left over the trench and bladed and shifted as necessary when settling has occurred. For graveled areas, after maximum settlement has been reached, excess material shall be hauled away and washed gravel or crushed stone added as necessary.

In areas to be paved, the trench soils shall be tested by the design engineer to determine their suitability for use as backfill material. If the trench soils are found to be unsuitable, they shall be replaced with suitable materials. Backfill in areas to be paved shall be placed in twelve inch (12") lifts and each lift compacted to ninety five percent (95%) Standard Proctor density. Backfill shall extend to the top of the subgrade.

G. Testing. Pressure sewer lines shall be hydrostatically tested to a pressure of one hundred fifty (150) psi. The duration of the test at the test pressure shall be at least one (1) hour. Pipe lines showing any leakage as evidenced by a reduction in pressure will not be accepted. Defective pipe or fittings shall be removed and replaced with sound material and the test repeated until satisfactory results are obtained.

Before applying the specified test pressure, all air shall be expelled from the pipe. If blow-offs are not available at high places, taps shall be made at points of highest elevation before the test is made. Each section of pipe shall be slowly filled with water to the specified test pressure, based on the elevation of the lowest point of the line or lowest point of the section under test and corrected to the elevation of the test gauge. Pressure shall be applied by means of a test pump connected to the pipe in an approved manner. Make arrangements for metering the amount of water used during the testing.

All testing must be conducted in the supervision of the Sewer and Water Department Director or designee.

