Local Subdivision Design Manual
For
Macon-Bibb County, Georgia

Adopted October 1, 2019

Amendments Page

Date	Change Description	Commission Approval	Date/NA

1. FOREWORD

This manual is a publication of Macon-Bibb County Engineering Department. It is meant to serve as a comprehensive guide to implementing the development of roads, streets, and related features of residential, commercial, industrial, and institutional development projects in Macon-Bibb County, Georgia. Additionally, the manual is designed to supplement County Subdivision Ordinance, Chapter 25 of the Macon-Bibb County Code of Ordinances. Requirements for development must follow all applicable Planning and Zoning and development standards from other local departments not included herein.

2. Construction Plans

Provide four copies of all plans for streets, sanitary sewers, storm sewers, sidewalks and other required improvements. The plans shall be prepared from an accurate survey of the existing conditions and shall show all proposed improvements. Normal elements to be included on the plans include the following:

(1) Plans:

a. Indicate direction of north.

b. Indicate right-of-way line, centerline, departing lot lines, lot numbers, subdivision limits and limits of construction.

c. Indicate centerline curve date, including delta, radius and tangent.

d. Indicate approved street name.

e. Indicate stations at every 100 feet at even stations on centerline. Indicate stations at point of curve and tangent at the beginning and end of all returns, at centerline intersection and at subdivision or section limits.

f. Indicate the width of right-of-way and relation to centerline.

g. Indicate state route number on all existing streets to which connection is to be made when applicable.

h. Indicate all existing and proposed drainage easements.

i. Omitted

j. Indicate all turnaround construction, with easements as indicated on the preliminary plat.

k. Indicate all storm sewers and appurtenances. Identify storm sewer appurtenances by type and a number. Station on plan must conform to stations shown on profile. Headwalls must be provided and shown.

l. Omitted

m. Indicate the location of all or any springs either within or draining to street right-of-way and indicate proposed treatment of same. All springs will be capped and piped in a minimum six-inch diameter perforated pipe encased in washed gravel and connected into the nearest storm sewer, or natural drain.

n. Indicate location of all streams or drainage ways related to the street construction.

o. Indicate proposed drainage ditches for the full length in all easements. Furnish detailed typical section and type of stabilization to be provided.

p. Indicate proposed stream locations or relocations. Show existing and proposed locations. Furnish detailed typical section and type of stabilization to be provided. Stone or concrete rip rap will be used where stream velocity exceeds six feet per second.
q. Indicate size and type or class of pipe to be installed both in right-of-way and outside right-of-way.
r. Indicate paved ditches and easements at toe of fills, when required by design criteria.
s. Indicate paved roadside ditches when required.
t. Indicate guard post or guard rail where required.
u. Indicate traffic barricades and/or "No Thru Street" signs.
v. Indicate the size of all driveway entrance culvert pipe, i.e., 18 inches or 21 inches according to computed size, for each lot.
w. Indicate protection of ends of curb and gutter by providing for erosion control.
x. Indicate typical paving section designation.
y. Add any notes that may be necessary to explain the intent and purposes of the plan or profile.
z. Minimum easement widths for in-placed pipe or culverts will be determined as follows:

Pipe Size	Easement
18 inches	15 feet
24 to 30 inches	20 feet
36 to 48 inches	25 feet
56 to 72 inches	30 feet

(2) Profiles:

a. Provide pipe profiles.

b. Existing centerline profiles to be shown and identified on all proposed:

1. Streets;
2. Storm sewers;
3. Stream relocations when approved by Georgia EPD;
4. Drainage ditches; and
5. Outfall of storm sewer to existing streams.

c. Omitted of centerline may be required.

d. Stations shown on profile must agree with stations shown on plans.

e. Grade line of proposed street construction must include:

1. Elevations at beginning and end of all vertical curves.
2. Length of vertical curves with elevations and stations of vertical points of intersection.
3. Elevations computed for every 50 feet of tangent sections, and grades computed every 50 feet.
4. Elevations at all centerline intersections of streets, at all street centerline intersections with boundaries of subdivision, at all culverts and storm sewer crossings, and at all curb inlets.

f. When proposed street is an extension of or connecting with an existing street or road, show existing centerline profiles for 200 feet minimum distance to insure proper grade tie.

g. If a difference exists in elevations of proposed curb grades, identify curb elevations at top of right curb, and top of left curb.

h. If a cul-de-sac is to be used as a temporary turnaround at the temporary end of a street the proposed grade and existing profiles shall be carried through to provide for the future extension of the proposed street, i.e., 300 feet beyond the property line.