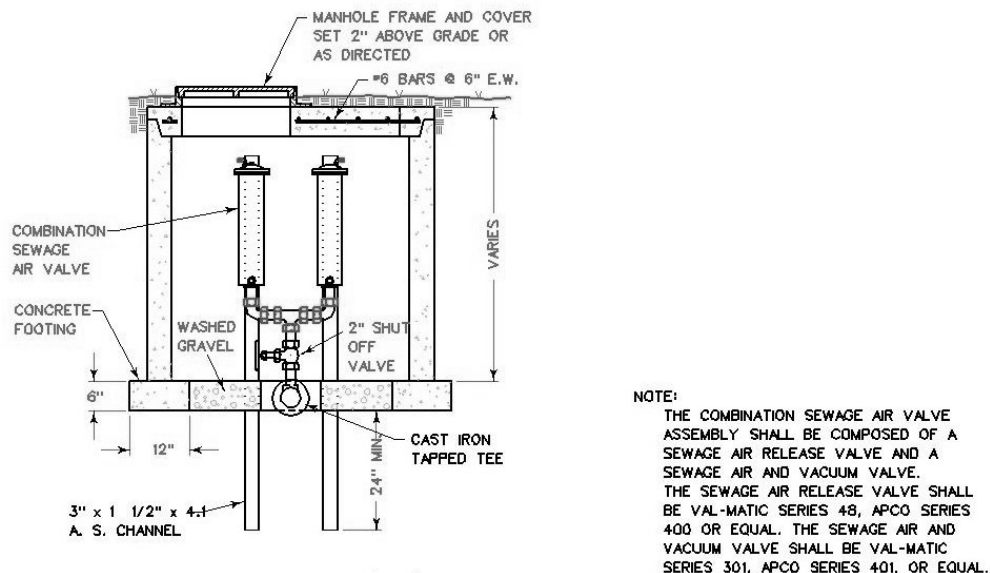


ILLUSTRATION 1306.2 A - PRESSURE SEWER AIR RELEASE VALVE

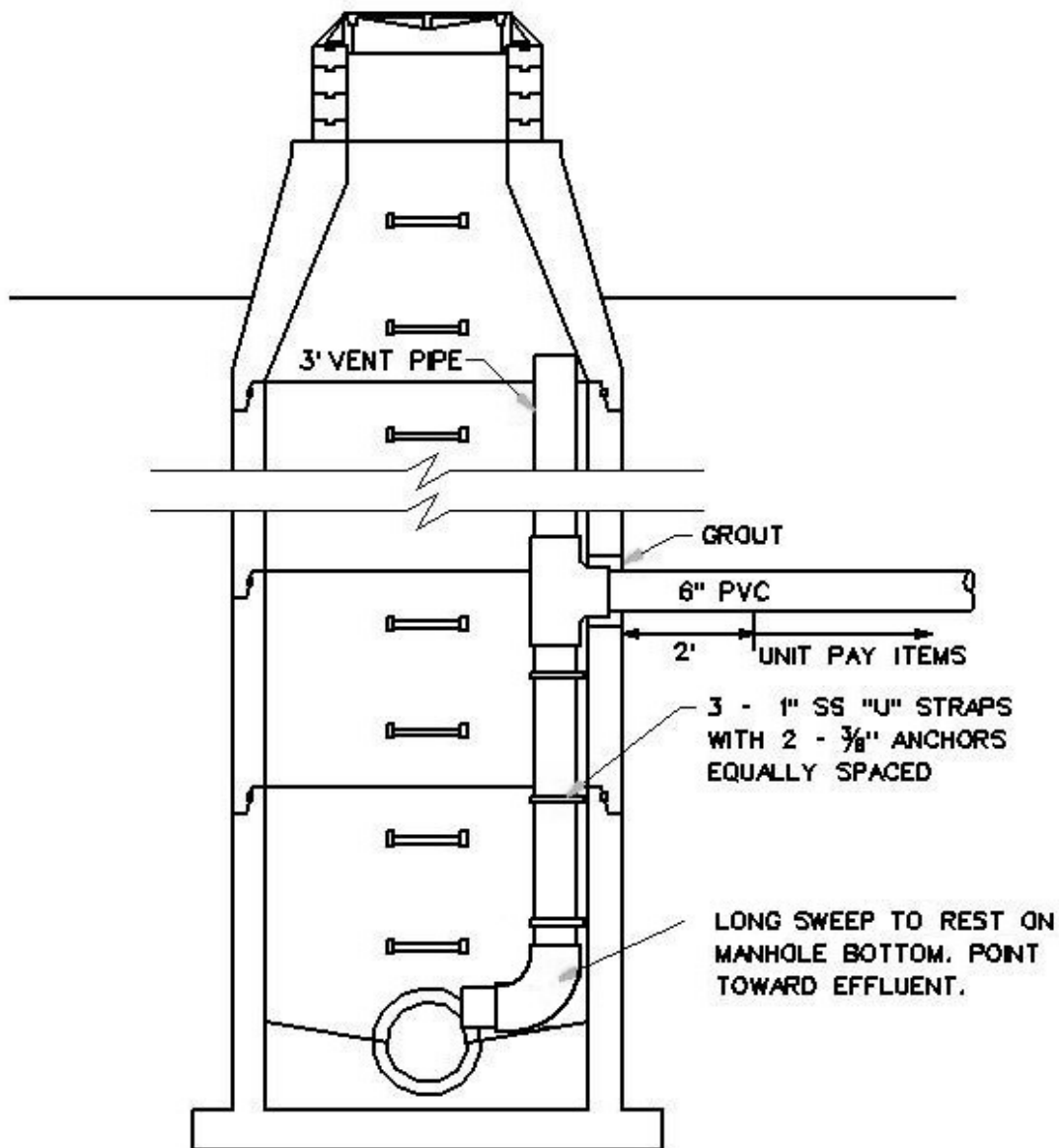


ILLUSTRATION 1306.2 B - PRESSURE SEWER CONNECTION TO EXISTING MANHOLE

SECTION 1307

GRANULAR MATERIALS

1307.1 General. The City shall be furnished certified test reports of the materials and gradations prior to incorporation into the work.

1307.2 Materials.

A. Crushed Stone. Crushed stone shall consist of fragments of sound, durable limestone, free from disintegrated stone, salt, alkali, vegetable matter, or adherent coatings and other deleterious substances; and shall be reasonably free from thin or elongated pieces. The percentage of wear shall not exceed fifty percent (50%). Crushed stone shall have a gradation as specified in Table 1307.2 A.

Table 1307.2 A: Crushed Stone Gradation

Sieve Size (Square Opening)	% Passing (by weight)			
	Fine	Medium	Coarse	Crusher Run
3 inch	---	---	100	---
2 inch	---	---	60-70	---
1 ½ inch	---	---	---	100
1 ¼ inch	---	100	5-40	---
1 inch	---	90-100	0-10	90-100
¾ inch	100	20-60	---	---
½ inch	95-100	0-10	---	---
3/8 inch	45-90	---	---	45-74
No. 4	0-15	0.3	---	30-55
No. 16	0-3	---	---	---
No. 100	---	---	---	4-15

B. Select Borrow Material. Selected Borrow Material shall be a mixture of sand and clay and shall contain sufficient binder material, natural or processed, to produce a uniform mixture complying with the requirements of these specifications. The materials shall be uniform and free of organic matter such as leaves, grass, roots, and other objectionable or foreign substances. The gradation of the natural or processed material shall be in accordance with Table 1307.2 B.

Table 1307.2 B: Natural or Processed Material Gradation

Sieve Size (square opening)	% Passing (by weight)
No.10	100
No.40	20-100
No.60	15-85
No. 200	6-40

The material shall have a plasticity index not more than six (6) and have a liquid limit of not more than twenty-five (25). (Local clean pit run topping-like material will normally meet this specification.)

C. Washed Gravel. Washed Gravel shall be composed of hard, tough, durable particles reasonably free of injurious or deleterious substances. The percentage of wear shall not exceed fifty percent (50%). The gradation of the washed gravel shall be as specified in Table 1307.2 C.

Table 1307.2 C: Washed Gravel Gradation

Sieve Size (square opening)	% Passing (by weight)
2 inch	100
1 ½ inch	90-100
1 inch	80-100
¾ inch	55-100
½ inch	35-80
3/8 inch	12-65
No. 4	5-30
No. 10	0-8

D. Clay Gravel. Clay Gravel shall be composed of natural or artificial mixtures of aggregates and soil mortar so proportioned as to meet all the requirements as hereinafter specified and with gradation as specified in Table 1307.2 D.

The coarse aggregate (material retained on the No. 10 sieve) shall consist of hard, durable particles of uncrushed gravel and shall be free from vegetable or other deleterious substances. The percentage of wear shall not exceed fifty percent (50%).

The binder portion of the surface material (that portion passing the No. 10 sieve) shall be composed of a natural or artificial mixture of natural quartz sand combined with silt and clay.

Table 1307.2 D: Clay Gravel (Aggregate and Binder) Gradation

Sieve Size (square opening)	% Passing (by weight)	
	Coarse Aggregate	Binder
3 inch	100	---
1 ½ inch	85-100	---
1 inch	65-100	---
½ inch	35-90	---
No. 4	90-75	---
No.10	30-55	100
No. 40	---	20-90
No. 60	---	15-80
No. 200	---	8-40

The binder material shall have a plasticity index of not more than six (6) and have a liquid limit of not more than twenty-five (25).

1307.3 Tests. Sampling and testing shall be in accordance with the following standard methods of the AASHTO: Sampling, T-2; Sieve Analysis, T-27; Liquid Limit, T-89; Plasticity Index, T-90.

The loss by abrasion test shall be as specified under *AASHTO Test T-96*.

**SECTION
1308**

SEWER SYSTEM CONSTRUCTION RECORDS

1308.1 Requirements. The following records must be provided prior to approval of the Final Plat or release of the Construction Bond:

- A.** A copy of the Mississippi Department of Environmental Quality's final approval letter.
- B.** A certification letter from the developer's engineer that the improvements were constructed in substantial conformance with the approved construction plans and specifications, accompanied by inspection documentation records and construction inspection photographs. The developer, or his designee, is responsible for maintaining inspection records to ensure that all improvements were constructed according to approved plans.
- C.** RECORD DRAWINGS shall accurately represent the completed construction including locations of service stub outs and appurtenances. Provide four (4) printed sets and two (2) sets on CD or other media in PDF or other acceptable machine-readable file format.
- D.** Two (2) copies of the manufacturer's literature necessary for reference in operating and maintaining the facilities including but not limited to manufacturer's product descriptive literature for materials incorporated into the work, operation and maintenance manuals for equipment, warranty related information, etc.
- E.** Contact information for the source of supply of basic materials and equipment.
- F.** Test results including pressure test, mandrel pull results, and other tests.
- G.** Prior to acceptance of the sewer system, the City shall require video records to prove that the system has been installed in accordance with these guidelines. Video recording shall be on DVD format for each manhole-to-manhole segment of gravity sewer keyed to the RECORD DRAWINGS with the location and interior condition or each service connection documented by use of a pan and tilt camera and located by measurement from the downstream manhole. A city representative should be present during all video scoping activity.
- H.** Other information as may be requested by the Planning Director.

CHAPTER 14

PLANNED UNIT DEVELOPMENT

SECTION 1401

GENERAL

1401.1 Planned Unit Development Statement. The Planned Unit Development is a contiguous area to be planned and developed as a single entity containing one or more structures to accommodate residential, and/or commercial uses in accordance with applicable zoning regulations. The procedure for approval of Planned Unit Developments is subject to the approval procedure specified by Chapter 2 of these Regulations for a Major Subdivision Development, regardless of the number of lots or dedication of public infrastructure.