i. Show the 100-year floodplain. Street construction must not encroach on the floodplain limit of the stream and must be designed to be not less than two feet above the projected 100-year flood high-water elevation.

j. Show proposed culvert or storm sewer crossings and sanitary sewer crossings at the proper location and grade on all street profiles.

k. Storm sewer to be shown in profile with the following required information:

1. Profile of proposed finished grade.
2. Profile of existing ground at centerline of storm sewer.
3. Percent of grade of proposed storm sewer.
4. Size of proposed pipe or structure.
5. Station to be shown every 100 feet and at all appurtenances.
6. Show curb inlets, etc., with proposed elevations for the tops and inverts, or tabulation in plain view may be permitted if all structures are identified. Show all existing stream crossings.

l. Show cross sections, topography and spot elevations. Floor elevation for all residential dwellings shall be at least two feet above the 100-year flood level.

m. Show existing ground at centerline and proposed computed grade of invert on all streams where relocation of channel is proposed.

n. Give datum reference and bench marks for elevations used.

(3) Additional details:

a. Pipe size will be determined using hydrologic methods conforming to the latest version of the Georgia Stormwater Management Manual. Pipe sizes shall be determined by the criteria in the Local Stormwater Design Manual for Macon-Bibb County.

b. A registered design professional’s current stamp will be on all sheets, together with the necessary certificates for same required by Georgia State Board of Professional Engineers and Land Surveyors.

c. The developers' names, addresses, e-mail address, and telephone numbers.

d. Proposed layout including lot lines with dimensions, lot numbers, block letters, proposed street names, right-of-way widths, street widths indicated clearly from either face to face or back to back of curb lines (specify); and easements for sanitary sewer, stormwater drainage or pedestrian access, consistent with the approved plat.

e. Omitted

f. Location of land subject to flooding, indicated by a flood crest contour (100-year floodplain).

g. Location of all sanitary sewer lines and laterals with appurtenances (specify type).

h. Location of tract showing land district and land lot, giving acreage of tract being developed.

i. Any request for deviations from the above regulations or any questions concerning these, or the code or the standards will be addressed to the Macon-Bibb County engineer.

j. All plans shall show the total length of paved roads being dedicated as a public road. This figure, along with other applicable road construction items, will be used in establishing the value of the maintenance bond.

k. Omitted

l. The owner or developer shall obtain approval of street light layout from the Macon-Bibb County facilities management director prior to commencing any construction of any street light facilities.

m. Omitted

(4) The engineer will be given an estimated date by the developer as to when construction is to begin and the anticipated time duration of the contract.

3. Road and Pavement Standards

Minimum Lane Widths

Freeways and Expressways: 12’
Arterial, Collectors, and Local Streets: 11’, unless otherwise approved by the County Engineer.

Road Subgrades and Base Courses

The contractor shall provide soil subgrades under pavements and sidewalks satisfactory to properly support the pavements. In general soils classified as IIB3 or better by GDOT will be suitable for subgrade construction. Unsatisfactory soils may be made satisfactory when mixed with lime, fly ash, cement or similar materials, or reinforced with soil matting products. The developer must demonstrate to the satisfaction of the Engineering Department that such soil augmentation will provide a satisfactory road subgrade.

Unsuitable materials include those that contain large clods, stones greater than 4” in any dimension, debris, vegetation, waste, or chemical contamination. Also, unsuitable soils are those soils that are excessively saturated, resulting in yielding under proof roll loads.

Embankment soil shall be compacted in loose lifts no greater than 8” under road rights of way or 12” outside of the rights of way. Soil under pavements shall be compacted to 95% of the standard Proctor density up to within 2’ if the top of subgrade, with the remaining subgrade compacted to 98% of the maximum dry density. Soil outside of pavements shall be compacted to at least 90% of Standard Proctor Compaction Test (ASTM D698).

Base courses shall be compacted to 100% of the maximum dry density.

Utility Compaction

Follow Macon Water Authority standards for utility compaction. These are summarized as follows:

Backfill and compact to prevent settlement and displacement of the pipe.

A. Material:

Backfill trenches with earth only. Do not use rock excavated from trenches in the backfill. If necessary, furnish suitable earth material to backfill the trench.

B. Backfill:

Place backfill material in the bottom of the trench and up to two feet above the pipe in 6-inch layers. Compact with two hand operated air hammers with tamping feet, one on each side of the pipe, operated simultaneously.

Backfill above, shall be compacted as follows:

(1) In 6-inch layers, if using light power tamping equipment, such as a "jumping jack".
(2) In two foot layers, if using heavy tamping equipment, such as hammer with tamping feet.

C. Backfill Under Roads:
Backfill under roads shall be compacted to 95% up to top 2' below grade and 98% for top of the maximum dry density as determined by the Standard Proctor Compaction Test (ASTM D698).

D. Settlement:

If trenches settle, refill and grade the surface to conform to the adjacent surface.

E. Compaction:

The backfill in all the trenches shall be compacted as stated herein: shall be 100 percent of the maximum dry-density as determined by Standard Proctor Compaction Test (ASTM D698) for the base material under the pavement. The top (24) inches of backfill shall be compacted to a minimum of (98) percent of the maximum dry density. It shall be 95% outside the pavement but within the road right-of-way and 85% outside road right-of way. The testing agency shall run as a minimum (1) Proctor for each type of soil encountered or could use "Family of Curves Method - GHD - 67" as approved and utilized by the Georgia Department of Transportation and the U. S. Army Corps of Engineers.

During the backfilling, loose lifts shall not exceed (8) inches in thickness. Field density determination (compaction tests) should be made a minimum of one (1) test per 200 linear feet per two (2) compacted vertical feet. This is a minimum requirement for all the areas. Additional tests may be required for special conditions such as in streets and other critical areas as desired by the Engineer. The range of moisture contents should be maintained within plus or minus three (3) percent of the optimum moisture content as determined in accordance with GHD - 67.

Road Pavement Structure

Residential roads constructed in the county containing 1-19 dwelling units shall be constructed so as to have a minimum structure of 6” graded aggregate base (GAB) or other approved base course material and 2” asphalt surface course. Where a road will contain 20 dwelling units or collect traffic from 20 dwelling units or more in the ultimate build-out (all phases), the developer shall build a road that has a minimum 6” base and two inch binder course. Then at approximately 16-17 months following road acceptance, the developer will repair all failed pavement areas and resurface the entire development with a minimum 1” asphalt surface course. Where a road will collect traffic from 250 dwelling units in the ultimate build-out of the development (the residential collector), the minimum road structure shall be 8” of GAB and 3” of asphalt and a similar additional 1” surface course at 16-17 months following road acceptance. Where a road will collect traffic from 500 dwelling units or more in the ultimate build-out, the minimum structure will be 10” of GAB and 3.5” of asphalt plus a similar additional 1” of asphalt at 16-17 months. This is based on a subgrade with a California Bearing Ratio value of 6 or greater. Soils identified in the Soil Survey of Bibb County by the Soil Conservation Service, March 1979, that are rated as “Good” in Table 11, Construction Materials, are presumed to meet this standard, unless evidence exists that poor soils are present. Other soils must be tested by an approved commercial testing firm and recommendations made to the County Engineer to augment the soil with an appropriate soil stabilizer, provide suitable off-site fill material, or increase the pavement structure to provide an equivalent pavement.

Commercial roads shall be designed to conform to the Georgia Department of Transportation standards or other approved road standards for a 20 year design life. The designer shall submit his or her design analysis for approval.

Asphaltic concrete and base course material shall conform to that specified by the Georgia Department of Transportation in their standard specification current at the time of construction. This will normally be graded aggregate base (GAB). Soil cement construction and recycled concrete conforming to GDOT standards will be allowed also.

Quality Control

Compaction: Proper compaction of utility trenches and road subgrades and base courses are vital to the long term performance of roads to be dedicated to the county for future maintenance. The developer is responsible to provide compaction test reports from an approved commercial testing laboratory. The reports shall be submitted directly to the County Engineer, as well as to the Macon Water Authority, with a copy to the developer. Compaction tests shall be as follows:

Utility trenches for main sanitary and storm lines under pavements and sidewalks-One test for every 250-300 LF section in a location directed by the inspector. One test will be required for every 2' of fill in the trench.

Water and sewer laterals-One test for every 4 trench-installed laterals, as directed by the inspector. One test will be required for every 2' of fill in the trench. Compaction effort for these utility trenches shall extend 3' feet behind the curb line. This is to prevent poorly compacted soils receiving excessive rainwater resulting in excessive settlement under the pavement and curbing.

Storm or sanitary manholes: Test the fill beside all sanitary and storm manholes in the pavement. One test will be required for every 2' of fill beside the manhole.

Other utilities-One test at every road crossing. One test will be required for every 2' of fill in the trench.

Roadway embankment and subgrade-One test for every 200 LF of roadway section for every 12" of compacted vertical lift and at the finished subgrade. In addition, the contractor shall provide a roll test of the finished subgrade and base course using a heavily loaded tandem truck.