1401.2 Purpose. Planned unit development of land may be permitted in order to provide a means for a more desirable physical development pattern than would be possible through the strict application of zoning regulations and subdivision regulations. The Planning Commission will permit certain variety and flexibility in land development to encourage the subdivider to adjust design to irregular topography, economize in the construction of utilities, and create architectural variation as well as attractive and usable buildings and building sites.

SECTION 1402

DESIGN

1402.1 Uses Permitted. Compatible residential, commercial, and public and quasi-public uses may be combined, provided that the proposed location of the commercial uses will not adversely affect or disregard adjacent property, public health, safety, and the general welfare. A variety of housing and building types is encouraged by permitting a higher per acre housing density and a reduction in lot dimensions and yard and building setbacks, compared with conventional development standards.

1402.2 General Requirements.

- A.** The gross area of the tract to be developed under the planned unit development approach shall comprise not less than five (5) acres, unless otherwise approved by the Planning Commission.
- B.** The total ground area occupied by buildings and structures shall not exceed eighty percent (80%) of the total ground area, unless previous development in the neighborhood has a greater ground coverage, in which case the plan may increase the ground coverage of buildings and structures to correspond with the average coverage in the neighborhood.
- C.** A minimum of ten percent (10%) of the land developed shall be reserved for open space and similar uses such as an internal park network, recreational facilities, and preservation of natural features.

- D. The minimum lot size shall be not less than seventy percent (70%) of the lot area per family or use which would be otherwise required under these regulations. Lot widths and required setbacks may be reduced to eighty percent (80%) of the requirements of these regulations.
- E. The design of the internal circulation system shall provide convenient access to dwelling units and non-residential facilities, separation of vehicular and pedestrian traffic, and shall be adequate to carry anticipated traffic, including access for emergency vehicles.

1402.3 Open Space and Common Property. The amount of open space reserved in the Planned Unit Development shall either be held in corporate ownership by the owners of the project area, for the use of those who buy property, be held by an association of property owners within the development, or be dedicated to the City and retained as open space or related uses. All land dedicated to the City shall meet the requirements of the Planning Commission. Public utility or water course easements are not acceptable for open space dedication unless such land is usable as a trail and approved by the Planning Commission.

1402.3.1 Management of Common Property. A homeowner's association, or in the case of non-residential development, an owners association, shall be established to provide for the maintenance of all facilities and/or properties held in common within Planned Unit Developments. These shall include, but not be limited to, private streets and walkways, private recreational facilities, common lots and open space areas. The developer shall submit evidence as to the financial ability of the homeowners association to maintain any property or facilities held in common ownership, including the estimated annual cost of maintaining all common properties and facilities; the estimated monthly fee which shall be assessed to each residential property; and an estimate of the value of the dwelling units which will be constructed within the planned unit development. Any homeowners association and accompanying regulations shall be reviewed and approved by the City Attorney.

1402.3.2 Open Space Improvement Guarantee. At the time of the application for final plat approval, the subdivider shall provide:

- A. A performance guarantee in accordance with Section 203.6.3 of these Regulations, in the amount of the estimated cost of the proposed improvements.
- B. A maintenance guarantee, in accordance with Section 203.6.3 of these Regulations, in such amount as determined and approved by the Planning Commission that shall be arranged for a required maintenance period from the date of acceptance of the improvements.

SECTION
1403

STREETS

1403.1 Conformity to Existing Streets and Thoroughfare Plan. Whenever a Planned Unit Development abuts or contains an existing or proposed major thoroughfare or minor existing street, the roadway standards as contained in these Regulations shall be applicable.

1403.1.1 Public Streets. The Planning Commission may require certain streets within the Planned Unit Development be public if it determines that the project density necessitates the use of public streets for adequate circulation.

1403.1.2 Private Streets.

- A. Private streets may be permitted in Planned Unit Developments and shall meet the construction requirements of these Regulations. Private streets shall be owned and maintained by a mandatory Homeowner's Association. Lot deeds shall convey membership in the Association and provide for the payment of dues and assessments required by the Association.
- B. The following notice shall appear in bold print on each deed to property in the subdivision, on the plat of the subdivision and on each contract on the sale of land within the subdivision:

Notice: The lots within this subdivision are governed by a Homeowner's Association requiring the payments of fees. Failure to pay such fees are subject to attachment of a lien on your property by the Association.