Provide base course and asphalt pavement thickness tests using an approved commercial testing laboratory. In general, base thickness tests should be near the crown of the road at the tire wheel path nearest the centerline, but shall be as directed by the inspector. Take one test per every 200 LF of road centerline. Test locations shall be referenced to the road stationing. Provide the testing lab with copies of the job plans or keep a copy on site for them to reference.

Asphaltic concrete – Provide a GDOT approved mix design prior to asphalt paving. Provide copies of all weight tickets along with a calculation of the square feet of area paved. Provide asphalt concrete testing of in-place asphalt material. Perform a laboratory extraction test to determine the asphalt cement content and the gradation of aggregate. Perform these tests on the asphaltic pavement material removed as a part of the thickness testing at two locations. One

location will be near the start of the project and one near the end of the project, as directed by the inspector.

Test results, including failing test results, shall be forwarded to the County Engineer by the independent commercial testing firm at the same time as to the developer.

The developer is responsible for repairing all test locations.

The County Engineer must be notified of the time of all testing so that a representative can be present during all testing.

Geometric Design Standards

Unless specified otherwise elsewhere, the geometric design standards shall conform to *A Policy on Geometric Design of Highways and Streets, 2011 Edition,* by the American Association of State Highway and Transportation Officials (AASHTO). Where the roads are anticipated to carry average daily traffic volumes of under 400 vehicles per day in the design year, the AASHTO publication, *Guidelines for Geometric Design of Very Low-Volume Local Roads, 2001,* may be used with the approval of the County Engineer.

4. Sanitary Sewer Laterals and Water Service.

Under Macon Water Authority (MWA) policies, the sanitary sewer lateral from the main to the building is privately owned and is the responsibility of the property owner. However, to ensure that construction on the right of way is done to the highest quality standards to minimize future damage to Macon-Bibb County roads, sidewalks, and other utilities, the developer must construct a portion of the sewer lateral to Macon-Bibb County standards. Alll laterals shall be inspected by the Plumbing Inspections Division of the Macon-Bibb Business Development Services. In addition, sanitary sewer mains and water mains, and meter services inside the road right-of-way belong to the MWA. However, compaction requirements must follow these standards at a minimum to ensure proper performance of the road. Other features not covered by these standards are covered by requirements of MWA.

Sanitary Sewer Laterals

Materials: Ductile iron (push-on) laterals 4" and 6" in diameter shall be Class 51 in accordance with ANSI/AWWA C151/A21.51. Ductile iron (push-on) pipe laterals 8" in diameter and larger shall be Class 50 in accordance with ANSI/AWWA C151/A21.51. The interior lining of the pipe shall be a minimum thickness of 40 mils and shall be Protecto 401 ceramic epoxy, coal tar epoxy, polyurethane, Polybond II or Polyline. Both bare pipe and cement linings conforming to AWWA C104 are NOT allowed for any sanitary sewer pipe lateral.

Polyvinyl Chloride (PVC) shall conform to SDR 26 in ASTM D3034, Schedule 40 or approved equal per the International Plumbing Code (latest edition). Fittings shall have appropriate strength conforming to the pipe strength.

All sewer laterals shall have a cleanout(s) provided as per the International Plumbing Code (latest edition).

Bedding material

All ductile iron pipe (DIP) shall have a minimum of Class "C" bedding. When water or wet soil is encountered, Class "B" bedding shall be provided for DIP. PVC pipe bedding shall be as described below.

Class "B" Bedding: Pipe shall be bedded in crushed granite. The material shall be placed on a flat trench bottom with a minimum thickness of 4" and sliced under the haunches of the pipe. Crushed granite shall be placed to a minimum depth of one-half of the pipe outside diameter. The initial backfill shall be hand placed to a level of 12" over the pipe. Fill immediately over the pipe shall be free from debris and large rocks or stones.

Class "C" Bedding: Pipe shall be bedded in crushed granite. The material shall be placed on a flat trench bottom with a minimum thickness of 6" and sliced under the haunches of the pipe. Crushed granite shall be placed to a minimum depth of one-half of the pipe outside diameter. The initial backfill shall be hand placed to a level of 12" over the pipe. Fill immediately over the pipe shall be free from debris and large rocks or stones.

PVC Pipe Bedding: Pipe shall be bedded in crushed granite. The material shall be placed on a flat trench bottom with a minimum thickness of 6" and sliced under the haunches of the pipe. Crushed granite shall be placed to a minimum depth of two-thirds of the pipe outside diameter. The initial backfill shall be hand placed to a level of 12" over the pipe. Fill immediately over the pipe shall be free from debris and large rocks or stones.