- C. The Association documents shall establish a reserve fund for the maintenance of streets and other improvements and contain provisions for reliable access to provide City services and to other utility service providers with appropriate identification. The Association may not be dissolved, and no portion of the Association documents pertaining to this section may be amended without the written consent of the City.
- D. In the event the Association fails to maintain the streets in accordance with City standards, the City may repair and maintain the streets and charge the cost to the Association. If the Association fails to pay for the maintenance cost, after notice to the property owners, the costs shall be filed as a lien on all property within the subdivision.

SECTION
1404

DEVELOPMENT

1404.1 Phased Development of Planned Unit Development. Each stage of a Planned Unit Development must be so designed so as to stand independently of future related stages, in the event future stages are not constructed. The construction and provision of all

the common open spaces and public and recreational facilities which are shown on the final development plan must proceed at the same rate as the construction of dwelling units.

If a Planned Unit Development contains non-residential uses, these uses may be constructed first, but only if the Planning Commission approves such construction on the Preliminary Development Plan.

CHAPTER 15

REQUIRED STATEMENTS AND SIGNATURES TO BE AFFIXED ON THE FINAL PLAT

SECTION REQUIRED STATEMENTS

1501

Some or all of the following statements, or similar appropriate statements, shall be affixed on the subdivision Final Plat. The Planning Commission may require modifications to the statements. All signatures, except the signatures of the Chancery Clerk, Planning Commission, Mayor and Board of Aldermen shall be obtained prior to approval of the subdivision Final Plat.

A, Deed Reference and Legal Description

Situated in _____ Section, _____ Township, _____ Range, Itawamba County, Mississippi, containing _____ acres and being (part or) the same tract as conveyed to _____ and described in the deed recorded in Deed (Official Records) Book _____ Page _____, Itawamba County, Mississippi.

B. Certificate of Ownership and Dedication

This certifies that the undersigned is (are) the owner(s) of the property shown on this map, having acquired title thereto by deed(s) recorded in the Itawamba County, Mississippi Chancery Clerk's Office or otherwise as shown below and that by submission of this plat or map by approval, I/We do dedicate to the City of Fulton, Mississippi for public use all streets, easements (except drainage easements), rights-of-way and parks shown thereon for all lawful purposes to which the City may devote or allow the same to be used and upon acceptance thereof and in accordance with all City policies, ordinances, and regulations or conditions of the City of Fulton for the benefit of the public, said dedication shall be irrevocable.

Signature of Owner(s)

C. Certificate of Notary Public

Personally, appeared before me, _____, the Owner(s), and _____, (Registered Professional Engineer) each of whom acknowledged to me that they signed and delivered this plat and the certificates thereon as their own act and deed, on the day and year herein mentioned.

Given under my hand and seal of office on this the ____ day of _____, 20____.

(SEAL)

Notary Public

My Commission Expires:

D. Certificate of Surveyor

I, _____, (Registered Professional Land Surveyor), do hereby certify that at the request of _____, the Owner(s), I have subdivided and platted the following described land as follows to wit:

(Insert Legal Description here)

I hereby certify that the plan shown and described hereon is a true and correct survey of the accuracy required by the City of Fulton and that the monuments have been placed as shown hereon, in accordance with the requirements of the subdivision regulations.

(SEAL)

_____, 20____

Surveyor

MS Registration Number

E. Board of Aldermen Approval

This plat was approved by the Fulton Board of Aldermen on this ____ day of _____, 20____.

(SEAL)

Mayor

Municipal Clerk

F. Chancery Clerk's Certification

File No. _____

I, _____, Chancery Clerk of the Chancery Court in and for Itawamba County, Mississippi, do hereby certify that the Final Plat of (name of subdivision), was filed for record in my office on this the ____ day of _____, 20____, and was duly recorded in Plat Book No. ____, Page ____ of the records of maps and plats of land of Itawamba County, Mississippi.

Given under my hand and seal of office on this the ____ day of _____, 20____.

(SEAL)

Chancery Clerk

G. Restrictive Covenants (if applicable)

The property located in (name of subdivision), as shown on this plat is subject to restrictive covenants which are set out in an instrument recorded in book ____ at page ____ of the deed of records of Itawamba County, Mississippi, or recorded as instrument number _____.

Chancery Clerk

H. Acceptance of Dedications

Be it resolved by the Mayor and Board of Aldermen of the City of Fulton, Mississippi, that the dedications shown on this Plat are hereby approved and accepted for the best interest of the public this ____ day of _____, 20____.

(SEAL)

Mayor

Municipal Clerk